SEVENTH FRAMEWORK PROGRAMME

research activities:

Linköping University
SEVENTH FRAMEWORK PROGRAMME

research activities
(2007-2013)

Linköping University
“The European Framework Programme, in line with LiU’s overarching vision, provides an important platform for research and technology, and the creative exchange of ideas, helping – in the face of global demands and challenges – to fortify international networks, collaborative potential and innovative synergies seeking to advance research excellence in bringing about a sustainable future alongside societal well-being.”

Helen Dannetun
Vice-chancellor, Linköping University
The Seventh Framework Programme
2007 - 2013

Cooperation
Ideas
People
Capacities

Euratom
Joint Research Centre

Linköping University
The Seventh Framework Programme: Overview

**THE SEVENTH FRAMEWORK FOR RESEARCH AND TECHNOLOGICAL DEVELOPMENT**, or better known as FP7, served as the EU’s main instrument for funding research, science and innovation in Europe between 2007 and 2013. FP7 was broken down into four main actions directed at supporting and expanding research and the European Research Area through: “cooperation”, “ideas”, “people” and “capacities” (see Figure 1). The following descriptions, provided at the onset of FP7 by the European Commission via CORDIS (Community Research and Development Information Service), briefly outline the programme’s original objectives:

**COOPERATION** (with 10 themes): To gain leadership in key scientific and technological areas by supporting cooperation between universities, industry, research centres and public authorities across the European Union as well as the rest of the world. FP7 will distribute the benefits of research cooperation more widely across the major fields of progress in knowledge and technology where excellent research must be strengthened to address European social, economic, public health, environmental and industrial challenges. The Specific Programme ‘Cooperation’ will be open to the participation of countries who have entered a research cooperation agreement with the European Union and open to the participation of entities from third countries and of international organisations for scientific cooperation. Ten themes serve as research actions under Cooperation: 1) Health; 2) Food, Agriculture and Biotechnology; 3) Information and Communication Technologies; 4) Nanosciences, Nanotechnologies, Materials and new Production Technologies; 5) Energy; 6) Environment (including Climate Change); 7) Transport (including Aeronautics); 8) Socioeconomic Sciences and Humanities; 9) Space; 10) Security.

![Figure 1: FP7 breakdown by sub-programme actions and indicative budget.](image-url)
**IDEAS** (ERC): To reinforce the dynamism, creativity and excellence of European research at the frontier of knowledge and to improve the attractiveness of Europe for the best researchers from European and third countries, as well as for industrial research investment. The Specific Programme ‘Ideas’ shall be investigator-driven and aims to support activities in ‘frontier research’, carried out by individual teams competing at European level, within and across all fields of research. Projects will be funded on the basis of proposals presented by researchers both from the private and public sectors on subjects of their choice and evaluated on the sole criterion of excellence, as judged by peer review. For its implementation, a ‘European Research Council’, consisting of an independent ‘Scientific Council’, and a lean and cost-effective dedicated implementation structure will be created by the European Council.

**PEOPLE** (Mobility via Marie Skłodowska-Curie Actions): Strengthening, quantitatively and qualitatively, the human potential in R&D in Europe, by: stimulating people to enter into the researcher’s profession; encouraging European researchers to stay in Europe; attracting researchers from the entire world to Europe; making Europe more attractive to the best researchers. Increasing participation of women researchers, by: encouraging equal opportunities; ensuring achievement of an appropriate work/life balance; facilitating the resumption of a research career after a break. A coherent set of ‘Marie Curie actions’ will address researchers, from initial training to life-long learning and career development in the public and private sectors.

**CAPACITIES:** To enhance research and innovation capacities throughout Europe and unlock the full research potential of European regions, especially convergence regions. Synergies and complementarities will be sought with other community policies and programmes, such as the Community’s regional and cohesion policy, the Structural Funds, the Competitiveness and Innovation Framework Programme (CIP) and relevant education and training programmes. Building on the European Strategy Forum on Research Infrastructure (ESFRI), the Specific Programme ‘Capacities’ will support the construction of new research infrastructures in a two-stage approach involving a preparatory phase and a construction phase. Increased support will be available for the benefit of SMEs. Within the Specific Programme, the ‘Regions of Knowledge’ initiative aims at creating networks of regions to help them make full use of their research strengths, enable them to absorb new knowledge arising from research and to facilitate the emergence of ‘research-driven clusters’ associating universities, research centres, enterprises and regional authorities. The ‘Science in Society’ initiative will strengthen the European science system, broaden the engagement of researchers and the public at large, in addition to supporting reflection and debate on science and technology and their place in society.

**EURATOM & JOINT RESEARCH CENTRE:** The Euratom programme includes energy and nuclear research and training in fusion and fission, while the JRC is the European Commission’s in-house science service providing advice and technical support surrounding EU policy. Despite being part of FP7, and with respective budgets of ~2.7 & ~1.7b €, these activities are outside the scope or intent of this compendium, and not further considered herein.
This Compendium describes many of Linköping University’s contributions, in participation and performance, to the EU’s Seventh Framework Programme, highlighting research activities and academic excellence in thematic actions involving cooperation, ideas, people and capacities. The overall magnitude of FP7 participation is notably impressive. Over the seven years, 487 calls received 135,716 proposals involving over 601,000 applicant organisations and individuals of which, more than 25,000 proposals involving 130,000 participants were retained for negotiation – with reported average success rates for proposals and applicants being 19% and 22%, respectively. Aggregate project costs of retained proposals equaled €62.9 billion with a financial requested contribution of nearly €42 billion (DG Research and Innovation Monitoring Report, European Commission, 2015). Although 9th in rank regarding the number of applicants, in terms of signed grant agreements, Sweden ranked 8th in participation and budget share – with the number of grant holders being 4,506 (or 3.8%) relative to 117,639 for the EU-28. As of December 2014, forty-eight percent or 7,280 FP7 research projects were reported as completed – filing more than 1,500 patent applications and contributing over 40,000 publications of which nearly half were reportedly published in High Impact Peer Reviewed Journals (based on final processed reports; Seventh FP7 Monitoring Report, 2013).

Linköping University participated in over 120 projects during FP7, both as coordinator and partner, and with the inclusion of sole participations, at a rate of about 19 to 81%, respectively (N=112). Over 500 applications were actively registered as submitted from LiU, exhibiting a somewhat sporadic yet gradual increase in the rate of interest during the framework’s duration; a trend anecdotally reflecting overall submission rates (see Figure 2 below). The EU contribution received for projects at LiU increased from ~3.6M € in 2007 to that of ~7.0M € in 2010, remaining stable in terms of the amount generated until the close of FP7 in 2013. Table 1 lists the general share of EU projects by institution at LiU.

Figure 2: Application rate at LiU during FP7; by year with over 570 registered submissions during the framework’s timeline (Grants Office Database).
Table 1: FP7 projects at LiU by institution (Grants Office Database).

<table>
<thead>
<tr>
<th>Institute of Technology (Departments)</th>
<th>Projects</th>
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<tr>
<td></td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>64</td>
</tr>
<tr>
<td>Physics, Chemistry and Biology</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>24</td>
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<tr>
<td>Computer and Information Science</td>
<td>13</td>
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<tr>
<td></td>
<td>10</td>
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<tr>
<td>Science and Technology</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td>National Supercomputer Centre, Linköping</td>
<td>8</td>
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<tr>
<td></td>
<td>6</td>
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<tr>
<td>Mathematics</td>
<td>2</td>
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<tr>
<td>Faculty of Health Sciences (Departments)</td>
<td>26</td>
</tr>
<tr>
<td>Clinical and Experimental Medicine</td>
<td>12</td>
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<td></td>
<td>10</td>
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<td>Medical and Health Sciences</td>
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<tr>
<td>Biomedical Engineering</td>
<td>4</td>
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<tr>
<td></td>
<td>3</td>
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<tr>
<td>Social and Welfare studies</td>
<td>2</td>
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<td>2</td>
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<tr>
<td>Faculty of Arts &amp; Sciences (Departments)</td>
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<tr>
<td>Thematic Studies</td>
<td>7</td>
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<tr>
<td></td>
<td>6</td>
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<tr>
<td>Behavioural Sciences and Learning</td>
<td>4</td>
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<tr>
<td></td>
<td>3</td>
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<tr>
<td>Management and Engineering</td>
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<tr>
<td></td>
<td>3</td>
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<tr>
<td>Culture and Communication</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Studies of Social Change and Culture</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Projects</strong></td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>100%</td>
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Based solely on the projects within this compendium, Figure 3 depicts the proportion of applicants in relation to participant type regarding consortia composition, and also provides a breakdown of primary partner organisations (a and b, respectively). Thirty-three percent of project consortia showed some form of industry participation, a comparable rate to that for Sweden as a whole (~31%) but generally higher than that shown for FP7 consortia overall (~20%).

![Figure 3: Overview of national partnership (constellations) by actor/institution type. Based solely on the projects within this compendium N=86; excludes individually awarded projects such as ERC and some Marie Curie projects.](image-url)
Over 50% of all FP7 projects at LiU received funding under the Programme Cooperation; highlighting its preponderance at the core of Framework Seven and with two-thirds the budget. The majority of projects at LiU were in ICT (Information & Communication Technologies), Health, Nanosciences, and Transport (at approximately 41, 21, 10, 10%, respectively; see overall breakdown of LiU projects by action in Table 2, below). ICT stands out as an area of particular strength for LiU especially when considered in relative proportion to its overall rate of participation in Sweden (i.e., 41 vs. 24%).

In terms of the prestigious, investigator-driven, frontier-research awards or European Research Council’s programme ‘Ideas’, LiU was home to a total of 10 grants with outstanding researchers being awarded 7 Starting Grants and 3 Advanced Grants (six calls each over a seven year period regarding Starting and Advanced Grant categories). Two additional applicants from LiU were ranked as highly competitive but, due to unexpected shortfalls in available budgets, were funded post-hoc nationally under the rubric of “ERC grants” by VR, the Swedish Research Council; see footnote under Table 2, where VR funded ERC projects are not included). LiU took part in a wide array of Marie Curie actions, especially with reference to Initial Training Networks and under the Staff Exchange Scheme. Under the pro-

<table>
<thead>
<tr>
<th>Programme (FP7 subset)</th>
<th>Subset (acronym)</th>
<th>Breakdown Description (referring to projects at LiU)</th>
<th>Projects</th>
<th>LiU %</th>
<th>Swedish %</th>
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<tr>
<td>COOPERATION TOTAL</td>
<td>COOPERATION (THEMES)</td>
<td>(programme totals are between %; others are within %)</td>
<td>68</td>
<td>54.4</td>
<td>70.0</td>
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<td>1 HEALTH</td>
<td>Health Research</td>
<td>14(1)</td>
<td>20.6</td>
<td>18.1</td>
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<tr>
<td>2 KBBE</td>
<td>Food, Agriculture &amp; Fisheries, and Biotechnology</td>
<td>0</td>
<td>0.0</td>
<td>7.1</td>
<td></td>
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<tr>
<td>3 ICT</td>
<td>Information &amp; Communication Technologies</td>
<td>28</td>
<td>41.2</td>
<td>24.3</td>
<td></td>
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<tr>
<td>4 NMP</td>
<td>Nano-sciences, Materials &amp; New Production Technologies</td>
<td>7</td>
<td>10.3</td>
<td>13.3</td>
<td></td>
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<tr>
<td>5 ENERGY</td>
<td>Energy Research</td>
<td>2</td>
<td>2.9</td>
<td>5.1</td>
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<tr>
<td>6 ENV</td>
<td>Environment Research (including Climate Change)</td>
<td>2</td>
<td>2.9</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>7 TPT</td>
<td>Transport Research (including Aeronautics)</td>
<td>7</td>
<td>10.3</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>8 SSH</td>
<td>Socio-economic Sciences &amp; Humanities Research</td>
<td>1</td>
<td>1.5</td>
<td>2.7</td>
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<tr>
<td>9 SPA</td>
<td>Space Research</td>
<td>2</td>
<td>2.9</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>10 SEC</td>
<td>Security Research</td>
<td>5</td>
<td>7.4</td>
<td>5.6</td>
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<td>IDEAS TOTAL</td>
<td>EUROPEAN RESEARCH COUNCIL (6 yrs. each/category)</td>
<td>10(3)</td>
<td>8.0</td>
<td>4.1</td>
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<tr>
<td>1 STARTING</td>
<td>Starters &amp; Consolidators (~2-12 yrs post-PhD)</td>
<td>7(+2)</td>
<td>9(11)</td>
<td>3.5</td>
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<td>2 ADVANCED</td>
<td>Established researchers</td>
<td>3(+1)</td>
<td>5(6)</td>
<td>3.8</td>
<td></td>
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<td>PEOPLE TOTAL</td>
<td>MARIE CURIE ACTIONS</td>
<td>(selected subcategories)</td>
<td>32</td>
<td>25.6</td>
<td>13.0</td>
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<td>1 CIG</td>
<td>Marie Curie Career Integration Grant</td>
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<td>6.2</td>
<td>9.7</td>
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<td>2 IAPP</td>
<td>Marie Curie Industry-Academia Partnerships &amp; Pathways</td>
<td>3</td>
<td>9.4</td>
<td>8.8</td>
<td></td>
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<td>3 ITN</td>
<td>Initial Training Networks</td>
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<td>28.1</td>
<td>43.8</td>
<td></td>
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<tr>
<td>4 IIF</td>
<td>International Incoming Fellowships</td>
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<td>12.5</td>
<td>5.9</td>
<td></td>
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<tr>
<td>5 IOF</td>
<td>International Outgoing Fellowships</td>
<td>3</td>
<td>9.4</td>
<td>3.5</td>
<td></td>
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<td>6 IRSES</td>
<td>Research Staff Exchange Scheme</td>
<td>7</td>
<td>21.9</td>
<td>9.2</td>
<td></td>
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<tr>
<td>7 IEF</td>
<td>Intra-European Fellowship for Career Development</td>
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<td>12.5</td>
<td>19.1</td>
<td></td>
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<tr>
<td>CAPACITIES TOTAL</td>
<td>CAPACITIES (selected subcategories)</td>
<td>15</td>
<td>12.0</td>
<td>12.9</td>
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<tr>
<td>1 SIS</td>
<td>Science in Society</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2 RI</td>
<td>Research Infrastructures</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3 SME</td>
<td>Research for the Benefit of SMEs</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
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</table>

Table 2: Breakdown of FP7 projects at LiU (with a focus on compendium content relative to national awards). Parenthetically listed projects and not included in the overall count: 1) Cooperation/Health project funded under IMI, Innovative Medicine Initiative, a public-private partnership, 2) Two ERC Starting Grant applicants i.e., Nathaniel D. Robinson and David Bastviken, were shortlisted and ranked as highly competitive but due to the lack of EC funds received post-hoc support under the guise of ERC grants via the Swedish Research Council. 3) One Advanced Grant, awarded to Peter Hedström in 2012, was transferred to LiU in 2014. (Source: Grants Office Database and Vinnova Analysis, VA_2015:01, Published March 2015: ISBN: 978-9187534-24-0).
gramme ‘Capacities’, and despite the lack of essential details for post-hoc comparison, LiU was recognized and nationally noted as outstandingly active under the auspices of Science in Society (pers. comm. M. Hagardt, NCP for SiS at the Swedish Innovation Agency, Vinnova). Efforts surrounding ‘Research Infrastructures’ were well represented, for example, by the National Supercomputer Centre, located at LiU and as part of the Swedish National Infrastructure for Computing, which took part in numerous large-scale or Pan-European initiatives aimed at integrated computing for the purpose of enhanced/enabled grids and advanced informatics. Uniquely noteworthy is LiU’s involvement in a project entitled “Graphene-based revolutions in ICT and beyond” under the “Future of Emerging Technologies” Scheme (FET). Through an extensive and highly competitive selection process, and under a novel FP scheme focusing on frontier, large-scale initiatives, the Project “Graphene”, led by Chalmers and with over 70 partners, was deemed visionary and ambitious, and selected as one of only two “Flagship Initiatives”, from an original playing field of six pilot projects, to receive up to €100m in support over a ten-year period.

Part of the Framework’s mission, in consonance with seeking European cohesion, sustainable growth and socio-economic well-being under the European Research Area (ERA), is to promote and enhance cooperation. For FP7 by country, the top five collaborative links (in number) associated with successful Swedish consortia were: Germany (9,141), the United Kingdom (7,246), France (5,985) Italy (5,078) and Spain (4,544). LiU’s top European and Nordic consortium partners are listed in Table 3 (data gleaned from CORDIS, see caption below). From a longer perspective, i.e., within the timeframe of 2000 to 2014 where more complete data are available, LiU has taken part in a minimum of 179 EU Framework projects involving an impressive network of 2,168 partnerships.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Top European Partners</th>
<th>Country</th>
<th>n</th>
<th>Top Nordic Partners</th>
<th>Country</th>
<th>n</th>
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<tr>
<td>1</td>
<td>Centre National de la Recherche Scientifique</td>
<td>FR</td>
<td>30</td>
<td>Kungliga Tekniska Högskola</td>
<td>SE</td>
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<tr>
<td>2</td>
<td>Fraunhofer Gesellschaft Forschung</td>
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<td>Chalmers Tekniska Högskola AB</td>
<td>SE</td>
<td>11</td>
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<tr>
<td>3</td>
<td>Consiglio Nazionale delle Ricerche</td>
<td>IT</td>
<td>14</td>
<td>Uppsala Universitet</td>
<td>SE</td>
<td>11</td>
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<td>4</td>
<td>Commissariat a L’energie Atomique</td>
<td>FR</td>
<td>12</td>
<td>Karolinska Institutet</td>
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<tr>
<td>5</td>
<td>Eidgenoessische Technische Hochschule Zuerich</td>
<td>CH</td>
<td>12</td>
<td>University of Oslo</td>
<td>NO</td>
<td>9</td>
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<tr>
<td>6</td>
<td>Chancellor, Masters &amp; Scholars; Univ. of Cambridge</td>
<td>UK</td>
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<td>Lunds Universitet</td>
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<td>Institut National de Recherche en Informatique</td>
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<td>Umeå Universitet</td>
<td>SE</td>
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<td>8</td>
<td>Katholieke Universiteit Leuven</td>
<td>BE</td>
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<td>University of Helsinki</td>
<td>FI</td>
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<td>9</td>
<td>University College London</td>
<td>UK</td>
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<td>Acreo AB</td>
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<td>10</td>
<td>Airbus France SAS</td>
<td>FR</td>
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<td>Norwegian Univ. of Science &amp; Technology</td>
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<tr>
<td>11</td>
<td>Foundation for Research &amp; Technology - Hellas</td>
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<td>Technical Research Centre of Finland</td>
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<td>16</td>
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<td>8</td>
<td>Swedish Meteorology &amp; Hydrological Inst.</td>
<td>SE</td>
<td>3</td>
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<td>20</td>
<td>Consejo Superior de Investigaciones Científicas</td>
<td>ES</td>
<td>7</td>
<td>Total Partnerships 2168 (179 Projects)*</td>
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*Table 3: LiU’s top European and Nordic Framework Programme partners (total participant/partner numbers compiled as those most frequent and from between 2000-2014: EU Commission as per CORDIS http://cordis.europa.eu).
In terms of overall FP7 funding, LiU positioned itself well as 7th in the nation receiving just over €52 million (Table 4). Östergötland, with a Swedish EC contribution of €92.3 million, was ranked as the 5th most active county (län) in Sweden with just over 5% of all participations and ~5.4% of the national EC contribution, preceded only by Stockholm, Västra Götaland, Skåne and Uppsala Counties; counties/regions that are larger more historically developed, as well as having more diverse or complex R&D/HEI ecosystems (Östergötland as region 123 based on NUTS, nomenclature of units for territorial statistics). Linköping University, as the sole/primary university (HEI) in the region, accounted for the majority of FP activity in terms of participations (53%) and coordinated projects (70%), bringing in a total of 57.3% of the overall EC contribution of €90 million, followed by SMHI, SAAB, VTI and SGI (i.e., the Swedish Meteorological and Hydrological Institute, SAAB industries, Swedish National Road and Transport Research Institute and the Swedish Geotechnical Institute, respectively; Vinnova Analysis, VA 2015:01).

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution</th>
<th>Granted Funding (€)</th>
<th>Partnerships (N)</th>
<th>Coordination (N)</th>
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Note: This compendium’s intention is mainly for informational purposes in providing a general overview of FP7 projects at LiU. Not all EU projects are listed (e.g., Euratom and JRC projects, and/or joint programming or peripheral initiatives e.g., COST actions, ERASMUS) and further, with the caveat that during the Framework’s duration, some projects were transferred both to and from LiU. We kindly acknowledge the EU’s Community Research and Development Services Office, CORDIS, and, both in project support and potential, the European Commission.
Horizon 2020: Future Potential

Seeking to enhance stakeholder interest and involvement, and with a particular emphasis placed on advancing small and medium sized enterprise participation, the current framework programme has been deliberately “entitled” Horizon 2020. Breaking from past framework programmes that often focused on thematic research areas, Horizon 2020 aims its attention towards grand societal challenges. Extending from 2014 to 2020, it stands as the world’s largest research and innovation programme with an indicative budget of over €70 billion (see Horizon 2020 Figure below for a schematic breakdown). Project funding is emphatically structured under three pillars with a focus on excellent research (€24.4b, 31.7%), industrial leadership (€17b, 22.0%) and societal challenges (€29.4b, 38.5%), with horizontal elements involving “science with and for society” and “spreading excellence and widening participation”, further including the European Institute of Innovation and Technology (EIT) with a focus on competitiveness and knowledge communities, the Joint Research Centre (JRC), which is the EU’s in-house science service providing independent scientific advice and support for EU policy, and Euratom, a complementary research programme for nuclear research and training.

In light of the outstanding contributions made herein, and on behalf of LiU and LiU’s Grants Office, we hope this compendium provides insights in research excellence and a sense of inspiration - leading to future interest and synergies in European research cooperation and innovative potential. Please feel free to contact us with any questions or for more information regarding participation (grantsoffice@liu.se).

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**EU Framework Programme for Research & Innovation**

**HORIZON 2020**

**EXCELLENT SCIENCE** (24.4B€)
- European Research Council (13.1B€)
- Future & Emerging Technologies (2.7B€)
- Marie Skłodowska-Curie Actions (6.1B€)
- Research Infrastructures (2.5B€)

**INDUSTRIAL LEADERSHIP** (17.0B€)
- LEIT Leadership in Enabling Technologies
  - ICT (1.9B€)
  - Nano/Materials (2.5B€)
  - Biotechnology (3.7B€)
- Access to Risk Finance (2.9B€)
- Innovation in SMEs (0.6B€)

**SOCIETAL CHALLENGES** (29.7B€)
- Health (7.5B€)
- Food (3.9B€)
- Energy (6.0B€)
- Transport (6.3B€)
- Climate (3.0B€)
- Inclusive Societies (1.3B€)
- Security (1.7B€)

**SPREADING EXCELLENCE** (0.8B€)
- EIT (2.7B€)
- JRC (1.9B€)
- EURATOM (1.6B€)

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- EIT (2.7B€)
- JRC (1.9B€)
- EURATOM (1.6B€)
THE SPECIFIC PROGRAMME ‘Cooperation’ for Community action in the area of research and technological development, including demonstration activities, will support trans-national cooperation in different forms across the European Union and beyond, in thematic areas corresponding to major fields of knowledge and technology. The bulk of this effort will be directed towards improving industrial competitiveness, with a research agenda that addresses European social, economic, environmental and industrial challenges. While ensuring a strong element of continuity with previous programmes, the Specific Programme ‘Cooperation’ aims to facilitate European research cooperation by means of collaborative research in the major fields of advancement of knowledge through projects and networks able to attract researchers and investments from Europe and the entire world and will include: Joint Technology Initiatives intended to facilitate ambitious pan-European public-private partnerships; strengthening the coordination of national and regional research activities and continuing the ERA-NET scheme; improved coordination of non-Community research programmes through the participation of the Community in jointly implemented national research programmes (Treaty Article 169) to enhance the complementarity and synergies of research programmes across Europe; a more targeted approach to international cooperation within each theme and across themes, a more open and flexible means to respond to »emerging needs« and »unforeseen policy needs«; pluridisciplinarity encouraged by joint cross-thematic approaches to priority research and technology areas, dissemination and transfer of knowledge actions and measures to increase participation as well as the use and impact of research results by industry, policy makers and society. The ten themes determined for research actions are the following:

1) Health
2) Food, Agriculture and Biotechnology
3) Information and Communication Technologies
4) Nano-sciences/technologies, Materials & new Production Technologies
5) Energy
6) Environment (including Climate Change)
7) Transport (including Aeronautics)
8) Socio-economic Sciences and Humanities
9) Space
10) Security
AF3
ADVANCED FOREST FIRE FIGHTING

IN RECENT years, the frequency of large-scale forest fires has increased significantly owing to a number of factors including the effects of climate change, urbanisation, poor landscape management and malevolent acts. These so-called “Mega-fires” are particularly destructive and difficult to control with the technologies and systems currently available to fire fighters and emergency agencies. The AF3 project intends to provide an extraordinary improvement to the efficiency of current fire-fighting operations and to the protection of human lives, the environment and property by developing innovative technologies and means to ensure a high level of integration between existing and new systems.

To reach this objective, AF3 project focuses on the following areas:

• **Innovative active countermeasure**: implementation of the novel AAFF (Advanced Aerial Fire Fighting) system to accurately and safely disperse extinguishing materials from high altitude by aircrafts and helicopters in any condition: day and night, regardless of weather, smoke and configuration of terrain. It will enable a quick 24H response, minimizing fire duration and damages. The AAFF system can be adapted to a wide variety of aircrafts or helicopters.

• **Innovative passive countermeasures**: fast build-up of preventive defensive lines of capsules to prevent the spreading of fire from forest to populated areas

• **Early detection and monitoring**: integration and deployment of diverse systems including satellites, aeroplanes, UAVs, and both mobile and stationary ground systems for the early detection of fire and for monitoring the propagation of smoke and toxic clouds.

• **Integrated crisis management**: the innovative A AF3 Core Expert Engine will perform overall coordination of all fire fighting missions.

The results of AF3 will be validated by intermediate tests during the project, and by a final demonstration with flight tests and drilling exercises carried out simultaneously in Spain, Italy, Greece and Israel.

SENIOR LECTURER

SOFIE PILEMALM

The Department of Management and Engineering
HEARING LOSS is one of the most common chronic health conditions in the elderly population with important implications for patient quality of life. The diminished ability to hear and to communicate is frustrating in and of itself, but the strong association of hearing loss with depression and functional decline adds further to the burden on individuals who are hearing impaired. Hearing loss can limit communications skills: not to hear means not to understand what is being said. Hence deafness does not produce compassion but do often produce a sense of irritation. Despite the prevalence and burden of hearing loss, hearing impairment is largely underdiagnosed in older persons and undertreated. The reason for this is that one of the most conspicuous signs of a hearing loss is that it cannot be seen! Actually, this is the reason why deafness does not receive the necessary attention. Too often, the public and still too many health care professionals underestimate the dramatic effects of deafness. Novel strategies should be explored to make screening and early intervention a feasible part of routine care. Project AHEAD III has been specifically designed to: - Provide evidence of the effects of hearing impairment in adults and particularly in the elderly - Analyse costs associated with the implementation of integrated large scale programmes of hearing screening and intervention in the elderly - Provide quality standards and minimum requirements for screening methods and related diagnostic techniques - Develop guidelines and recommendations on how to implement successful screening programmes to be tuned to the local, social, and economical conditions of a country.

ASSOCIATE PROFESSOR STEFAN STENFELT
The Department of Physics, Chemistry and Biology
ARTISTDESIGN
ARTISTDESIGN - DESIGN FOR EMBEDDED SYSTEMS

THE ARTISTDESIGN NoE is the visible result of the ongoing integration of a community, that emerged through the Artist FP5 Accompanying Measure and that was organised through the Artist2 FP6 NoE. The central objective for ArtistDesign is to build on existing structures and links forged in Artist2, to become a virtual Center of Excellence in Embedded Systems Design. This will be mainly achieved through tight integration between the central players of the European research community. Also, the consortium is smaller, and integrates several new partners. These teams have already established a long-term vision for embedded systems in Europe, which advances the emergence of Embedded Systems as a mature discipline.

ArtistDesign will become the main focal point for dissemination in Embedded Systems Design, leveraging on well-established infrastructure and links, such as a web portal and newsletter. It will extend its dissemination activities, including Education and Training, Industrial Applications, as well as International Collaboration. ArtistDesign will establish durable relationships with industry and SMEs in the area, especially through ARTEMISIA/ARTEMIS. ArtistDesign will build on existing international visibility and recognition, to play a leading role in structuring the area.

The research effort aims to integrate topics, teams, and competencies, grouped into 4 Thematic Clusters: “Modelling and Validation”, “Software Synthesis, Code Generation, and Timing Analysis”, “Operating Systems and Networks”, “Platforms and MPSoC”. “Transversal Integration” covering both industrial applications and design issues aims for integration between clusters.

ArtistDesign has defined a four-year work programme, with a strong commitment to integration and sustainability. To achieve the aims, the estimated support from the EC is approximately 4.5 MEuros. This support is a very small proportion of the overall investment by the core partners.
ELECTRONIC TRANSDUCTION can open new perspectives for point-of-care diagnosis and treatment monitoring. In this respect, label free, organic field-effect transistor (OFET) sensors have recently raised the interest of the organic-electronic community. The EGOFET biosensor aims at an electronic transduction of a bio-recognition event, eventually leading to an amplified response. The sensor combines the specificity of a defined bio-probe with the label-free and high sensitivity of the field-effect transduction principle.

The recognition will be achieved through antigens, antibodies or membrane proteins placed on top of the organic semiconductor, right where the electrical transport occurs in this dielectrics/oxide-free structure. Supramolecular architectures will be used to immobilize the bio-probes into polymeric or phospholipid layers to maximise recognition capabilities and minimize non-specific binding and fouling. High sensitivity will be achieved by exploiting conformational changes and/or charge generation effects occurring upon the recognition process.

To attain low-operating voltage and low-power consumption, the OFET will take advantage of the high capacitance offered by the electrolytic or protonic medium used to carry the analyte up to the semi-conductor surface. Implementation of the devices on paper and plastic substrates will be realized by low-cost printing-compatible technologies. The sensors figures of merit will be assessed by exploiting the highly specific biotin/avidin affinity reaction. A proof-of-principle for a point-of-care relevant application, using the immunoassay approach, will be pursued afterwards.
IN 2011, THE White Paper on European Transport reasserted how fundamental transport was for society, for the mobility of European citizens and for the growth and vitality of the European economy. CAPACITY4RAIL will deliver research that is innovative, prepares rail for the future and takes into account results from previous research projects and programmes. The project builds on previous useable results and will deliver both technical demonstrations and system wide guidelines and recommendations that will be the basis for future research and investment, increasing the capacities of rail networks in the future. The time used for infrastructure monitoring, maintenance and renewal means ‘down time’. New concepts for low maintenance infrastructure, using standardized and “plug-and-play” concepts will be proposed. Non-intrusive innovative monitoring techniques or self-monitoring infrastructure will be investigated, allowing low or no impact on train operations. The fragility of some key component of the infrastructure system (especially in extreme weather conditions) such as switches may impact the efficiency of the whole system. The resilience of switches to any kind of known failure will be reinforced, as well as the ability of the operation system to recover from incidents. Capacity enhancements will also be achieved by higher speed freight vehicles, allowing an optimized interleaving of freight trains into mixed traffic, and improved planning models for operation. Intermodal integration within the global transport system will be improved through enhanced transhipment of passengers and freight. CAPACITY4RAIL will also look towards 2030/2050, by proposing guidelines for future deployments in the mid-term, recommendations for technologies to be developed and deployed in the long term and investigating the key opportunities for funding these within national and EU funding schemes.
THE AIM OF CASYM is a combined large scale effort to sustainably implement Systems Medicine across Europe. For that purpose CASyM will function as a managing and coordinating platform in bringing together a critical mass of relevant European stakeholders such as Systems Biology scientists, clinicians, programme managers, industry/SMEs as well as healthcare providers and patient organizations. The goal of that initial nucleus of experts is the development of a strategy to implement the Systems Biology approach into medical practice and research within the 4 years duration of CASyM. For this purpose it is essential that the involved communities build a vision and coordinated strategy. Our joint effort gathers extensive experience in the coordination and realization of such a new, large-scale European effort, thereby providing the basis for an advanced future medicine.

The output of CASyM will be a conceptual framework defining the remits, milestones, mechanisms and metrics for the implementation of Systems Medicine. The development of this framework will overcome competitive barriers and proceed to produce a European roadmap for Systems Medicine as concerted project result.
CLIPC
CLIMATE INFORMATION PLATFORM FOR COPERNICUS

**CLIPC WILL PROVIDE** access to climate information of direct relevance to a wide variety of users, from scientists to policy makers and private sector decision makers. Information will include data from satellite and in-situ observations, climate models and re-analyses, transformed data products to enable impacts assessments and climate change impact indicators.

The platform will complement existing Copernicus pre-operational components, but will focus on datasets which provide information on climate variability on decadal to centennial time scales from observed and projected climate change impacts in Europe, and will provide a toolbox to generate, compare and rank key indicators. Expanding climate data volumes will be supported with a distributed, scalable system, based on international standards. Guidance information on the quality and limitations of all data products will be provided. An on-going user consultation process will feed back into all the products developed within the project. The “one-stop-shop” platform will allow users to find answers to their questions related to climate and climate impacts data, and to ensure that the providence of science and policy relevant data products is thoroughly documented. Clarity of provenance will be supported by providing access to intermediate data products. Documentation will include information on the technical quality of data, on metrics related to scientific quality, and on uncertainties in and limitations of the data. A climate impacts toolkit will provide documentation on methods and data sources used to generate climate impact indicators. The toolkit will be made available for integration with Climate-ADAPT. The CLIPC consortium brings together the key institutions in Europe working on developing and making available datasets on climate observations and modelling, and on impact analysis.

**EXPERT TORGNY FAXÉN**
National Supercomputer Centre in Linköping

<table>
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<th>PARTNERS</th>
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<td>2. The University of Reading, United Kingdom</td>
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**STARTING DATE**

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CRESCENDO
COLLABORATIVE & ROBUST ENGINEERING USING SIMULATION CAPABILITY ENABLING NEXT DESIGN OPTIMISATION

THE IMG4 PROJECT CRESCENDO addresses the Vision 2020 objectives for the aeronautical industry by contributing significantly to the fulfilment of three specific targets of the aeronautical industry’s Strategic Research Agenda. CRESCENDO will develop the foundations for the Behavioural Digital Aircraft (BDA), taking experience and results from VIVACE, and integrating these into a federative system and building the BDA on top of them. Main components of the BDA are: the Model Store, the Simulation Factory, the Quality Laboratory, and the Enterprise Collaboration Capabilities. It will be validated through use cases and test cases concerning Power Plant Integration, Energy Aircraft, Thermal Aircraft and Value Generation design problems and viewpoints during the preliminary design, detailed design, and test certification phases of a generic aircraft product life-cycle. The BDA will become the new backbone for the simulation world, just as the Digital Mock-up (DMU) is today for the Product Life-cycle Management (PLM) world. This is considered a challenging area for research and innovation for the next decade. Hence, the CRESCENDO results will provide the aeronautics supply chain with the means to realistically manage and mature the virtual product in the extended/virtual enterprise with all of the requested functionality and components in each phase of the product engineering life cycle. CRESCENDO will make its approach available to the aeronautics supply chain via existing networks, information dissemination, training and technology transfer actions. The project will last three years and be organised into six subprojects: four technical and business-oriented subprojects, one Enabling Capabilities subproject which will deliver the BDA and a sixth subproject, responsible for consortium management and innovation issues. CRESCENDO will bring together 59 partners from industry, research institutes, universities and technology providers.

PROFESSOR PETTER KRUS
The Department of Management and Engineering
The Department of Physics, Chemistry and Biology

The concept of this project is to unlock the potential of epitaxial graphene on silicon carbide (SiC) for development of scalable electronics with the view to develop graphene-based devices & circuits with a non-conventional functionality. Our strategy is to explore two promising directions of graphene-based technology: the development of large-scale graphene wafers for manufacturing high-density of devices on a single SiC wafer, and the development of hybrid circuits for applications of graphene in spintronics and metrology by exploiting the flexibility for design offered by the large area of graphene on SiC.

The consortium of bidders brings together groups with complementary expertise and substantial achievements in the relevant area of graphene research and nanotechnology in general. The objectives are to:

1. Reliably produce large-area graphene with a controlled carrier density and improved transport characteristics.
2. Pattern graphene for applications using industrial nanostructuring and nanofabrication methods, aiming at high integration densities with a good yield of working devices.
3. Produce a prototype for a graphene-based Quantum Hall Resistance standard with characteristics surpassing existing silicon- and GaAs-based devices.
4. Develop a pilot version of spintronic devices of epitaxial graphene.
5. Start exploiting the commercial potential of graphene by establishing a start-up company that will produce graphene wafers for users outside this consortium.

These objectives relate directly to major parts of the call, namely, the need for new circuit architectures, metrology and characterization techniques; new device structures for non-Si and Si based advanced integrated components to add functionality to circuits and (sub)systems; and new technologies and functional devices beyond CMOS.

COOPERATION

PARTNERS
1. Chalmers Tekniska Högskola AB, Sweden (coordinator)
2. Friedrich-Alexander Universität Erlangen Nürnberg, Germany
3. NPL Management Limited, United Kingdom
4. Rijksuniversiteit Groningen, The Netherlands
5. Lancaster University, United Kingdom
6. Linköpings universitet, Sweden
7. Commissariat a l Energie Atomique et aux Energies Alternatives, France

NEW ELECTRONICS CONCEPT: WAFER-SCALE EPITAXIAL GRAPHENE

PROFESSOR ROSITSA YAKIMOVA
The Department of Physics, Chemistry and Biology
CRISIS IS a 36 month project to research and develop an advanced critical incident management, interactive simulation environment for training security and emergency personnel in airport operational security. The prototype to be delivered will be distributed, scalable, collaborative interactive simulation environment that will enable training of crisis managers and their staff at airports, at different levels of the organization. The prototype system will avoid the simulation paradigm where the trainee selects one of a number of pre-set drill oriented choices at a predictable decision point. Instead, using an interactive games paradigm, the trainees will be able to practice situation and cue assessment, problem diagnosis, decision making and action coordination, in real-time in response to a critical incident. Currently, one key problem hindering the maintenance of a high level of preparedness in operational security organizations at airports is the long 2-year wait between major exercises. In CRISIS, we will enable organizations and individuals to train-on-demand, and as frequently as needed due to the innovations, such as end-user re-configurability of training scenarios. This will allow staff to train individually ‘playing’ against the system, as a team within an organization, across organizations, and at different levels of the command hierarchy. CRISIS will adopt a 3-stage development strategy, integrating, testing and iteratively evaluating user performance at each step of the way. The CRISIS consortium brings together a powerful combination of expertise in User modeling and requirements engineering, Games and simulation, Software engineering, distributed systems, and security, Decision sciences and technology, User performance evaluation, to deliver capability for training and improving operational security preparedness at airports.
The Department of Biomedical Engineering

IN ABOUT HALF a century of antibiotic use, unexpected new challenges have come to light: fast emergence of resistances among pathogens, misuse and overuse of antibiotics; direct and indirect related costs. Antimicrobial resistance results in escalating healthcare costs, increased morbidity and mortality and the emergence or reemergence of potentially untreatable pathogens. In this context of infectious diseases we will (1) detect patient safety issues, (2) learn how to prevent them and (3) actually prevent them in clinical cases. We will detect harmful patterns and trends using clinical and operational information from Clinical Information Systems (CIS). This will be done through the ‘view’ of a virtualized Clinical Data Repository (CDR), featuring, transparent access to the original CIS and/or collection and aggregation of data in a local store. Text, image and structured data mining on individual patients as well as on populations will learn us informational and temporal patterns of patient harm. This knowledge will be fed into a Medical Knowledge Repository and mixed with knowledge coming from external sources (for example guidelines and evidences). After editing and validating, this knowledge will be used by a decision support and monitoring tool in the clinical environment to prevent patient safety issues and report on it. Outcomes and benefits, both clinical and economical will be measured and reported on. Innovation within this project lays in the virtualization of Clinical Data Repository through ontology mediation, the advanced mining techniques, the reasoning engine and the consolidation of all these techniques in a comprehensive but open framework. This framework will be implemented, focused on infectious diseases, but will be applicable for all sorts of clinical cases in the future.
DIAMOND develops methodology and integrated environment for diagnosis and correction of errors regarding the design and implementation of digital ICs.

The aim of DIAMOND project is improving the productivity and reliability of semiconductor and electronic system design in Europe by providing a systematic methodology and an integrated environment for the diagnosis and correction of errors. Increasing design costs are the main challenge facing the semiconductor community. Assuring the correctness of the design contributes to the major part of the problem. However, while diagnosis and correction of errors are more time-consuming compared to error detection, they have received far less attention, both in terms of research works and industrial tools introduced. Another, orthogonal threat to the development is the rapidly growing rate of soft-errors in the emerging nanometer technologies. According to roadmaps, soft-errors in sequential logic are becoming a more severe issue than in memories. However, the design community is not ready for this challenge because existing soft-error escape identification methods for sequential logic are inadequate. The DIAMOND project aims at developing a unified, holistic diagnostic model for design and soft errors as well as automated localisation and correction techniques based on the unified model, both pre-silicon and post-silicon. In addition work will be directed to the implementation of a reasoning framework for localisation and correction, encompassing word-level techniques, formal, semi-formal, and dynamic techniques and to the integration of automated correction with the diagnosis methods. DIAMOND reaches beyond the state-of-the-art by proposing an integrated approach to localisation and correction of specification, implementation, and soft errors. In addition, it considers faults on all abstraction levels, from specification through implementation down to the silicon layout. Handling this full chain of levels allows DIAMOND take advantage of hierarchical diagnosis and correction capabilities incorporating a wide range of error sources.

ASSOCIATE PROFESSOR
ERIK LARSSON
The Department of Computer and Information Science
COOPERATION

THE DIPLECS project aims at designing an Artificial Cognitive System architecture that allows for learning and adapting hierarchical perception-action cycles in dynamic and interactive real-world scenarios. The architectural progress will be evaluated within the scenario of a driver assistance system that continuously improves its capabilities by observing the human driver, the car data, and the environment.

The system is expected to emulate and predict the behaviour of the driver, to extract and analyse relevant information from the environment, and to predict the future state of the car in relation to its context in the world. Starting from a rudimentary, pre-specified, i.e., man-modelled system, the architecture is expected to successively replace manually modelled knowledge with learned models, thus improving robustness and flexibility. Bootstrapping and learning is applied at all levels, in a dynamic and interactive context.

Dynamic and interactive context means that the system needs to react at any time to any relevant event and that the action comprises communication to the human driver or direct car control. The architecture applies a hierarchical design principle, where adjacent levels are connected by feedback-loops that require time for processing. Therefore, the potential reaction becomes more advanced through time, i.e., the system provides nested strategies. A real-time operation requires feed-forward mappings, which use the information learned in feedback operation.

The developed methods will be evaluated in three different settings: off-line with data recorded in a real vehicle, online in the real vehicle, and online for a model car. The first setting allows for evaluating methods that take into account the dynamics of the environment, but which are not real-time capable. The second setting allows for testing of passive assistance capabilities by communicating real-time information. The third setting allows for testing of active capabilities.

PROFESSOR
MICHAEL FELSBERG
The Department of Electrical Engineering
CORONARY ARTERY DISEASE (CAD) remains the primary cause of cardiovascular morbidity and mortality in Europe. In current clinical practice, patients with chronic CAD are followed using non-invasive imaging methodologies for possible adverse morphologic remodelling and functional recovery of the myocardium before the decision for invasive examinations and treatments is taken.

Technological developments have brought about several newer imaging methodologies (and associated parameters) that have shown accurate prognostic results under study conditions in selected patient populations. Each of these methodologies offers intrinsic advantages and disadvantages due to the physiologic processes it tries to assess, due to the technology it requires or due to its availability (often determined by its associated cost). However, to date, no large scale studies have made a direct comparison of the different methodologies towards predicting adverse morphologic remodelling or functional recovery of the myocardium after medical therapy. The lack of such information results in a sub-optimal use of the methodologies at hand.

The aim of DOPPLER-CIP is therefore to conduct a multi-centre clinical study including about 1200 patients in order to determine the optimal prognostic parameters derived from (new) non-invasive imaging for a patient presenting with suspected chronic ischemic heart disease. The modality used to extract these parameters is of secondary importance. However, as both the accuracy and the cost related to extracting a particular parameter is modality-dependent, DOPPLER-CIP will also make a cost-effectiveness analysis in order to determine which modality should preferentially be used to extract the clinically most relevant parameter.

**DOPPLER-CIP**

DETERMINING OPTIMAL NON-INVASIVE PARAMETERS FOR THE PREDICTION OF LEFT VENTRICULAR MORPHOLOGIC AND FUNCTIONAL REMODELING IN CHRONIC ISCHEMIC PATIENTS

**PARTNERS**

1. Katholieke Universiteit Leuven, Belgium (coordinator)
2. Varsinais-Suomen Sairaanhoitopiirin Kuntayhtyma, Finland
3. Servicio Madrileño de Salud, Spain
4. Consiglio Nazionale Delle Ricerche, Italy
5. King’s College Hospital NHS Trust, United Kingdom
6. Linköpings universitet, Sweden
7. Rikshospitalet HF, Norway
8. Advanced Medical Imaging Development SRL, Italy
9. King’s College London, United Kingdom

**PROFESSOR TINO EBBERS**

The Department of Medical and Health Sciences
COOPERATION

30 million Europeans were affected by depression and their number is still growing. Half of Europeans in need of mental care for depression do not have access to care services, do not always receive evidence-based treatments, are confronted with long waiting lists or high care expenditures. Internet-based treatment has the potential to address the drawbacks of standard care and keep depression treatment of high quality and affordable.

E-COMPARED will conduct comparative effectiveness research in routine specialized mental care settings on the (cost-) effectiveness of internet-based treatment for depression in comparison with standard care. Health care systems, and policies, existing ICT infrastructures and their uptake will be taken into account. E-COMPARED aims to

1) Evaluate EU mental health policies/guidelines for standard and internet-based care for depression in specialized care settings in countries with different health care systems and access levels of standard and internet-based care;

2) Compare clinical efficacy and cost-effectiveness of internet-based treatment and treatment as usual within controlled research settings,

3) Carry out pragmatic randomized controlled trials to study how internet-based depression treatment can be effectively implemented within routine specialized care settings,

4) Predict which patient groups could benefit from internet-based treatment vs. standard treatment by modeling patient characteristics;

5) Develop evidence based recommendations on how internet-based depression treatment can be cost-effectively integrated into routine specialized care systems for depression in EU mental health care systems, and develop a business case to ensure structural implementation of these services.

E-COMPARED is multidisciplinary (psychology, HTA, ICT, care) and its members have a front runners position in internet-based treatment for common mental health disorders, e.g. through participating in FP7 projects (ICT4Depression, ROAMER).

PARTNERS

1. Stichting VU-VUMC, The Netherlands (coordinator)
2. INESC PORTO - Instituto de Engenharia de sistemas e Computadores do Porto, Portugal
3. University of Limerick, Ireland
4. London School of Hygiene and Tropical Medicine, United Kingdom
5. Universitaet Bern, Switzerland
6. Universitat de Valencia, Spain
7. Universitat Jaume I de Castellon, Spain
8. Linköpings universitet, Sweden
9. Universite Paris XII Val de Marne, France
10. Friedrich-Alexander-Universitat Erlangen Nurnberg, Germany
11. Stichting CGZ Ingest, The Netherlands
12. Leuphana Universitat Luneburg, Germany
13. Global Alliance of Mental Illness Advocacy Networks Europe AISBL, Belgium
14. SZkola Wyszsa Psychologii Spolecznej, Poland

EUROPEAN COMPARATIVE EFFECTIVENESS RESEARCH ON ONLINE DEPRESSION TREATMENT

PROFESSOR GERHARD ANDERSSON

The Department of Behavioral Sciences and Learning
CURRENT APPROACHES to improving glycaemic control in type 1 diabetes are centred on increasingly complex insulin delivery systems. However, less than 30% of patients can achieve target levels of glucose control with this approach even in a clinical trial setting and many patients are either unable or unwilling to make the personal commitment required. By contrast, preservation of even small amounts of endogenous insulin production, has been shown to improve glycaemic control, reduce hypoglycaemia, improve quality of life and reduce long-term complications. Importantly, glycemic control in the presence of endogenous beta cell function is not demanding and hence would be effective across the full spectrum of individuals. Antigen specific immunotherapy (ASI) is the preferred approach to beta cell preservation since this avoids the risks of immunosuppression. Attempts at ASI to date although successful in preclinical models have had limited efficacy in humans. There is therefore an urgent need for the development of novel approaches to deliver effective ASI.

Our Enhanced Epidermal Antigen Specific Immunotherapy (EE-ASI) system represents an innovative approach to ASI created by combining technologies brought by our academic and 2 SME partners. A beta cell target T cell epitope (proinsulin C19-A3) will be combined with the tolerogenic cytokine IL-10 and targeted to antigen presenting cells via gold nanoparticles and delivery into the very superficial layers of the skin using microneedles. Validation of manufacture, in vitro and in vivo preclinical efficacy will be demonstrated followed by a phase 1 clinical trial to confirm safety in humans.

We anticipate that the EE-ASI system will be less costly, more effective and more acceptable to patients in improving glycaemic control than exogenous insulin replacement. Intellectual property, regulatory and ethical issues will be carefully addressed in order to maximise exploitation of this integrated system for the benefit of the SMEs.

PROFESSOR EMERITUS JOHNNY LUDVIGSSON
The Department of Clinical and Experimental Medicine
EUNAMUS

NATIONAL MUSEUMS are authoritative spaces for display and negotiation of community and citizenship. Through collecting and creating repositories of scientific, historic and aesthetic objects choices are made that protect and narrate ideas of virtues, unicity and place in the wider world.

Explicitly and implicitly territorial identities are negotiated and related both to ideas in the tradition of universalistic enlightenment and through its selection and narration presenting formative ideas of who belongs to what political and cultural entity, why and with what consequences. This is done by negotiating different claims on what citizenship means, the relationship with competing political projects on sub-national and supra-national levels, and by calling on universalistic values and virtues as basis of claimed unicity and value of community, belonging and pride.

EuNaMus explore the creation and power of the heritage of European national museums to the world, Europe and its states as an unsurpassable institution in contemporary society. In order to shape cultural policy for an expanding European Union the understanding of one of its most enduring institutions for creating and contesting political identities is necessary. The focus is on understanding the conditions for using the past in negotiations that recreate citizenship, and on the understanding of layers of territorial belonging beyond the actual nation-state.

The research is pursued through multi-disciplinary collaboration between eight leading institutions and a series of work packages studying institutional path dependencies, the handling of conflicts, modes of representation, cultural policy and visitors experiences in national museums. Understanding the cultural force of national museums will provide citizens, professionals and policy makers with reflexive tools to better communicate and create a common understanding of diversity and community in developing cultural underpinning for democratic governance.

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<tbody>
<tr>
<td>1. Linköpings universitet, Sweden (coordinator)</td>
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<tr>
<td>2. University of Leicester, United Kingdom</td>
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<td>4. Universite Paris i Pantheon-Sorbonne, France</td>
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<td>5. Tartu Ulikool, Estonia</td>
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<td>6. Universitetet i Oslo, Norway</td>
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<td>7. Alma mater Studiorum - Universita di Bologna, Italy</td>
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<td>8. Kozep - Europai Egyetem, Hungary</td>
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PROFESSOR PETER ARONSON
The Department of Studies of Social Change and Culture
THE PROJECT  High Quality European GaN-Wafer on SiC Substrates for Space Applications (EuSiC) is aiming at establishing an independent, purely European sustainable supply chain for Gallium Nitride (GaN) based space technologies. The project will significantly reduce the dependence on critical technologies and capabilities from outside Europe for future space applications. An independent supply chain has to include countries of the European Community (EC): a supplier of high-quality semi-insulating Silicon Carbide (SiC) substrates, qualified sources to perform GaN epitaxial layers and as well manufacturers with leading knowledge in GaN device technology required e.g. for Monolithic Microwave Integrated Circuits (MMICs). At present, the missing link in this chain is a reliable source for high-quality 3 inch semi-insulating SiC substrates in Europe.

The intention of this project is to improve the quality of semi-insulating SiC-substrates at SiCrystal AG, the leading manufacturer of SiC substrates in Europe. The provided substrates shall be analyzed and evaluated by epi-growth specialists IAF, III-V-Lab, and QinetiQ. Finally devices shall be built and verified on the created GaN epi-wafers by UMS. Continuous monitoring and several feedback loops to the quality of the substrates will enable an accelerated development at SiCrystal AG. Also impacts to improvement of the performance of GaN devices are expected. The project will complement activities already undertaken by European Space Agency ESA, who has assembled a consortium of competent partners under the: GaN Reliability Enhancement and Technology Transfer Initiative (GREAT2).

EUSIC
HIGH QUALITY EUROPEAN GaN-WAFER ON SiC SUBSTRATES FOR SPACE APPLICATIONS

PARTNERS
1. SiCrystal AG, Germany (coordinator)
2. Alcatel-Thales III-V Lab, France
3. Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., Germany
4. Linköpings universitet, Sweden
5. United Monolithic Semiconductors GmbH, Germany

PROFESSOR ERIK JANZÉN
The Department of Physics, Chemistry and Biolog
The EXCESS project aims at providing radically new energy execution models forming foundations for energy-efficient computing paradigms that will enable two orders of magnitude improvements in energy efficiency for computing systems. A holistic approach that involves both hardware and software aspects together has the best chances to successfully address the energy efficiency problem and discover innovative solutions. EXCESS proposed models will try to describe and bridge embedded processors models with general purpose ones. EXCESS will take a holistic approach and will introduce novel programming methodologies to drastically simplify the development of energy-aware applications that will be energy-portable in a wide range of computing systems while preserving relevant aspects of performance.

The EXCESS project is going to be driven by the following technical components that are going to be developed during EXCESS:

- Complete software stacks (including programming models, libraries/algorithms and runtimes) for energy-efficient computing.
- Uniform, generic development methodology and prototype software tools that enable leveraging additional optimisation opportunities for energy-efficient computing by coordinating optimisation knobs at the different levels of the system stack, enabled by appropriate modelling abstractions at each level.
- Configurable energy-aware simulation systems for future energy-efficient architectures.

The EXCESS consortium unites Europe’s leading experts in both high-performance computing and embedded computing. The consortium consists of world-class research centres and universities (Chalmers, LIU, UiT), a high performance computing centre (HLRS at USTUTT), and a European embedded multi-core SME (Movidius), and has the required expertise to accomplish the ambitious but realistic goals of EXCESS.

**EXCESS**

ADVANCED COMPUTING, EMBEDDED AND CONTROL SYSTEMS

**THE EXCESS**
SIGNIFICANT EFFORTS have been invested to strengthen border ID checks with biometrics Travel Documents embedding electronic chips (ePassport). However, problems appeared regarding fraud in the ePassport issuing process, citizen losing control on their personal data, difficulties in certificates management, and shortcomings in convenience, speed, and efficiency of ID checks, including the access to various remote data bases.

FIDELITY is a multi-disciplinary initiative which will analyse shortcomings and vulnerabilities in the whole ePassports life cycle and develop technical solutions and recommendations to overcome them. FIDELITY will demonstrate privacy enhanced solutions to:

- Secure issuing processes: authentication of documents, preventing impersonation fraud;
- Improve ePassport security and usability: authentication processes, ID check speed, accuracy of biometrics, management of certificates, access to remote data bases, convenience of biometric sensors and inspection devices;
- Better manage lost and stolen passports;
- Strengthen privacy: privacy-by-design applied to all phases of the ePassport life cycle, systematic anonymisation of data and separation of data streams, using novel privacy-enhancing-technologies.

FIDELITY will strengthen trust and confidence of stakeholders and citizens in ePassports, provide more reliable ID checks, hence hinder criminal movements, and ease implementation of E/E records providing better analysis of migration flows.

FIDELITY solutions will be designed for backwards compatibility to be deployed progressively in the existing infrastructure. The FIDELITY consortium is composed of market-leading companies, innovative SME, renowned academia, ethical-sociological-legal experts, and end-users, which will help to define requirements and recommendations and assess results. They will, with the other partners actively promote the project results towards stakeholders and international working groups that elaborate future ePassport standards.
Road accidents involving pedestrians are far more frequent at night than during the day. More than 12,000 pedestrians and cyclists are killed and almost 300,000 are seriously injured in the EU every year. The most important factor is the driver’s dramatically reduced range of vision. Fewer pedestrians will be killed or seriously injured through improved driver warning strategies enabled by Night Vision systems with image analysis detecting pedestrians up to 120m ahead. There are two types of night-vision technologies on the market: Far-Infrared (FIR) and Near-Infrared (NIR) systems. FIR systems are passive, detecting the thermal radiation at wavelengths in the interval 8-12µm. NIR systems use a light source with a wavelength of around 0.8 µm to illuminate the object and then detect the reflected light. The main advantage of NIR systems is the picture resolution and that the picture is easy to understand for the driver. FIR systems on the other hand offer a superior range and pedestrian-detection capability. A wide use of both technologies is currently limited by the system cost.

The objective of the project is to demonstrate the next generation Night Vision System with automatic detection of upcoming hazard at an affordable cost. Using a combined NIR/FIR system enable substantial system cost reduction and increased performance through sensor signal fusion. The combined system allow cost reduction through reduced FIR sensor resolution, computing capacity, innovative European technology for molded FIR optics and FIR detectors designed for mass fabrication. The partners in the consortium represent some of the world’s leading organizations in their field of expertise. They also represent different levels in the value chain. Successful completion of the project will create European industrial exploitation opportunities. Such opportunities will include infrared detector technology, optical components and affordable Pedestrian Collision Avoidance Systems.

Guest Professor Christian (KIP) Smith
The Department of Computer and Information Science
THE GARNICS PROJECT aims at 3D sensing of plant growth and building perceptual representations for learning the links to actions of a robot gardener. Plants are complex, self-changing systems with increasing complexity over time. Actions performed at plants (like watering), will have strongly delayed effects. Thus, monitoring and controlling plants is a difficult perception-action problem requiring advanced predictive cognitive properties, which so far can only be provided by experienced human gardeners.

Sensing and control of a plant's actual properties, i.e. its phenotype, is relevant to e.g. seed production and plant breeders. We address plant sensing and control by combining active vision with appropriate perceptual representations, which are essential for cognitive interactions. Core ingredients for these representations are channel representations, dynamic graphs and cause-effect couples (CECs). Channel representations are a wavelet-like, biologically motivated information representation, which can be generalized coherently using group theory. Using these representations, plant models – represented by dynamic graphs – will be acquired and by interacting with a human gardener the system will be taught the different cause-effect relations resulting from possible treatments. Employing decision making and planning processes via CECs, our robot gardener will then be able to choose from its learned repertoire the appropriate actions for optimal plant growth. This way we will arrive at an adaptive, interactive cognitive system, which will be implemented and tested in an industrially-relevant plant-phenotyping application.

GARNICS
GARDENING WITH A COGNITIVE SYSTEM

COOPERATION

PARTNERS
1. Forschungszentrum Jülich GmbH, Germany (coordinator)
2. Linköpings universitet, Sweden
3. Georg-August-Universität Göttingen Stiftung Öffentlichen Rechts, Germany
4. Agencia Estatal Consejo Superior de Investigaciones Científicas, Spain

PROFESSOR MICHAEL FELSBERG
The Department of Electrical Engineering
### COOPERATION

**GRAPHENE**

**GRAPHENE-BASED REVOLUTIONS IN ICT AND BEYOND**

**THIS PROPOSED FLAGSHIP** aims to take graphene and related layered materials from a state of raw potential to a point where they can revolutionize multiple industries – from flexible, wearable and transparent electronics, to high performance computing and spintronics. We will do so by bringing together a large European consortium of world-leading academics and key industries, working closely to create a new disruptive technology. The scope and level of ambition of this endeavor is such that it can only be realized through a large scale coordinated effort that integrates the entire value chain from materials to components and systems. The rewards of this flagship will impact the lives of Europeans with increased standard of living through new products, job opportunities, and economic growth.

During the ramp-up phase, the flagship will focus on logical and physical communication and closely related areas. The flagship is organized in 11 scientific and technological work packages, supported by work packages dedicated to innovation dissemination and management. The core work packages target breakthroughs in information and communication technologies, with others providing the necessary support in materials and production technologies, and extending the impact of the flagship to other areas such as energy and transport. In the ten year time frame, disruptive technologies based on graphene and other two-dimensional materials extend to new areas such as health, with the aim of becoming new platform materials, as ubiquitous as steel or plastics. This progression from scientific excellence to industrial exploitation and societal impacts is the guiding principle of the proposed flagship, enforced by a series of open calls targeting graphene-based engineering and commercialization, starting already during the ramp-up phase of the flagship.

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This is a FET Flagship

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**PROFESSOR ROSITSA YAKIMOVA**

The Department of Physics, Chemistry and Biology
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5. Airbus Operations SL, Spain
6. Aalto - Korkeakoulussaatio, Finland
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9. Oxford Instruments Nanotechnology Tools Limited, United Kingdom
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12. Universidade do Minho, Portugal
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15. Sabanci University, Turkey
16. Albert-Ludwigs-Universitaet Freiburg, Germany
17. Stmicrolithography SRL, Italy
18. Universitaet Bremen, Germany
19. Commissariat A L Energie Atomique et Aux Energies Alternatives, France
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22. Technische Universitaet Dresden, Germany
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58. Gesellschaft für Angewandte Mikro und Optoelektronik mit Beschränkerhaftung Amo GMBH, Germany
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60. Rijksuniversiteit Groningen, The Netherlands
61. Technical University Wien, Austria
62. University College Dublin, National University of Ireland, Ireland
63. Rheinisch-Westfaelische Technische Hochschule Aachen, Germany
64. Universita Degli Studi di Trieste, Italy
65. Fundacio Privada Institut Catala de Nanotecnologia, Spain
66. Universitaet Regensburg, Germany
67. Fondazione Istituto Italiano di Tecnologia, Italy
68. Grupo Antolin - Ingenieria SA, Spain
69. Universite Catholique de Louvain, Belgium
70. Nokia UK Limited, United Kingdom
71. Nokia OYJ, Finland
72. Lancaster University, United Kingdom
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11. Rheinisch-Westfaelische Technische Hochschule Aachen, Germany
12. Universidad Politecnica de Madrid, Spain
13. Hospital Clinico San Carlos de Madrid Insalud, Spain
14. University of Hull, United Kingdom
15. The Chinese University of Hong Kong, Hong Kong SAR China
16. Service Madrileño de Salud, Spain
17. Luthian Health Board, United Kingdom
18. Linköpings universitet, Sweden
19. Universitätsklinikum Heidelberg, Germany
20. Fundación Vodafone España, Spain
21. Fundacio Institut de Investigacio en Ciencies de la Salut Germans Trias i Pujol, Spain
22. Deutsche Sporthochschule Köln, Germany
23. Clothing Plus OY, Finland

HEARTCYCLE
COMPLIANCE AND EFFECTIVENESS IN HF AND CHD CLOSED-LOOP MANAGEMENT

EACH YEAR CARDIOVASCULAR Disease (CVD) causes over 1.9 million deaths in the EU, causing direct health costs of €105 billion. Coronary Heart Disease (CHD), half of all CVD deaths, is the single most cause of death in Europe. Heart Failure (HF) - a CHD being the most frequent cause of hospitalisation for people over 65 - has 10 million patients in the EU. Current treatment of HF entails recommendations from clinicians on medication, diet and lifestyle. Patients only receive feedback at doctors visits, or when facing symptoms. Daily monitoring, close follow up, and help on treatment routine is lacking. Non-adherence to the treatment regime is a major cause of suboptimal clinical benefit.

HeartCycle will provide a closed-loop disease management solution to serve both HF and CHD patients, including hypertension, diabetes and arrhythmias as possible co-morbidities. This will be achieved by multi-parametric monitoring of vital signs, analysing the data and providing automated decision support, to derive therapy recommendations.

The system will contain a patient loop interacting directly with the patient to support the daily treatment. It will show the health development, including treatment adherence and effectiveness. Being motivated, compliance will increase, and health will improve. The system will also contain a professional loop involving medical professionals, e.g. alerting to revisit the care plan. The patient loop is connected with hospital information systems, to ensure optimal and personalised care.

Europe’s health system is undergoing radical changes due to an aging population. It’s moving from reactive towards preventative care, and from hospital care to care at home. Tomorrow’s patients will become more empowered to take their health into their own hands. New ICT is required to enable this paradigm shift. HeartCycle, coordinated by Philips “leading in electronics and health care”, includes experts on textiles, ICT, decision support and user interaction.
COOPERATION

THE DEVELOPMENT OF conceptually new materials following a project HINTS faces these ICT challenges by combining naturally downscalable materials, organic semiconductors, with low energy consumption information processing via spintronic effects. More explicitly, the main objective of the proposal is developing novel hybrid organic-inorganic materials featuring interfaces with conceptually new electric and magnetic behaviour. The definition HINTS involves both academics and industrial partners focused on potential application, ensuring an effective exploitation of results.

HINTS
NEXT GENERATION HYBRID INTERFACES FOR SPINTRONIC APPLICATIONS

PARTNERS
1. Consiglio Nazionale Delle Ricerche, Italy (coordinator)
2. Martin - Luther - Universität Halle - Wittenberg, Germany
3. CIC Nanogune, Spain
4. The Provost, Fellows and Scholars of the College of the holy and undivided trinity of Queen Elizabeth near Dublin, Ireland
5. Institut Jozef Stefan, Slovenia
6. Queen Mary and Westfield College University of London, United Kingdom
7. Technische Universität Kaiserslautern, Germany
8. Universität de Valencia, Spain
9. Linköpings universitet, Sweden
10. Dr. Eberl MBE-Komponenten GmbH, Germany
11. M-Solv Ltd., United Kingdom
12. Thales SA, France
13. Centre National de la Recherche Scientifique, France
14. IN S.R.L., Italy

PROFESSOR MATS FAHLMAN
The Department of Physics, Chemistry and Biology
PROFESSOR ANNA STRÖMBERG
The Department of Medical and Health Sciences

COOPERATION

HOMECARE
CLINICAL CONTINUITY BY INTEGRATED CARE

OUR COMPREHENSIVE approach to clinical continuity by integrated care (IC) across the secondary-primary interface departs from a preliminary literature review selecting frequent chronic conditions (CC) as stroke, COPD and HF as our focus areas.

However, within each of these areas IC is a small activity, still, requiring more basic research. As IC for these different CC are based on the same patient values (feeling safe, participation and primary feedback) the synergistic effect from cross-sectional relationships arising from this project should be significant. In all, our 11 deliverables may be important to trespass the critical mass required for an expansion of this kind of IC as far as justified by the empirical results.

In general, moderately improved health at minimal costs might be expected from some point of their life to a large segment of the population in EU suffering from the CC in study. That would deliver goodwill to the EU! Special projects are going to investigate the relevance of the access to health improvements by these Low-Tech-IC-interventions in low- and middle-income MS with distinct problems of fragmented care systems.

The project has several milestones:
• A kick-off Symposium aiming to establish a common decision-making framework introducing the HTA method
• A systematic literature review checking preliminary choices of focus areas after 6 months
• After 18 months a comprehensive status of the progress of the different trials and surveys is scheduled with respect to both timeliness and scientific content
• After 30 months the practical IC-guides for clinicians on stroke, heart failure and COPD, respectively, should be concluded after an extensive hearing in an international network related to the 2nd Annual meeting of the consortium.

PARTNERS
1. Syddansk Universitet, Denmark (coordinator)
2. Region Nordjylland, Denmark
3. University of Glasgow, United Kingdom
4. Provincia Lombardo Veneta Dell’Ordine Religioso Dei Chierici Regolari Ministri Degli Infermi, Italy
5. Universidade De Aveiro, Portugal
6. Fundacio Privada Clinic Per a La Recerca Biomedica, Spain
7. Akademia Wychowania Fizycznego Im. Jerzego Kukuczki w Katowicach, Poland
8. Academisch Ziekenhuis Groningen, The Netherlands
9. Linköpings universitet, Sweden
10. Regione Del Veneto, Italy
11. Region Midtjylland, Denmark
12. Odense Universitetshospital, Denmark
13. Fondazione Ospedale San Camillo, Italy

Starting date Ending date Duration Theme
2009-04-01 2012-03-31 36 months Health

EU contribution Amount to LiU
€ 2 519 991 € 254 971
WE PROPOSE A collaborative effort to advance our understanding of the inflammatory bowel diseases Ulcerative Colitis and Crohn’s Disease and to increase diagnostic precision in detection of the diseases in their early manifestation. We will utilize the largest collection of samples so far assembled of treatment naive patients recently diagnosed with inflammatory bowel disease, a total of 400 patients. The material will be extensively analysed for DNA methylation status, RNA transcription profile, protein markers and gut microbial content in order to create a molecular snapshot of IBD in its early manifestation. As control group, material from a total of 200 recently by endoscopy diagnosed non-inflammatory but symptomatic patients (symptomatic non-IBD) as well as 200 healthy, age-matched, non-smoking, controls without any known first relatives diagnosed with IBD, will be collected and used. All patients will be diagnosed according to standardized diagnostic criterias, characterized using current known clinical markers as well as genotyped for known susceptibility loci.

This large, well characterized cohort in conjunction with our proposed massive molecular profiling will yield a list of biomarkers indicative for onset of the disease. Based on the finding within the project assays capable of analysing panels of relevant protein markers and methods for rapid profiling of gut microbial content relevant for IBD will be developed by participating SME:s, offering large commercial potential. The proposed biomarkers will form a solid ground for development of improved diagnostic assays and be a rich source to mine for novel therapeutic targets.

PROFESSOR JOHAN D SÖDERSTRÖM
The Department of Clinical and Experimental Medicine

PARTNERS
1. Olink AB, Sweden (coordinator)
2. Universitetet i Oslo, Norway
3. The University of Edinburgh, United Kingdom
4. Diagenode SA, Belgium
5. Linköpings universitet, Sweden
6. Karolinska Institutet, Sweden
7. Instituto Aragones De Ciencias De La Salud, Spain
8. Genetic Analysis AS, Norway
9. Fundacio Privada Parc Cientific De Barcelona, Spain
10. Örebro University, Sweden
MAJOR DEPRESSION IS currently the fourth disorder worldwide in terms of disease burden, and is expected to be the disorder with the highest disease burden in high-income countries by 2030. Estimated costs of depression are annually 177 and 147 million euro per 1 million inhabitants for major and minor depression respectively. Current treatment methods for depressive disorders can reduce the burden of this disease with about one third. The ICT4Depression consortium will develop an ICT-based system for use in primary care that will further improve patient outcomes and increase access to treatment. All technologies to be developed will be beyond state of the art and include 1) devices for monitoring activities and biosignals in a non-intrusive and continuous way, 2) treatments for depression and automatic assessment of the patient using mobile phone and web based communication, 3) computational methods for reasoning about the state of patients, progress of therapies, and the risk of relapse and 4) a flexible system architecture for monitoring and supporting people using continuous observations and feedback via mobile phone and the web.

The ICT4Depression system is flexible and can easily be adapted for treatment of other mental diseases. The project will be carried out by an interdisciplinary consortium with 5 (research) organisations and 2 SME companies at the forefront of Artificial and Ambient Intelligence, wireless biosignal sensors, activity monitoring using cell phones, monitoring patient compliance with drug prescriptions, service oriented application for the health care domain, psychology, psychiatry, and internet-based psychological treatment. The project will boost European leadership in ICT-based treatment of mental illness and will provide ample opportunities for commercial exploitation.
THE PROPOSED IDIHOM PROJECT is motivated by the increasing demand of the European aerospace industries to advance their CFD-aided design procedure and analysis by using accurate and fast numerical methods, so-called high-order methods. They will be assessed and improved in a top-down approach by utilising industrially relevant complex test cases, so-called application challenges in the general area of turbulent steady and unsteady aerodynamic flows, covering external and internal aerodynamics as well as aeroelastic and aeroacoustic applications. Thus, the major aim is to support the European aeronautics industry with proven-track method(s) delivering an increased predictive accuracy for complex flows and (by same accuracy) an alleviation of computational costs which will secure their global leadership. An enhancement of the complete high-order methods suite is envisaged, including the most relevant methods, Discontinuous Galerkin and Continuous Residual-Based methods, in combination with underlying technologies as high-order grid generation and adaptation, visualisation, and parallelisation. The IDIHOM project is a key-enabler for meeting the ACARE goals, as high-order methods offer the potential of more accurate prediction and at the same time faster simulations.

Main objectives:
1. Advance current high-order methods and apply them to complex industrial flows.
2. Demonstrate capabilities of high-order approaches in solving industrially relevant (challenging) applications and achieving synergy effects by applications to external and internal aerodynamics.
3. Demonstrate that high-order methods can be well applied to multi-disciplinary topics as there are aeroacoustics (noise reduction) and aeroelastics (reduced A/C weight, improved A/C safety).
4. Advance the Technology Readiness Level from about 3 to 5.
5. Facilitate co-operation between different industries as there are airframe, turbo-engines, helicopters, ground transportation and the EU CleanSky project.

PROFESSOR JAN NORDSTRÖM
The Department of Mathematics
IMPACT

IMPROVING THE LIVES OF PARKINSONS DISEASE PATIENTS WHILE REDUCING SIDE-EFFECTS THROUGH TAILORED BRAIN STIMULATION

THE IMPACT PROJECT is about improving the lives of brain disease patients through a novel approach that leaps beyond currently available Deep Brain Stimulation (DBS) devices and procedures. The initial project focus is on Parkinson’s Disease (PD), but further brain-disease indications will be included in the later phase of the project. The personalized approach that IMPACT brings is essential in delivering full therapeutic benefits to DBS patients while preventing the stimulation-induced side-effects that occur with today’s DBS implants.

PD is well known for its characteristic symptoms: shaking, rigidity, slowness of movement and postural instability. Millions are suffering from PD including famous people like Michael J. Fox. Drugs are used as first treatment, but as the disease progresses they become ineffective and increasingly higher doses are needed. This leads to many side-effects, while symptoms still persist.

DBS is a pacemaker for the brain, analogous to the function of pacemakers for the heart: mild electrical stimuli are delivered to brain tissue to suppress unwanted activity and restore desired neuronal functions. When stimulation is optimal, the impact of DBS is spectacular: shaking and rigidity are strongly improved, and medication doses may be lowered significantly.

Despite its successes, DBS is still in its infancy. Programming for optimal therapy is complicated since physicians lack the appropriate tools to support them. Around 15-30% of DBS patients suffer from stimulation-induced side-effects resulting from stimulation leaking outside intended target regions. IMPACT addresses these barriers to adoption exploiting the directivity provided by next generation high-resolution implants.

IMPACT delivers a physician tool for tuning the high-resolution implant based on a personalized patient brain stimulation model that takes into account imaging data (MRI, X-ray) as well as pre-operative data (local field potentials).
THE VISION OF I-ONE is to exploit for the first time flexible organic electronics for the development and testing of Active Multifunctional Implantable Devices (AMIDs) to treat Spinal Cord Injury (SCI).

The devices will:
(a) Have long-term stability associated to high biocompatibility and safety.
(b) Have reduced risk of a host versus graft immune response.
(c) Mimic the local microenvironment for stem/precursor cell recruitment and differentiation.
(d) Monitor locally the functionality of the regenerated nerve cells to intervene with loco-regional therapies.
(e) Perform local stimulation with tunable electric fields.
(f) Deliver locally growth factors, neurotransmitters, and drugs.

The use of flexible organic electronics devices (ultra-thin film organic field effect transistor (FET), organic electrochemical transistor, nano-particle organic memory FET) will advance the state-of-the-art of implantable devices for SCI from passive to active layouts that will promote nerve regeneration by a combination of local stimuli delivered on demand, will sense inflammation, and will control the immune-inflammatory response.

The biomedical impact of the project will be demonstrated in vitro and in vivo. In vitro, the neural therapeutic plasticity induced by the I-ONE device will be evaluated on stem cells, which will be differentiated to neural progenitor cells, and then to neural cells. In vivo, the study of neural plasticity will be transferred to endogenous stem cells by implanting the I-ONE device into a contusion SCI animal model.

I-ONE will acquire the knowledge and the technology required to regenerate the nerve in the niche of the injury.
PARTNERS

1. University of Leeds, United Kingdom (coordinator)
2. Technische Universität Hamburg-Harburg, Germany
3. Imperial College of Science, Technology and Medicine, United Kingdom
4. Uppsala University, Sweden
5. Universität Zürich, Switzerland
6. Linköpings universitet, Sweden
7. Aesculap AG, Germany
8. Tutech Innovation GMBH, Germany
9. Simulation Solutions Limited, United Kingdom
10. IHI Ionbond AG, Switzerland
11. Anybody Technology A/S, Denmark
12. The Leeds Teaching Hospitals National Health Service Trust, United Kingdom
13. Eidgenössische technische Hochschule Zürich, Switzerland
14. Peter Brehm, Germany
15. Wilhelm Schulthess Stiftung, Switzerland

LIFELONGJOINTS
SILICON NITRIDE COATINGS FOR IMPROVED IMPLANT FUNCTION

ARTICULATING JOINT replacements represent a medical market exceeding 14 billion p.a. that is expected to rise as demographics reflect an ageing population. However, faster growth has been seen in the revision market, where prosthetic joints are replaced, than in primary interventions. The major cause of these revisions is that all joint replacements are prone to wear leading to loss of implant function. Further, it has been demonstrated that adverse or extreme loading has a detrimental effect on implant performance. Thus, device failure still occurs too frequently leading to the conclusion that their longevity and reliability must be improved. The premise of this proposal is to realise that wear and corrosion are an inevitable consequence of all implant interfaces within contemporary total joint replacements. To overcome this problem our novel approach is to use silicon nitride coatings in which the combined high wear resistance of this material and solubility of any silicon nitride wear particles released, reduce the overall potential for adverse tissue reactions. In this work a variety of silicon nitride based coatings will be applied to different tribological scenarios related to total hip arthroplasty.

The coatings suitability in each scenario will be assessed against target profiles. In particular, it is important to consider coating performance within each of these applications under adverse conditions as well as those outlined in internationally utilised standards. To accomplish this, cutting-edge adverse simulation techniques, in vitro assays and animal models will be developed together with a suite of computational assessments to significantly enhance device testing in terms of predicting clinical performance. Data will inform new standards development and enhance current testing scenarios, and will provide 5 European enterprises with a significant market advantage, whilst providing data for a regulatory submission which is aligned with Dir 93/42/EEC.

PROFESSOR LARS HULTMAN
The Department of Physics, Chemistry and Biology
LIVEDIVERSE (LD) WILL develop new knowledge on the interactions between human livelihood and biodiversity in riparian and aquatic contexts in four developing countries (Vietnam, India, South Africa, Costa Rica). It has a strong emphasis on dissemination and the constructive engagement of a broad selection of social groups and their governmental and non-governmental representatives. The analysis of biodiversity values, sustainable use and livelihoods (biodiversity governance) within the project adopts vulnerability as a unifying concept, taking the point of departure in the concepts of biodiversity and livelihood vulnerability. Vulnerability will be considered from a combination of biophysical, socio-economic and cultural/spiritual perspectives, where human ability to conserve and husband biodiversity while at the same time achieving sustainable livelihoods is of vital importance.

The analyses of areas will analyse vulnerability in terms of biophysical, socio-economic-legal, and cultural/spiritual issues. Maps of these three perspectives will then be constructed in each case study and incorporated into a GIS system. These maps will identify biodiversity and livelihood hot-spots, that is, places where there is a high risk (according to natural science criteria), and a low capability (according to the socio-economic, law and policy criteria). Finally, biodiversity and livelihood scenarios will be developed. These scenarios will take into account the main perspectives: biological diversity risk, socio-economic ability and cultural perceptions to cope with effects of this risk. Working in a 15-year perspective, the scenarios will examine future possible trends, threats and developments in order to formulate strategies and policy to meet the needs of both biodiversity and livelihoods.

PROFESSOR GEOFFREY GOOCH
The Department of Management and Engineering
The continued use of composite materials in the aerospace industry has been addressed in several past research projects which have focused on new design solutions and composite manufacturing processes. However, an area which has been given much less attention until now is how to achieve a time and cost effective lean assembly production system. The current airframe assembly process of composites, metals and hybrid structures is affected by an important number of non-added value operations, which strongly cause disruptions and prevents fast ramp-up and high production rates. LOCOMACHS will focus on significantly reducing or totally eliminating the most time-consuming and hence expensive non-added value operations, e.g. temporary assembly to check gaps, shimming, dismantling and tool handling. The project will improve the design conditions which today strongly dictate the way part manufacture and assembly is performed. Important step changes will be made by dramatically improving the use of tolerance and geometrical variation management. The project will integrate existing technologies with missing breakthrough technologies developed and matured within LOCOMACHS. To support the industrialisation of future assembly production lines, key innovations such as intelligent drilling, high speed non-contact hole inspection, compact automation and active flexible tooling will be demonstrated. The design and assembly process improvements and breakthrough technologies will be validated on two physical partial wing box demonstrators, a virtual fuselage section demonstrator and additionally a virtual demonstrator showing a complete wing structure in the context of the next generation lean production flow. This Level 2 proposal is being submitted in the 5th Call FP7-AAT-2012-RTD-1 against the activity area AAT.2012.4.4-1 Integrated approach and demonstration to lean manufacturing of metal, composite and hybrid aircraft / engine structures by a Consortium led by Saab AB.
COOPERATION

**The Focus of LOLA**

LOLA is on access-layer technologies targeting low-latency robust and spectrally-efficient transmission in a set of emerging application scenarios. We consider two basic types of wireless networks, namely long-range LTE-Advanced Cellular Networks and medium-range rapidly-deployable mesh networks. Research on low-latency transmission in cellular networks is focused firstly on transmission technologies in support of gaming services which will undoubtedly prove to be a strategic revenue area for operators in the years to come. Secondly, we also consider machine-to-machine (M2M) applications in mobile environments using sensors connected to public infrastructure (in trains, busses, train stations, utility metering, etc.). M2M is an application area of extremely high growth potential in the context of future LTE-Advanced networks.

A primary focus of the M2M research is to provide recommendations regarding PHY/MAC procedures in support of M2M to the 3GPP standardization process. The rapidly-deployable mesh topology component addresses M2M applications such as remote control and personnel/fleet tracking envisaged for future broadband civil protection networks. This work builds upon ongoing European research in this important area. Fundamental aspects of low-latency transmission are considered in addition to validation on real-time prototypes for a subset of the considered application scenarios.

The cellular scenario validation is carried out using both live measurements from an HSPA test cell coupled with large-scale real-time emulation using the OpenAirInterface.org emulator for both high-performance gaming and M2M applications. In addition, a validation testbed for low-layer (PHY/MAC) low-latency procedures will be developed. The rapidly-deployable wireless mesh scenario validation makes use of the real-time OpenAirInterface.org RF platform and the existing FP6 CHORIST demonstrator interconnected with commercial M2M equipment.

**Professor Erik G Larsson**
The Department of Electrical Engineering

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**Partners**

1. Eurecom, France (Coordinator)
2. Thales Communications SA, France
3. Technische Universität Wien, Austria
4. Linköpings universitet, Sweden
5. AT4 wireless, S.A., Spain
6. Ericsson D.O.O for Telecommunications, Serbia
IN THIS PROJECT we seek to develop new smart imaging molecular tools for combating neurodegenerative diseases such as Alzheimer’s disease and prion diseases. Emphasis is put on translational applied research for the development and validation of novel properly functionalized luminescent conjugated polymers (LCP) that via modern imaging technology can give rise to entirely new and innovative methodology for studying neurodegenerative diseases. The objectives include the development of novel imaging agents that can be utilized for biomedical research, diagnosis, monitoring and prognosis, and for support and guidance of therapeutic interventions for Alzheimer’s disease and prion diseases.

The consortium is composed of expert groups in experimental optics, polymer synthesis, magnetic resonance imaging (MRI), synthesis of functionalized magnetic nanoparticles, amyloid structure, AD mouse models, clinical AD, and prion diseases. At the same time this project establishes strategic links between mainly SME based Industries, expert researchers at universities and principal users in terms of hospitals. The project consortium will develop and share an efficient plan for dissemination and exploitation of the project results.

LUPAS
LUMINESCENT POLYMERS FOR IN VIVO IMAGING OF AMYLOID SIGNATURES

PROFESSOR PER HAMMARSTRÖM
The Department of Physics, Chemistry and Biology
THE INTERNET OF the future will to a large extent rely on mobile networks. Mobile data grew with 70% in 2012 and is predicted to grow 13-fold in the next 5 years. This puts very high demands on the development of mobile access technology.

MAMMOET will advance the development of Massive MIMO (MaMi), a new and most promising direction in mobile access. MaMi makes a clean break with current technology by using several hundreds of base station antennas that operate phase-coherently together, simultaneously serving many tens of low-complexity single-antenna terminals in the same time-frequency resource.

MAMMOET will demonstrate that MaMi can increase both data rates and the overall spectral efficiency by up to ten times, while decreasing the transmitted radiofrequency (RF) power by many orders of magnitude. Other benefits of MaMi include the extensive use of inexpensive low-power components, reduced latency, simplification of the multiple-access layer, and robustness to interference. The drastically reduced emitted RF power can reduce the total energy consumption of a mobile network, when implemented with simple, low power hardware developed in MAMMOET. Consequently, MaMi can, with proper system design, facilitate entirely new deployment scenarios, with wind or solar powered base stations.

MAMMOET will substantially contribute to the development of practical MaMi systems and secure a leading position for European industry in its exploitation. Specifically, MAMMOET will investigate the practical limitations of MaMi, and develop complete technological solutions leveraging on innovative low-cost and drastically more efficient and flexible hardware.

The academic and research institute partners in MAMMOET include pioneers in MaMi and groups with extensive experience in circuit design for wireless communications. The industrial partners are leaders in their fields and cover the entire chain from component manufacturing to system development and service provisioning.

PROFESSOR ERIK G LARSSON
The Department of Electrical Engineering
COOPERATION

MAN4GEN
MANUAL OPERATION FOR 4TH GENERATION AIRLINERS

THE PROJECT WILL identify current deficiencies of situational awareness and manual control of modern flight decks, and impact the design of procedures, training and cockpit design in the aerospace industry. Procedures will be developed to help the pilot identify not only the fault, but where the airplane is with respect to its operational envelope and limits. By empowering the pilot to utilize his/her skills more effectively, identifying how to create conditions that increase the likelihood of success, and developing guidelines to train fundamental skills to deal with unexpected events, Man4Gen will directly impact the reduction of fatal accidents such as those caused by LOC-I.
MOLESOL

ALL-CARBON PLATFORMS FOR HIGHLY EFFICIENT MOLECULAR WIRE-COUPLED DYE-SENSITIZED SOLAR CELLS

THE PROPOSED PROJECT comes with a visionary approach, aiming at development of highly efficient molecular-wire charge transfer platform to be used in a novel generation thin film dye-sensitized solar cells fabricated via organic chemistry routes. The proposed technology combines the assembled dye monolayer, linked with organic molecular wires to semiconducting thin film deposited on optically transparent substrates. Current organic photovoltaic (OPV) cell designs made a significant step towards low cost solar cells technology, however in order to be competitive with Si and CIGs technologies, OPVs have to demonstrate long term stability and power conversion efficiencies above 10%. The highest reported power conversion efficiency for OPV device based on bulk heterojunction device with PCBM and low band gap conjugated polymers is today 6.4% but this system seems reaching its limit. Offsets in the energetics of these systems lead to large internal energy losses. The dye-sensitized solar cells (DSC) reach the efficiency above 11% but the problems with the stability of the electrolyte are the current bottleneck. The MOLESOL comes with a novel concept of hybrid device combining the advantages of both concepts (i.e. dye coupled with organic molecular wire to a conductive electrode). This concept will lead to stable cells with enhanced conversion efficiency based on:

- Reduction of critical length for the charge collection generated in the dye monolayer by the inorganic bottom electrode, using short molecular wires compatible with exciton diffusion length.
- Replacing current inorganic ITO/FTO (n-type) layer by novel transparent wide band p-type semiconductor with a possibility of engineering the surface workfunction and leading to perfect matching between HOMO of the dye layer and the valence band of semiconductors, allowing larger Voc.

PROFESSOR MATS FAHLMAN

The Department of Physics, Chemistry and Biology

PARTNERS

1. Interuniversitair Micro-Electronica Centrum VZW, Belgium (coordinator)
2. Solarprint Limited, Ireland
3. Dyesol Italia SRL, Italy
4. Greatcell Solar SA, Switzerland
5. Ustav Fyzikali Chemie J. Heyrovskeho AV CR, v. v. i., Czech Republic
6. National University of Singapore, Republic of Singapore
7. Ecole Polytechnique Federale de Lausanne, Switzerland
8. Max Planck Gesellschaft Zur Foerderung Der Wissenschaften E.V., Germany
THE GROWING FIELDS of organic electronics and spin-based electronics rely on the use of organic conjugated molecules and polymers as active components in multi-layer device applications such as light-emitting displays, solar cells, field-effect transistors, (bio)chemical sensors and storage devices. Since all organic-based devices are made by deposition of successive layers (metal, oxide, insulating or semiconducting layers), many key electronic processes (such as charge injection from metallic electrodes, charge recombination into light or light conversion into charges, spin injection, etc.) occur at interfaces. Although a large body of knowledge has been accumulated on the characterization of such interfaces (especially morphological issues), a detailed and unified understanding of the electronic processes occurring at these interfaces is currently missing and there is no consensus on the materials and device strategies that need to be developed in order to achieve these objectives. The main goal of this proposal is to bring together complementary expertises in order to assess the electronic processes occurring at interfaces via theoretical modelling tools supported by surface-sensitive characterization techniques. MINOTOR gathers leading groups in the modelling of electronic processes at interfaces (organic/organic, metal/organic, and inorganic/organic) typically encountered in organic-based electronic devices. The main goal of MINOTOR is to develop a multiscale theoretical approach ranging from the atomistic to mesoscopic scale to model in the most realistic way such interfaces and provide a unified view of the electronic phenomena taking place at these interfaces. The theoretical predictions will be compared to experimental investigations performed in the consortium, thereby allowing a direct feedback between theory and experiment.

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**PROFESSOR MATS FAHLMAN**

The Department of Physics, Chemistry and Biology
IN ORDER TO strengthen Europe’s leading position in high-speed, end-to-end, mobile network systems technology, the Multi-Base consortium has identified three main areas where research will have a major impact on the advancement of state-of-the-art technology and the emergence of a sound competitive and innovative environment for the European communications and services industry:

i. multi-tasking radio
ii. scalable reconfigurable multi-processor technology (MPSOC frameworks) and
iii. algorithm/architecture co-design for maximum energy efficiency.

The Multi-Base project objectives target the elimination of key technical and commercial barriers to ubiquitous broadband access by enabling efficient and sustainable disposition of operation and production factors as spectrum, power engineering cost and silicon process technology.

Drawing on project research in these three areas, the Multi-Base consortium will demonstrate new handset baseband architectures that enable end-to-end interconnection of humans and devices, with ability to support tenfold scaling in the number of interoperating connectivity links at the same cost and power consumption as today’s technology. For more information please see http://www.multibase-project.eu.
THE SYMPTOMS OF complex disease like allergy, obesity and cancer depend on the products of multiple interacting genes. High-throughput techniques have implicated hundreds of genes. There are also considerable individual variations. A clinical implication of this may be inadequate treatment response, which is increasingly recognized as a cause of increased suffering and costs. Ideally, physicians should be able to routinely personalize medication based on a few diagnostic markers. Finding such markers is a formidable challenge. We hypothesize that translational clinical studies based on high-throughput genomics, advanced computing and systems biology may help to identify markers for personalized medication in complex diseases. We organize disease-associated genes in networks that are analyzed in a top-down manner. First, modules of interacting genes with distinct biological functions are identified. Then the modules are dissected to find pathways and finally upstream genes with key regulatory functions. We use bioinformatic methods that were recently described by us in Nature Genetics and Nature Biotechnology. An important focus of this project is to develop these methods to form multi-layer modules that integrate information about disease-associated changes on the DNA, RNA and protein levels. Since these levels interact, studies of the different levels can be interactively used to cross-validate the modules. This involves both genetic and experimental studies, but the ultimate test of the modules will be if they can be used for clinical predictions. For example, changes in RNA expression may be caused by a single nucleotide polymorphism (SNP) in a regulatory region. If so, the corresponding protein is tried as a marker to personalize medication. We have chosen hay fever as a model of complex disease because it is common, well-defined and readily examined in clinical and experimental studies. However, the methods may be generally applicable to complex diseases.
CARBON BASED SMART SYSTEMS FOR WIRELESS APPLICATIONS

FROM THE STRATEGIC agendas of ENIAC, EPoSS and ITRS it is evident that wireless applications are gaining more and more importance that results to new requirements in terms of miniaturization and increased complexity. The limitations of Moore’s Law in term of physics but also in terms of manufacturability, flexibility and multi-functionality has motivated research and development to implement new technologies and new wireless architectures identified as Beyond CMOS and More than Moore. Carbon nanotubes are featuring very attractive intrinsic multi-physic properties. These properties coupled with CMOS compatibility offer promise for a new generation of smart miniaturised systems for wireless communications. Graphene also exhibits impressive electrical and mechanical properties. CMOS compatible microwave graphene devices, still at their infancy, hold promise for extremely low noise and high speed communications. The coordinator (TRT) is one of the major world players in civilian & professional electronics. TAS is №1 in Europe and №3 worldwide for civil and military aerospace products. One key area for their products is T/R front-end systems for applications like radars for which long term solutions are continuously sought after.

The main concept of NANO-RF is the development of CNT & graphene based advanced component technologies for the implementation of miniaturised electronic systems for 2020 and beyond wireless communications and radars. The major objectives of NANO-RF are the development of: Active components from CNTs & graphene Passive components from CNTs & graphene Capacitive RF NEMS from CNTs based vertical interconnects CNTs & graphene based ICs The developed components and technologies will be implemented in the following demonstrators: Reflect array antennae for wake vortex and weather radars and Graphene receiver module The demonstrators will exhibit the reconfigurability, systemability, integratability and manufacturability of the developed technologies and unify advanced.

PROFESSOR ROSITSA YAKIMOVA
The Department of Physics, Chemistry and Biology
VGASTROENTERITIS, caused by the airborne Norovirus, is the third most deadly infectious disease worldwide, infecting ~4% of the population annually, worldwide, and has related costs measured in billions € annually in the EU alone. Today, detection of airborne viruses can only be done in retrospect in the laboratory, which severely limits the ability to rapidly react and limit the spread of an outbreak. The NOROSENSOR consortium will address this problem by developing the first of its kind, real-time sensor for airborne viruses, with particular focus on the NoV. Because the virus concentration in air can be very low, and because rapid and efficient virus trapping and concentration methods have been missing, no solution exists today. The NOROSENSOR project will fill this important need by integrating a number of recently developed, highly powerful technologies:

- Novel nanobiotechnology: nano-bead enhanced rolling circle amplification (nano-RCA), engineered synthetic DNA aptamers, and proximity ligation assays (PLA)
- First ever airborne nanoparticle manipulation: capturing, filtering and up-concentration of viruses using acoustophoresis and electrostatic precipitation, with beyond state-of-the-art:
  - Ultra-sensitive QCM mass-sensitive transducers and electronics.
  - Novel Off-stoichiometry Thiol-Ene-Epoxies (OSTE) polymers for cartridge and reagent storage on-chip. The consortium consist of six of the highest ranked European Universities, each experts in their research area, two SMEs providing a unique expertise in their core business areas, and a large multinational industry in infection control technology.

**NOROSENSOR**

**A REAL-TIME MONITORING SYSTEM FOR AIRBORNE NOROVIRUS**

**PARTNERS**

1. Kungliga Tekniska Högskolan, Sweden (coordinator)
2. Katholieke Universiteit Leuven, Belgium
3. Stockholms universitet, Sweden
4. Vibrating Sensor Sweden AB, Sweden
5. Linköpings universitet, Sweden
6. The Chancellor, Masters and Scholars of the University of Cambridge, United Kingdom
7. Future Diagnostitics BV, The Netherlands
8. Karolinska institutet, Sweden
9. Getinge Infection Control AB, Sweden
10. Loughborough University, United Kingdom

**PROFESSOR LENNART SVENSSON**

The Department of Clinical and Experimental Medicine
**ODHIN IS A** Europe wide project involving research institutions from nine European countries that will help to optimize the delivery of health care interventions by understanding how better to translate the results of clinical research into every day practice. ODHIN will use the implementation of identification and brief intervention (IBI) programmes for hazardous and harmful alcohol consumption (HHAC) in primary health care (PHC) as a case study. There is strong evidence for the effectiveness and cost-effectiveness of IBI in reducing HHAC and its consequences, which include more than 60 clinical diagnoses and conditions. A series of systematic reviews investigating the impact of different behavioural, organizational and financial strategies in changing provider behaviour across a range of clinical lifestyle interventions will be undertaken. The knowledge base of potential barriers and facilitators to implementing IBI will be updated. A stepped cluster randomised controlled trial will be undertaken with five arms and three time phases to test the incremental effect of strategies.

Phase A will aim at raising awareness, insight, and acceptance of performance of IBI in PHC. Phases B and C will aim at acceptance, change and maintenance of implementation with financial and organisational strategies used in a different order to test the impact of both separately and in sequence. Modelling studies will test the impact of different IBI approaches on changes in alcohol consumption and the resulting impacts on healthcare costs and health-related quality of life. ODHIN will build a clinical evidence-based database on effective and cost-effective IBI measures for use in PHC and will develop a tool to assess the extent of provision of clinical practice. A project website and a series of scientific publications, reports and fact sheets will widely disseminate the documented and evaluated conceptual models across diverse health care settings throughout Europe.

**PARTNERS**

1. Fundacio Privada Clinic Per a la Recerca Biomedica, Spain (coordinator)
2. Stichting Katholieke Universiteit, The Netherlands
3. The University of Sheffield, United Kingdom
4. University of York, United Kingdom
5. Azienda Per i Servizi Sanitari n°2 Isontina, Italy
6. University of Newcastle Upon Tyne, United Kingdom
7. King’s College London, United Kingdom
8. Goteborgs universitet, Sweden
9. Linköpings universitet, Sweden
10. Department de Salut - Generalitat de Catalunya, Spain
11. Państwowa Agencja Rozwiązywania Problemów Alkoholowych, Poland
13. Univerza v Ljubljanhi, Slovenia
14. Instituto da Droga e da Toxicodependencia, Portugal
15. Servico de intervencao nos comportamentos aditivos e nas dependencias, Portugal
16. Istituto Superiore di Sanita, Italy
17. Universiteit Maastricht, The Netherlands
18. Statni Zdravotni Ustav, Czech Republic
19. Pomorski Uniwersytet Medyczny w Szczecinie, Poland
20. Warszawski Uniwersytet Medyczny, Poland

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**PROFESSOR PREBEN BENDTSEN**

The Department of Medical and Health Sciences
OVER THE LAST years, enormous technological achievements have been made in the field of organic electronics and photonics and some applications such as light-emitting diodes, photovoltaics, and flexible electronic paper are now in an advanced stage of commercialisation. However new functional organic materials are still missing to enable the next generation of applications. These materials should allow new or enhanced properties in electron transport, conversion of photons into electrons and/or conversion of electrons into photons and being printed in a continuous process.

The Organic Nanomaterials for Electronics and Photonics project will develop the missing high-performance, low-cost multifunctional materials and their process technology to strengthen industrialization of the electronics and photonics sector in Europe thanks to the synergy between academic and industrial research and the integration of complementary competences.
**GOALS: WE PROPOSE** a regenerative medicine clinical trial of the therapeutic system OSTEOGROW for regenerating bone through harnessing a novel bone device to accelerate and enhance bone repair.

The osteogenic device is composed of an autologous carrier and a biologically active recombinant human protein offering a therapeutic solution in bone regeneration superior to currently available options.

The autologous carrier is a whole blood-derived coagulum device (WBCD) from the peripheral blood of a patient, which will act as an endogenous biocompatible material causing significantly less inflammatory reactions than currently used bone devices.

The bone inducing molecule is the recombinant human bone morphogenetic protein 6 (BMP6) which binds to WBCD and is more potent than other BMPs in stimulating bone formation in preclinical animal models. The consortium members will scale-up the production of BMP6 from an already developed working cell bank to enter clinical trials on bone regeneration.

The bone diseases we will treat locally with OSTEOGROW are acute radius fractures and recalcitrant non-unions of the tibia. These conditions are widespread and highly debilitating diseases for which such therapy holds great promise.

**Workflow:** Preliminary pre-clinical data are already available, and clinical grade (GMP) BMP6 will be available before the beginning of the project to perform toxicology studies and to determine the final formulation of OSTEOGROW. Clinical trials will start within 18 months from the start of the project funding.

**Business strategy:** SMEs Genera Research and BioTest will develop and validate the BMP6 production in their facilities. Consortium members from Medical University of Vienna, Sarajevo University Clinical Centre, Linkoping University Faculty of Health Sciences, Zagreb University Trauma Clinic, SMART Medico and Paul Regulatory Services will perform, monitor and coordinate clinical trials. OSTEOGROW will find a wide use in human and veterinary medicine.

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**PROFESSOR PER ASPENBERG**

The Department of Clinical and Experimental Medicine

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**PARTNERS**

1. Sveuciliste u Zagrebu, Medicinski Fakultet (University of Zagreb School of Medicine), Croatia (coordinator)
2. Genera istrazivanja d.o.o. (Genera Research), Croatia
3. Linköpings universitet, Sweden
4. Biotest s.r.o., Czech Republic
5. Medizinische Universität Wien (Medical University of Vienna), Austria
6. Klinika za Ortopediju i traumatologiju KCU Sarajevo (University of Sarajevo Clinical Center, orthopedic and traumatology Clinic), Bosnia and Herzegovina
7. Paul Regulator Services UK Ltd, United Kingdom
8. Klinički bolnički centar »Sestre milosrdnice«, Croatia
9. Smart Medico d.o.o., Croatia
10. Vitrology Limited, United Kingdom
11. European Research and Project Office GmbH (Eurice), Germany
THE INAPPROPRIATE SUPPLY and consumption of non-prescribed medicines consists a public health problem of utmost importance for developed as well as for developing countries. The aims to develop new research methods and generate scientific basis to reduce the incidence of drug-related mishaps and maximize the potent effect of medicines in the provision of healthcare.

The project utilizes a theory-specific approach to identify and understand primary care physicians and primary care patients behaviour towards prescription and consumption of medicines. Grounded on the theory of planned behaviour (TPB; Ajzen, 1991) seeks to identify predisposing behavioural factors that will enable the alteration of the problematic behaviour. This model also provides the basis for theory-guided interventions, tailored to address the behavioural components playing an influential role in the irrational prescription and consumption of medicines.

In particular, the project s objectives include the assessment of the extent of OTC misuse in countries of southern Europe, the identification of influential factors on primary care physicians and patients intentions towards irrational prescription and misuse of medicines as well as the design and implementation of certain pilot interventions with the potential to be translated into policy. Qualitative and quantitative research methods will be employed to assess predisposing factors of inappropriate prescription practices and medicine misuse in samples of primary care physicians and primary care patients. Pilot interventions will be also devised and applied. Southern European countries will benefit from the progress and the know-how of northern European countries invited to participate in the current proposal.

Another benefit will be the formation of a network consisting of various disciplines that ensures evaluation, discussion and widespread dissemination of emerging knowledge throughout European primary health care settings.

OTC SOCIOMET
ASSESSING THE OVER-THE-COUNTER MEDICATIONS IN PRIMARY CARE AND TRANSLATING THE THEORY OF PLANNED BEHAVIOUR INTO INTERVENTIONS

PARTNERS
1. University of Crete, Clinic of Social and Family Medicine, UoC, Greece (coordinator)
2. Linköpings universitet, Sweden
3. LEAD Programme at NHN-UL, Faculty of Sciences, Leiden University, UL, The Netherlands
4. Association of General Practice in Cyprus, GPCy, Cyprus
5. French Society of General Medicine, SFMC, France
6. Mediterranean Institute in Primary Care, MIIPC, Malta
7. Turkish Association of Family Physicians, TAHUD, Turkey
8. Charles University in Prague, Department of Social & Clinical Pharmacy, FAF CU, Czech Republic
9. National School of Public Health, NSPH, Greece
10. Greek Association of General Practitioners (EL.E.GE.IA.), ELEGEIA, Greece
11. World Organization of National Colleges Academies and Academic Associations of General Practitioners/Family Physicians (WONCA Trust), WONCA Trust, The Netherlands

COOPERATION
THE EMERGENCE OF highly parallel, heterogeneous, often incompatible and highly diverse, many-core processors poses major challenges to the European software-intensive industry. It is imperative that such architectures can be fully exploited without starting from scratch with each new design. In particular, there is an urgent need for techniques for efficient, productive and portable programming of heterogeneous many-cores. PEPPHER will provide a unified framework for programming architecturally diverse, heterogeneous many-core processors to ensure performance portability. PEPPHER will advance state-of-the-art in its five technical work areas: (1) Methods and tools for component based software; (2) Portable compilation techniques; (3) Data structures and adaptive, autotuned algorithms; (4) Efficient, flexible run-time systems; and (5) Hardware support for autotuning, synchronization and scheduling. PEPPHER is unique in proposing direct compilation to the target architectures. Portability is supported by powerful composition methods and a toolbox of adaptive algorithms. Heterogeneity is further managed by efficient run-time schedulers. The PEPPHER framework will thus ensure that applications execute with maximum efficiency on each supported platform. PEPPHER is driven by challenging benchmarks from the industrial partners. Results will be widely disseminated through high-quality publications, workshops and summer-schools, and an edited volume of major results. Techniques and software prototypes will be exploited by the industrial partners. A project website (www.peppher.eu) gives continuity to the dissemination effort. The PEPPHER consortium unites Europe’s leading experts and consists of world-class research centres and universities (INRIA, Chalmers, LIU, KIT, TUW, UNIVIE), a major company (Intel) and European multi-core SMEs (Codeplay and Movidius), and has the required expertise to accomplish the ambitious but realistic goals of PEPPHER.

PEPPHER
PERFORMANCE PORTABILITY AND PROGRAMMABILITY FOR HETEROGENEOUS MANY-CORE ARCHITECTURES

PROFESSOR CHRISTOPH KESSLER
The Department of Computer and Information Science
TYPE 1 DIABETES is caused by an inflammatory process which damage insulin-producing beta-cells in the pancreas. It is one of the most common chronic diseases and its incidence is rapidly increasing. Due to its complications it causes a significant medical and economic burden to European society. A causal association between enterovirus and type 1 diabetes has become more and more likely. The aim of the present research programme is to create a new research strategy aligned to a concerted scientific research effort and creation of a network of unique resources which makes it possible to achieve a significant breakthrough in this field. The main focus is in the detection of persistent enterovirus infection leading to inflammation and tissue damage in the pancreas and its role in mediating the inflammatory response that causes type 1 diabetes. The goal is to take the critical steps towards therapeutic translation of research findings by employing a novel research design and synergistic networks of excellence based on the combination of a multidisciplinary research strategy and availability of unique biobanks existing in Europe. This research programme will also create a completely new type of biobank which facilitates a wide range of new analyses of fresh tissues. The programme includes a strong translational component which facilitates the ongoing efforts to develop vaccines against diabetogenic enteroviruses and other targeted therapies. The program also has a wider impact on the entire field of research on pathogen-disease associations, since the same innovative research strategy can be applied to other diseases as well. Altogether, this research program will take full advantage of the excellent biobank networks and a long tradition in biomedical and clinical research in Europe and creates an exceptional opportunity to take the final steps towards proving causality in the enterovirus-diabetes association.

PEVNET
PERSISTENT VIRUS INFECTION AS A CAUSE OF PATHOGENIC INFLAMMATION IN TYPE 1 DIABETS - AN INNOVATIVE RESEARCH PROGRAM OF BIOBANKS AND EXPERTISE

PARTNERS
1. Tampereen Yliopisto, Finland (coordinator)
2. Karolinska Institutet, Sweden
3. Uppsala Universitet, Sweden
4. Universitetet i Oslo, Norway
5. The Chancellor, Masters and Scholars of The University of Cambridge, United Kingdom
6. King’s College London, United Kingdom
7. Universita’ Degli Studi Di Siena, Italy
8. Helsingin Yliopisto, Finland
9. Turun Yliopisto, Finland
10. The University of Exeter, United Kingdom
11. Centre Hospitalier Regional et Universitaire de Lille, France
12. Vactech OY, Finland
13. Linköpings universitet, Sweden

PROFESSOR JOHNNY LUDVIGSSON
The Department of Clinical and Experimental Medicine

Starting date Ending date Duration Theme
2011-01-01 2015-12-31 48 months Health
EU contribution Amount to LiU
€ 5 999 687 € XX
THE NETWORK OF Excellence (NoE) PolyNet aims to establish Europe in the area of organic and large area electronics as the world leader in science, technology development and subsequent commercial exploitation of printing and large area technologies for heterointegration of flexible electronics.

Future industrial exploitation needs a research cooperation base and a service base to foster transfer from science to industry within the EU. Therefore, the fragmentation of the European research landscape has to be overcome.

The NoE PolyNet will support these aims with three core platforms:

- a research cooperation platform
- a service platform
- a knowledge platform

For a long-term integration of the European research landscape, concepts for the continuation of research cooperation and service offers will be developed, validated and put into operation.

Impact is expected not only on the research landscape of Organic and Large Area Electronics but also indirectly on European industry by long-term stimulation of innovative technologies and new companies.

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**POLYNET**

NOE POLYNET - NETWORK OF EXCELLENCE FOR THE EXPLOITATION OF ORGANIC AND LARGE AREA ELECTRONICS

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**PARTNERS**

1. VDI/VDE Innovation + Technik GMBH, Germany (coordinator)
2. University of Liverpool, United Kingdom
3. Linköpings universitet, Sweden
4. Politechnika Lodzka, Poland
5. Acreo AB, Sweden
6. Aristotle Thessaloniki, Greece
7. Cardiff University, United Kingdom
8. Commissariat a L’Energie Atomique, France
9. Fraunhofer Gesellschaft zur Foerderung der angewandten Forschung, Germany
10. Interuniversitair Micro-Electronica Centrum vzw, Belgium
11. Joanneum Research Forschungsgesellschaft mbH, Austria
12. Valtion Teknillinen Tutkimuskeskus, Finland
13. Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO, The Netherlands
14. Technische Universität Chemnitz, Germany
15. Oulun Yliopisto, Finland
16. Universite Paris 7 Denis Diderot, France
17. Ecole Polytechnique, France

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**PROFESSOR MAGNUS BERGGREN**

The Department of Science and Technology
The Department of Science and Technology

RERUM
RELIABLE, RESILIENT AND SECURE IOT FOR SMART CITY APPLICATIONS

RERUM will develop, evaluate, and trial an architectural framework for dependable, reliable, and secure networks of heterogeneous smart objects supporting innovative Smart City applications. The framework will be based on the concept of “security and privacy by design”, addressing the most critical factors for the success of Smart City applications.

The technical approach aims to enable tighter integration of Internet of Things (IoT) technology in the Smart City domain. The ultimate target is to provide innovative applications that will improve the citizens’ quality of life. RERUM will design mechanisms to manage resources in an efficient and effective manner, ensuring confidentiality, authenticity, integrity, and availability of data gathered by IoT objects. The RERUM approach is scenario-independent, hence applicable to the entire gamut of future Smart City applications.

To achieve these goals RERUM will:
• analyse industrial and Smart City application requirements for steering the overall system design,
• develop a new, technically innovative framework to interconnect a large number of heterogeneous software and hardware smart objects, using novel approaches, e.g. based on virtualization and cognitive radio,
• increase the energy efficiency of IoT to provide sustainable infrastructures in the economic and ecologic sense,
• model the trustworthiness of the IoT and enable secure and reliable exchange of trusted information,
• enable secure bootstrapping and self-monitoring of networks to detect and mitigate security events,
• perform proof-of-concept experiments and real-world trials in two Smart City environments to assess the project results with respect to technical feasibility and user acceptance, and
• assess the portability and its “scenario-agnostic” characteristics by cross-evaluating the trials’ results.
• To vertically address these aspects RERUM unites a consortium of complementary stakeholders covering all areas of the IoT-based Smart Cities paradigm.

PARTNERS
1. Eurecom-European Institute For Research and Strategic Studies in Telecommunications GMBH, (Coordinator), Germany
2. Atos Spain SA, Spain
3. Siemens AG, Germany
4. University of Bristol, United Kingdom
5. Linköpings universitet, Sweden
6. Universität Passau, Germany
7. Advancare, SL, Spain
8. Foundation For Research and Technology Hellas, Greece
9. Cyta Hellas Tilepokoinonias AE, Greece
10. Ayuntamiento de Tarragona, Spain
11. Heraklion Municipality, Greece
12. Siemens SRL, Romania

RELIABLE, RESILIENT AND SECURE IOT FOR SMART CITY APPLICATIONS

RERUM

Starting date Ending date Duration Theme
2013-09-01 2016-08-31 36 months ICT
EU contribution Amount to LiU
€ 3 497 000 € 369 840

COOPERATION

LECTURER EVANGELOS ANGELAKIS
The Department of Science and Technology
BETWEEN 1994 AND 2001, 361 children were injured or killed during transportation to/from their school in Sweden, whereas 455 were killed or injured in Austria only in 2007 and 97 were killed in Italy in 2005. In a single school bus accident in Greece in 2003, 20 children lost their lives. Different as the above numbers may be, they all tell us one thing: Crashes involving school buses and crashes involving children travelling from/to school, are far from negligible and require further efforts to be drastically reduced.

SAFEWAYS2SCHOOL aims to design, develop, integrate and evaluate technologies for providing a holistic and safe transportation service for children, from their home door to the school door and vice versa, encompassing tools, services and training for all key actors in the relevant transportation chain. These include optimal route planning and rerouting for school buses to maximize safety, on-board safety applications (i.e. for speed control and seat belts), intelligent bus stops, effective warning and information systems for bus drivers, children, parents and the surrounding traffic; as well as training schemes for all actors.

The project innovative systems, services and training schemes will be tested in 4 sites Europewide, including North (Sweden), Central (Austria), South (Italy) and Eastern (Poland) Europe; to evaluate their usability, efficiency, user acceptance and market viability; taking into account the very different children’s transportation to/from school systems across the different European regions as well as key cultural and socio-economic aspects.

PROFESSOR TORBJÖRN FALKMER
The Department of Medical and Health Sciences
SAPHYRE

SHARING PHYSICAL RESOURCES - MECHANISMS AND IMPLEMENTATIONS FOR WIRELESS NETWORKS

IN CURRENT WIRELESS communications, radio spectrum and infrastructure are typically used such that interference is avoided by exclusive allocation of frequency bands and employment of base stations. SAPHYRE will demonstrate how equal-priority resource sharing in wireless networks improves spectral efficiency, enhances coverage, increases user satisfaction, leads to increased revenue for operators, and decreases capital and operating expenditures.

SAPHYRE represents a consortium that spans the entire chain from spectrum regulatory aspects, networking, physical layer to hardware implementation.

The vision of SAPHYRE is to:
(i) show how voluntary sharing of physical and infrastructure resources enables a fundamental, order-of-magnitude-gain in the efficiency of spectrum utilisation;
(ii) develop the enabling technology that facilitates such voluntary sharing;
(iii) and determine the key features of a regulatory framework that underpins and promotes such voluntary sharing.

SAPHYRE’s main objectives are conceptually described as:
1. SAPHYRE will analyse and develop new self-organising physical layer resource (spectrum, spatial coexistence) sharing models by a generalised cross-layer and cross-disciplinary approach.
2. SAPHYRE will propose and analyse efficient co-ordination mechanisms which require only small intervention (to counteract selfish, malicious users). In particular in sharing scenarios, incentive based design is applied in order to reduce regulatory complexity.
3. SAPHYRE will develop a framework for infrastructure sharing to support quality of service with sufficiently wide carrier bandwidths and competition between different operators.

Therefore, modern and novel physical layer techniques, including network and interference aware modulation/coding, multi-antenna, spatial scheduling, multi-hop, relay co-operative transmission which lead to high spectral efficiency are developed.
SECURITY HAS ALWAYS been a stepchild to the developers of embedded systems. In the past they were able to rely on physical protection. Due to the connectivity and ubiquity of today’s embedded systems this is no longer possible.

The aim of SecFutur is to develop and establish a security engineering process for embedded systems. In order to achieve this overall goal SecFutur will provide a set of implemented resource-efficient security building blocks for embedded systems, each addressing a specific complex non-functional requirement, and a security engineering framework that supports the developer in integrating these building blocks into the overall engineering process.

SecFutur targets the developer of embedded systems who by using the project results will be able to follow an application driven security engineering approach and increase the overall security of the system. Practical scenarios from several security-relevant application areas will be used in SecFutur to evaluate and demonstrate the advances towards secure resource-efficient embedded systems.
THE KEY IDEA in SEMENTICON’S is to exploit human face as a major indicator of individual’s health status. The application field will be the prevention of cardiometabolic risk, for which healthcare systems are registering an exponential growth of social costs. According to semeiotics viewpoint, face signs will be mapped to measures and computational descriptors. To this end, we will design and construct a multisensory system integrated into a hardware platform (Wize Mirror) having the exterior aspect of a mirror. Thus, it will easily fit at users’ home or in other sites of their daily life (e.g. fitness and nutritional centres, pharmacies, schools and so on). The Wize Mirror will collect data mainly in the form of videos, images and gas concentration signals. They will be processed by dedicated methods to extract biometric, morphometric, colorimetric, and compositional descriptors measuring individual’s facial signs. The integration of such descriptors will provide a virtual individual’s model useful to compute and trace the daily evolution of an individual’s wellness index. A health diary will be created so as to enable individuals to evaluate and personally correlate lifestyle to well-being and health. Suggestions and coaching messages will be also provided. Moreover, only if agreed with the individual, data in the diary could be shared with health professionals so as to receive, when needed, direct expert guidance and support. In this frame, we will carefully concentrate on the development of user-friendly human-computer interactions so as to foster the perception of the system usefulness and reliability. Medical experts will validate system. Exploitation of the Wize Mirror should favor new aggregations between health and well-being actors including industry, fitness, and schools. Significant effects towards the development of new CVD prevention strategies are expected, with positive impacts to the reduction of avoidable disease burden and health expenditures.
COOPERATION

DYNAMIC SPECTRUM ALLOCATION has become a key research activity in wireless communications field and in particular a key technology for “The Network of the Future” objective proposed in ICT Work Programme 2007.

Following these current trends towards dynamic spectrum allocation, the SENDORA project will focus on developing innovative techniques based on sensor networks, that will support the coexistence of licensed and unlicensed wireless users in a same area. The SENDORA project ideas stem from recent fundamental works on cognitive radio technology.

The capability to detect spectrum holes, without interfering with the primary network currently in use, is the actual major difficulty faced by the cognitive radio. The innovative concept proposed in SENDORA project consists in developing a “sensor network aided cognitive radio” technology which will allow to solve this issue, thanks to the introduction of sensor networks and associated networking capabilities.

The sensor network aided cognitive radio proposed and studied in SENDORA project will address many different advanced techniques, but will also propose an analysis of the potential exploitation of these techniques. First, scenarios of interest will be defined and will provide the technical activities with requirements to cover. Different types of scenarios will be proposed, corresponding to real needs, mainly identified by the potential integrators of the solutions. On the technical point of view, novel spectrum sensing techniques will be first proposed to be able to identify spectrum holes. Corresponding information management and exploitation will be studied to achieve the co-existence of cognitive radios with primary licensed technology without generating harmful interferences. The design, dimensioning and networking of the wireless sensor network will be deeply addressed. Finally, a proof-of-concept demonstration will be developed to assess the theoretical research.

SENDORA
SENSOR NETWORK FOR DYNAMIC AND OPPORTUNISTIC RADIO ACCESS

PARTNERS

1. Thales Communications and Security SAS, France (coordinator)
2. Institut Eurocom, France
3. Kungliga Tekniska Högskolan, Sweden
4. Teknillinen Korkeakoulu, Finland
5. Norges Teknisk-Naturvitenskapelige Universitet NTNU, Norway
6. Telenor ASA, Norway
7. Universitat de Valencia, Spain
8. Universita Degli Studi di Roma «La Sapienza», Italy
9. Linköpings universitet, Sweden

PROFESSOR ERIK G LARSSON
The Department of Electrical Engineering
THE GOAL OF SHERPA is to develop a mixed ground and aerial robotic platform to support search and rescue activities in a real-world hostile environment like the alpine scenario. What makes the project very rich from a scientific viewpoint is the heterogeneity and the capabilities to be owned by the different actors of the SHERPA system: the “human” rescuer is the “busy genius”, working in team with the ground vehicle, as the “intelligent donkey”, and with the aerial platforms, i.e. the “trained wasps” and “patrolling hawks”. The emphasis is placed on robust autonomy of the platform, acquisition of cognitive capabilities, collaboration strategies, natural and implicit interaction between the “genius” and the “SHERPA animals”, which motivate the research activity.
SOFTWARE SYSTEMS CONTINUE to be crippled by security vulnerabilities. One of the reasons for this is that information on known vulnerabilities is not easily available to software developers, or integrated into the tools they use.

The main objective of SHIELDS is to increase software security by bridging the gap between security experts and software practitioners and by providing the software developers with the means to effectively prevent occurrences of known vulnerabilities when building software.

We will achieve this objective by developing novel formalisms for representing security information, such as known vulnerabilities, in a form directly usable by development tools, and accessible to software developers. This information will be stored in an internet-based Security Vulnerabilities Repository Service (SVRS) that facilitates fast dissemination of vulnerability information from security experts to software developers. We will also present a new breed of security methods and tools (some open source, some commercial) that are constantly kept up-to-date by using the information stored in the SVRS.

In addition to the SVRS, and new security tools, we will create a SHIELDS Compliant certification for tools and a SHIELDS Verified logo program for software developers that will offer an affordable and yet technically effective evaluation and certification method in the fight against common security vulnerabilities. Commercial exploitation will be through these programs, the tools, and through subscriptions to the repository (parts will be free).

The consortium consists of two universities and three major research institutes, with complementary leading expertise in the technical areas of the project, one large software developer, and two SMEs that specialise in security consulting, security evaluations and development of secure software. The project duration will be 30 months, with an overall budget of 4.9M euro and requested grant of 3.6M euro.

PROFESSOR NAHID SHAHMEHRI
The Department of Computer and Information Science
PARTNERS

1. National University of Ireland, Galway, Ireland (coordinator)
2. Institute of Communication and Computer Systems, Greece
3. University of Southampton, United Kingdom
4. Linköpings universitet, Sweden
5. BioIRIC d.o.o. Kragujevac, Serbia
6. Intrasoft International SA, Belgium
7. University College London, United Kingdom
8. National and Kapodistrian University of Athens, Greece
9. The Methodist Hospital Research Institute, USA
10. The Research Trust of Victoria University of Wellington, New Zealand

THE CLINICAL EVIDENCE indicates that the number of people with all levels of hearing impairment and hearing loss is rising mainly due to a growing global population and longer life expectancies. Hearing loss caused by pathology in the cochlea or the cochlear nerve is classified as sensorineural hearing loss. The study of the normal function and pathology of the inner ear has unique difficulties as it is inaccessible during life and so, conventional techniques of pathologic studies such as biopsy and surgical excision are not feasible.

SIFEM focuses on the development of a Semantic Infostructure interlinking an open source Finite Element Tool with existing data, models and new knowledge for the multi-scale modelling of the inner-ear with regard to the sensorineural hearing loss. The experts will have access to both the data (micro-CT images, histological data) and inner ear models, while the open-source developed tools and the SIFEM Conceptual Model will be contributed to the VPH toolkit enhancing their reusability. These SIFEM open source tools and services enhance and accelerate the delivery of validated and robust multi-scale models by focusing on:

(i) Finite Element Models manipulation and development,
(ii) cochlea reconstruction and
(iii) 3D inner ear models visualization.

The final outcome is the development of a functional, 3D, multi-scale and validated inner-ear model that includes details of the micromechanics, cochlea geometry, supporting structures, surrounding fluid environment and vibration patterns. In the open context that the project addresses the results can be used to better identify the mechanisms that are responsible for the highly sensitive and dynamic properties of hearing loss. These result to the description of alterations that are connected to diverse cochlear disorders and assist the experts to better assess each patient’s condition leading to more efficient treatment and rehabilitation planning and, in long-term, to personalized healthcare.

SIFEM
SEMANTIC INFOSTRUCTURE INTERLINKING AN OPEN SOURCE FINITE ELEMENT TOOL AND LIBRARIES WITH A MODEL REPOSITORY FOR THE MULTI-SCALE MODELLING OF THE INNER-EAR

PROFESSOR STEFAN STENFELT
The Department of Clinical and Experimental Medicine
ORGANIC PHOTOVOLTAICS (OPV) represent the newest generation of technologies in solar power generation, offering the benefits of flexibility, low weight and low cost enabling the development of new consumer nomadic applications and the long term perspective of easy deployment in Building Integrated Photo Voltaics (BIPV) and energy production farms. This is a key opportunity for the EU to further establish its innovation base in alternative energies.

The current challenges reside in the combination to increase efficiencies to 8-10% (module level), increase expected lifetime up to 20 years and decrease production costs to 0.7 Eur/Wp, while taking into account the environmental impact and footprint.

The key project objectives are to achieve:
- Printed OPV with high efficiency architectures such as tandem cells and dedicated light management structures
- High performance photo active and passive (barrier) materials including process controlled morphology
- Solutions for cost effective flexible substrates, diffusion barriers and conductors
- Deep understanding of the device physics, elucidation of degradation mechanisms and estimate environmental impact of the main materials and processes

The project consortium combines industrial, institutional and academic support to make a significant impact at European and International level, especially on materials and processes while demonstrating their market-relevant implementations. The industrial project partners are well assembled along the supply chain of future OPV-based products, which is an important prerequisite for the creation of significant socio-economic impact of this proposal.
ADJUNCT PROFESSOR LOTTA ANDERSSON
The Department of Thematic Studies

SWITCH-ON
SHARING WATER-RELATED INFORMATION TO TACKLE CHANGES IN THE HYDROSPHERE - FOR OPERATIONAL NEEDS

THE PROJECT SWITCH-ON addresses water concerns to thoroughly explore and exploit the significant and currently untapped potential of open data. Water information is highly sought after by many kinds of end-users, both within government and business as well as within civil society. Water touches virtually all societal and environmental domains and the knowledge domain is largely multidisciplinary. New water information and knowledge can thus lead to more efficient use of environmental services and better handling of environmental problems, including those induced by climate and environmental change. SWITCH-ON will show the benefits achieved through the whole process chain by re-purposing (re-using under different context) open data products into more dedicated and refined water products, which have high value and a broad impact on society. The vision is to improve public services, and to foster business opportunities and growth, by establishing new forms of water research and facilitating the development of new products and services based on principles of sharing. The SWITCH-ON objectives are to use open data for implementing: 1) an innovative spatial information platform with open data tailored for direct water assessments, 2) an entirely new form of collaborative research for water-related sciences, 3) fourteen new operational products and services dedicated to appointed end-users, 4) new business and knowledge to inform individual and collective decisions in line with the Europe’s smart growth and environmental objectives. While focusing on water, the project is expected to inspire a much broader environmental and societal knowledge domain and many different end-users. The SWITCH-ON project will be one trigger in a contemporary global movement to better address environmental and societal challenges through openness and collaboration.

COOPERATION

PARTNERS
1. Sveriges Meteorologiska och Hydrologiska Institut, Sweden (Coordinator)
2. Alma Mater Studiorum-Universita Di Bologna, Italy
3. University of Bristol, United Kingdom
4. Ciscmet GmbH, Germany
5. Technische Universiteit Delft, The Netherlands
6. Stichting Deltares, The Netherlands
7. Ecologic Institut Gemeinnützige GmbH, Germany
8. Fondazione Eni Enrico Mattei, Italy
9. Gecosistema SRL, Italy
10. Dipl.-Ing. Günter Humer GmbH, Germany
11. HKV Lijn In Water BV, The Netherlands
12. Jeremy Benn Associates Limited, United Kingdom
13. Technische Universitaet Wien, Austria
14. Linköpings universitet, Sweden
15. Emvis Symvouloi Michanikoi Anonymi Etaireia, Greece

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ADJUNCT PROFESSOR LOTTA ANDERSSON
The Department of Thematic Studies
THERAEDGE IS AN industry-driven effort to accelerate the adoption of theranostics applications in Primary Care by pushing Point of Care Test (POCT) technology far beyond its current state-of-the-art and by delivering clinical, analytical and operational breakthroughs.

TheraEDGE is built around the high-incidence clinical case of early diagnosing lower respiratory tract infections in Primary Care. Simultaneous testing for different pathogens and their antibiotic resistance will have a huge European impact:

- **better clinical outcomes** and standards of care through more effective and timely diagnosis and treatment
- **improved health economics** through optimisation of antibiotics prescription, infection control practices and reduction of clinical visits or hospital stays
- **substantial business** for the In Vitro Diagnostics industry through the standardisation of POCT instruments and information systems, offering radical usability, robustness and vendor interoperability improvements. Practitioners will be able to run out-of-the-box multiple compliant devices from one single PDA-based operator interface
- **a set of applications** built on a convergent ITC platform that supports General Practitioners in their patient management and clinical decision-making, and provides therapeutic services for patient education and compliance monitoring in order to fight antibiotic misuse and abuse.

**ADJUNCT PROFESSOR SIGVARD MÖLNSTAD**
The Department of Medical and Health Sciences
PARTNERS
1. Numerical Mechanics Applications International SA, Belgium (coordinator)
2. Dassault Aviation SA, France
3. EASN Technology Innovation Services BVBA, Belgium
4. Alenia Aermacchi SPA, Italy
5. MAN Turbo Schweiz AG, Switzerland
6. Turbomeca SA, France
7. NPO Saturn OAO, Russian Federation
8. Eesteco SPA, Italy
9. Office National D’Etudes Et De Recherches Aerospatiales, France
10. Deutscheszentrum Fuer Luft- Und Raumfahrt EV, Germany
11. Institut National De Recherche En Informatique Et En Automatique, France
12. Centro Italiano Ricerche Aerospaziali SCPA, Italy
13. Centre International De Metodes Numerics En Enginyeria, Spain
14. Centre Europeen De Recherche Et De Formation Avancee En Calcul Scientifique, France
15. Technische Universiteit Delft, The Netherlands
16. Vrije Universiteit Brussel, Belgium
17. Politechnika Warszawska, Poland
18. Ecole Polytechnique Federale De Lausanne, Switzerland
19. European Aeronautic Defence and Space Company EADS FRANCE SAS, France
20. The Board of Trustees of the Leland Stanford Junior University, United States
21. Technische Universitaet Dresden, Germany

VIRTUAL PROTOTYPING (VP) is a key technology for environmental friendly and cost effective design in the aircraft industry. However, the underlying analysis and simulation tools (for loads, stresses, emissions, noise), are currently applied with a unique set of input data and model variables, although realistic operating conditions are a superposition of numerous uncertainties under which the industrial products operate (uncertainties on operational conditions, on geometries resulting from manufacturing tolerances, numerical error sources and uncertain physical model parameters). Major new developments in this new scientific area of Uncertainty Management and Quantification (UM and UQ) and Robust Design methods (RDM) are needed to bridge the gap towards industrial readiness, as the treatment of uncertainties enables a rigorous management of performance engagements and associated risks. This is the main objective of the UMRIDA project, which has the following action lines:
• Address major challenges in UQ and RDM to develop and apply new methods able to handle large numbers of simultaneous uncertainties, generalized geometrical uncertainties in design and analysis within a turn-around time acceptable for industrial readiness in VP systems.
• To respond to the validation requirements of UQ and RDM, a new generation of database, formed by industrial challenges (provided by the industrial partners), and more basic test cases, with prescribed uncertainties, is proposed.
• The methods developed by the research partners will be assessed quantitatively towards the industrial objectives on this database, during the project and at two open workshops. The gained experience will be assembled in a Best Practice Guide on UQ and RDM.

It is anticipated that the UMRIDA project will have a major impact on most of the EU objectives for air transport, by enabling design methods to take into account uncertainty based risk analysis. The UMRIDA partners are 8 European airframe and engine industries, 2 SME’s including the coordinator, and 13 research groups from major aeronautical research establishments and academia.
ONE OF THE most important challenges of the emerging Information Age is to effectively utilise the immense wealth of information and data acquired, computed and stored by modern information systems. On the one hand, the appropriate use of available information volumes offers large potential to realize technological progress and business success. On the other hand, there exists the severe danger that users and analysts easily get lost in irrelevant, or inappropriately processed or presented information, a problem which is generally called the information overload problem. Visual Analytics is an emerging research discipline developing technology to make the best possible use of huge information loads in a wide variety of applications. The basic idea is to appropriately combine the strengths of intelligent automatic data analysis with the visual perception and analysis capabilities of the human user.

We propose a Coordination Action to join European academic and industrial RandD excellence from several individual disciplines, forming a strong Visual Analytics research community. An array of thematic working groups set up by this consortium will focus on advancing the state of the art in Visual Analytics. Specifically, the working groups will join excellence in the fields of data management, data analysis, spatial-temporal data, and human visual perception research with the wider visualisation research community. This Coordination Action will (1.) form and shape a strong European Visual Analytics community, (2.) define the European Visual Analytics Research Roadmap, (3.) expose public and private stakeholders to Visual Analytics technology and (4.) set the stage for larger follow-up Visual Analytics research initiatives in Europe.

SENIOR LECTURER MATTHEW COOPER
The Department of Science and Technology
'INVESTIGATOR-DRIVEN' 'FRONTIER' RESEARCH, within the framework of activities commonly understood as 'basic research', is a key driver of wealth and social progress, as it opens new opportunities for scientific and technological advance, and is instrumental in producing new knowledge leading to future applications and markets. Despite many achievements and a high level of performance in a large number of fields, Europe is not making the most of its research potential and resources, and urgently needs a greater capacity to generate knowledge and translate such knowledge into economic and social value and growth. A Europe-wide competitive funding structure (in addition to and not replacing national funding) for frontier research executed by individual teams, which may be of national or transnational character, is a key component of the European Research Area (ERA). By promoting frontier research across the European Union, the Specific Programme 'Ideas' aims to put European research in a leading position, opening the way to creating new and often unexpected scientific and technological results, and new areas for research. It will stimulate the flow of ideas and allow Europe to exploit its research assets and foster in the drive towards a dynamic knowledge-based society, with long-term benefits for the competitiveness of European economies and wellbeing. This action will respond to the most promising and productive areas of research, and the best opportunities for scientific and technological progress, within and across disciplines, including engineering and social sciences, as well as humanities.
OUR AFFECTIVE AND motivational state is important for our decisions, actions and quality of life. Many pathological conditions affect this state. For example, addictive drugs are hyperactivating the reward system and trigger a strong motivation for continued drug intake, whereas many somatic and psychiatric diseases lead to an aversive state, characterized by loss of motivation. I will study specific neural circuits and mechanisms underlying reward and aversion, and how pathological signalling in these systems can trigger relapse in drug addiction. Given the important role of the dopaminergic neurons in the midbrain for many aspects of reward signalling, I will study how synaptic plasticity in these cells, and in their target neurons in the striatum, contribute to relapse in drug seeking. I will also study the circuits underlying aversion. Little is known about these circuits, but my hypothesis is that an important component of aversion is signaled by a specific neuronal population in the brainstem parabrachial nucleus, projecting to the central amygdala. We will test this hypothesis and also determine how this aversion circuit contributes to the persistence of addiction and to relapse. To dissect this complicated system, I am developing new genetic methods for manipulating and visualizing specific functional circuits in the mouse brain. My unique combination of state-of-the-art competence in transgenics and cutting edge knowledge in the anatomy and functional organization of the circuits behind reward and aversion should allow me to decode these systems, linking discrete circuits to behaviour. Collectively, the results will indicate how signals encoding aversion and reward are integrated to control addictive behaviour and they may identify novel avenues for treatment of drug addiction as well as aversion-related symptoms affecting patients with chronic inflammatory conditions and cancer.
I AIM TO achieve a fundamental understanding of the atomistic kinetic pathways responsible for nanostructure formation and to explore the concept of self-organization by thermodynamic segregation in functional ceramics. Model systems are advanced ceramic thin films, which will be studied under two defining cases: 1) deposition of supersaturated solid solutions or nanocomposites by magnetron sputtering (epitaxy) and arc evaporation. 2) post-deposition annealing (ageing) of as-synthesized material. Thin film ceramics are terra incognita for compositions in the miscibility gap. The field is exciting since both surface and in-depth decomposition can take place in the alloys. The methodology is based on combined growth experiments, characterization, and ab initio calculations to identify and describe systems with a large miscibility gap. A hot topic is to elucidate the bonding nature of the cubic-SiNx interfacial phase, discovered by us in TiN/Si3N4 with impact for superhard nanocomposites. I have also pioneered studies of self-organization by spinodal decomposition in TiAIN alloy films (age hardening). Here, the details of metastable c-AlN nm domain formation are unknown and the systems HfAlN and ZrAlN are predicted to be even more promising. Other model systems are III-nitrides (band gap engineering), semiconductor/insulator oxides (interface conductivity) and carbides (tribology). The proposed research is exploratory and has the potential of explaining outstanding phenomena (Gibbs-Thomson effect, strain, and spinodal decomposition) as well as discovering new phases, for which my group has a track-record, backed-up by state-of-the-art in situ techniques. One can envision a new class of super-hard all-crystalline ceramic nanocomposites with relevance for a large number of research areas where elevated temperature is of concern, significant in impact for areas as diverse as microelectronics and cutting tools as well as mechanical and optical components.
ANIMAL WELFARE IS a topic of highest societal and scientific priority. Here, I propose to use genomic and epigenetic tools to provide a new perspective on the biology of animal welfare. This will reveal mechanisms involved in modulating stress responses. Groundbreaking aspects include new insights into how environmental conditions shape the orchestration of the genome by means of epigenetic mechanisms, and how this in turn modulates coping patterns of animals. The flexible epigenome comprises the interface between the environment and the genome. It is involved in both short- and long-term, including transgenerational, adaptations of animals. Hence, populations may adapt to environmental conditions over generations, using epigenetic mechanisms. The project will primarily be based on chickens, but will also be extended to a novel species, the dog. We will generate congenic chicken strains, where interesting alleles and epialleles will be fixed against a common background of either RJF or domestic genotypes. In these, we will apply a broad phenotyping strategy, to characterize the effects on different welfare relevant behaviours. Furthermore, we will characterize how environmental stress affects the epigenome of birds, and tissue samples from more than 500 birds from an intercross between RJF and White Leghorn layers will be used to perform an extensive meth-QTL-analysis. This will reveal environmental and genetic mechanisms affecting gene-specific methylation. The dog is another highly interesting species in the context of behaviour genetics, because of its high inter-breed variation in behaviour, and its compact and sequenced genome. We will set up a large-scale F2-intercross experiment and phenotype about 400 dogs in standardized behavioural tests. All individuals will be genotyped on about 1000 genetic markers, and this will be used for performing an extensive QTL-analysis in order to find new loci and alleles associated with personalities and coping patterns.
THE PRIMARY PURPOSE of the cardiovascular system is to drive, control and maintain blood flow to all parts of the body. Despite the primacy of flow, cardiac diagnostics still rely almost exclusively on tools focused on morphological assessment. The objective of the HEART4FLOW project is to develop the next generation of methods for the non-invasive quantitative assessment of cardiac diseases and therapies by focusing on blood flow dynamics, with the goals of earlier and more accurate detection and improved management of cardiac diseases. Recently, a novel moment framework for flow quantification using magnetic resonance imaging (MRI) has been presented which allows for simultaneous measurement of time-resolved, three-dimensional (time + 3D = 4D) blood flow velocity and turbulence intensity.

In the HEART4FLOW project, this framework is extended and exploited for assessment of intracardiac blood flow dynamics. A user-friendly quantitative assessment approach is obtained for intracardiac blood flow energetics and wall interaction, as well as stenotic and regurgitant blood flow. Furthermore, the accuracy, measurement time, and robustness of 4D flow MRI acquisition are optimized, allowing its use in large clinical trials. Studying intracardiac blood flow dynamics in patients and healthy subjects at rest and under stress will improve our understanding of the roles of flow dynamics in both health and disease, leading to improved cardiac diagnostics, novel assessments of pharmaceutical, interventional, and surgical therapies, and promoting exploration of new avenues for management of cardiac disorders.
THE OBJECTIVE WITH this proposal is to provide design tools and algorithms for model management in robust, adaptive and autonomous engineering systems. The increasing demands on reliable models for systems of ever greater complexity have pointed to several insufficiencies in today’s techniques for model construction. The proposal addresses key areas where new ideas are required. Modeling a central issue in many scientific fields. System Identification is the term used in the Automatic Control Community for the area of building mathematical models of dynamical systems from observed input and output signals, but several other research communities work with the same problem under different names, such as (data-driven) learning.

We have identified five specific themes where progress is both acutely needed and feasible:

1. **Encounters with Convex Programming Techniques**: How to capitalize on the remarkable recent progress in convex and semi-definite programming to obtain efficient, robust and reliable algorithmic solutions.

2. **Fundamental Limitations**: To develop and elucidate what are the limits of model accuracy, regardless of the modelling method. This can be seen as a theory rooted in the Cramer-Rao inequality in the spirit of invariance results and lower bounds characterizing, e.g., Information Theory.

3. **Experiment Design and Reinforcement Techniques**: Study how well tailored and “cheap” experiments can extract essential information about isolated model properties. Also study how such methods may relate to general reinforcement techniques.

4. **Potentials of Non-parametric Models**: How to incorporate and adjust techniques from adjacent research communities, e.g., concerning manifold learning and Gaussian Processes in machine learning.

5. **Managing Structural Constraints**: To develop structure preserving identification methods for networked and decentralized systems. We have ideas how to approach each of these themes, and initial attempts are promising.

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**LEARN**
IMITATIONS, ESTIMATION, ADAPTIVITY, REINFORCEMENT AND NETWORKS IN SYSTEM IDENTIFICATION

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**PARTNERS**
1. Linköpings universitet, Sweden (coordinator)
2. Kungliga Tekniska Högskolan, Sweden

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**PROFESSOR LENNART LJUNG**
The Department of Electrical Engineering
NANOSCALE ENGINEERING IS a fascinating research field spawning extraordinary materials which revolutionize microelectronics, medicine, energy production, etc. Still, there is a need for new materials and synthesis methods to offer unprecedented properties for use in future applications. In this research project, I will conduct fundamental science investigations focused towards the development of novel materials with tailor-made properties, achieved by precise control of the materials structure and composition.

The objectives are to:
1) Perform novel synthesis of graphene.
2) Explore nanoscale engineering of “graphene-based” materials, based on more than one atomic element.
3) Tailor uniquely combined metallic/ceramic/magnetic materials properties in so called MAX phases.
4) Provide proof of concept for thin film architectures in advanced applications that require specific mechanical, tribological, electronic, and magnetic properties.

This initiative involves advanced materials design by a new and unique synthesis method based on cathodic arc. Research breakthroughs are envisioned: Functionalized graphene-based and fullerene-like compounds are expected to have a major impact on tribology and electronic applications. The MAX phases are expected to be a new candidate for applications within low friction contacts, electronics, as well as spintronics. In particular, single crystal devices are predicted through tuning of tunnel magnetoresistance (TMR) and anisotropic conductivity (from insulating to n-and p-type). I can lead this innovative and interdisciplinary project, with a unique background combining relevant research areas: arc process development, plasma processing, materials synthesis and engineering, characterization, along with theory and modelling.
NON-INVASIVE IMAGING techniques allow visualization of the dynamics and biochemical activity of pathological processes in real-time. By having proper molecular tools, a complete picture of pathologic conditions can be acquired at resolutions from the molecular level to the full body scale. Hence, smart multimodal imaging tools can be utilized for a diversity of applications, ranging from fundamental understanding of disease related events to molecular diagnostics of specific diseases. Secondly, molecular scaffolds used for imaging can also be explored as therapeutics for specific diseases, since such scaffolds are directed towards targets involved in the pathological mechanism of the disease. This project aims at developing an alternative concept for molecular imaging, diagnostics and therapy based on the chemical design of luminescent conjugated oligomeric thiophene derivatives (LCOs) which recognize distinct structural motifs instead of specific biomolecules. The LCO can for instance be utilized for specific labelling of protein aggregates, the pathological hallmark of Alzheimer’s, Parkinson’s and prion diseases, and for differentiation of distinct cell types, such as stem cells or cancer cells. By combining the LCO technique with other technology platforms, multimodal molecular imaging tools that can be used to gain novel insights regarding fundamental disease related biological mechanisms from the nanoscopic to the macroscopic level will be achieved. The LCO molecular scaffolds will also be evaluated as therapeutically active agents towards pathologic molecular process underlying protein aggregation diseases, bacterial infection and cancer. The main objectives of the project are; To synthesize a diverse library of novel LCOs specific for disease related molecular targets To develop novel LCO-hybrid materials for multimodal real time in vivo imaging of biological and pathological processes from the nanoscopic (molecular, cellular) to the macroscopic level (body, organ) To utilize the novel real-time imaging probes for studying the pathological or biological processes associated with certain diseases, including protein aggregation diseases, such as Alzheimer’s and Parkinson’s diseases, bacterial infection and cancer. To explore LCO and LCO-based pharmacophores as therapeutics towards pathological molecular process involved in protein aggregation diseases, bacterial infection and cancer. The main focus of the project is to synth.

MUMID
MULTIMODAL TOOLS FOR MOLECULAR IMAGING, DIAGNOSTICS AND THERAPEUTICS

ASSOCIATE PROFESSOR
PETER NILSSON
The Department of Physics, Chemistry and Biology
**MY RECENT DISCOVERY** of the anomalously high thermoelectric power factor of ScN thin films demonstrates that unexpected thermoelectric materials can be found among the early transition-metal and rare-earth nitrides. Corroborated by first-principles calculations, we have well-founded hypotheses that these properties stem from nitrogen vacancies, dopants, and alloying, which introduce controllable sharp features with a large slope at the Fermi level, causing a drastically increased Seebeck coefficient. In-depth fundamental studies are needed to enable property tuning and materials design in these systems, to timely exploit my discovery and break new ground.

The project concerns fundamental, primarily experimental, studies on scandium nitride-based and related single-phase and nanostructured films. The overall goal is to understand the complex correlations between electronic, thermal and thermoelectric properties and structural features such as layering, orientation, epitaxy, dopants and lattice defects. Ab initio calculations of band structures, mixing thermodynamics, and properties are integrated with the experimental activities. Novel mechanisms are proposed for drastic reduction of the thermal conductivity with retained high power factor. This will be realized by intentionally introduced secondary phases and artificial nanolaminates; the layering causing discontinuities in the phonon distribution and thus reducing thermal conductivity.

My expertise in thin-film processing and advanced materials characterization places me in a unique position to pursue this novel high-gain approach to thermoelectrics, and an ERC starting grant will be essential in achieving critical mass and consolidating an internationally leading research platform. The scientific impact and vision is in pioneering an understanding of a novel class of thermoelectric materials with potential for thermoelectric devices for widespread use in environmentally friendly energy applications.

**ASSOCIATE PROFESSOR PER EKLUND**  
The Department of Physics, Chemistry and Biology
AT THE MOMENT, there is no viable technology to produce electricity from natural heat sources (T<200°C) and from 50% of the waste heat (electricity production, industries, buildings and transports) stored in large volume of warm fluids (T<200°C). To extract heat from large volumes of fluids, the thermoelectric generators would need to cover large areas in new designed heat exchangers. To develop into a viable technology platform, thermoelectric devices must be fabricated on large areas via low-cost processes. But no thermoelectric material exists for this purpose.

Recently, the applicant has discovered that the low-cost conducting polymer poly(ethylene dioxythiophene) possesses a figure-of-merit ZT=0.25 at room temperature. Conducting polymers can be processed from solution, they are flexible and possess an intrinsic low thermal conductivity. This combination of unique properties motivate further investigations to reveal the true potential of organic materials for thermoelectric applications: this is the essence of this project.

My goal is to organize an interdisciplinary team of researchers focused on the characterization, understanding, design and fabrication of p- and n-doped organic-based thermoelectric materials; and the demonstration of those materials in organic thermoelectric generators (OTEGs).

Firstly, we will create the first generation of efficient organic thermoelectric materials with ZT> 0.8 at room temperature:

(i) By optimizing not only the power factor but also the thermal conductivity;
(ii) By demonstrating that a large power factor is obtained in inorganic-organic nanocomposites.

Secondly, we will optimize thermo-electrochemical cells by considering various types of electrolytes.

The research activities proposed are at the cutting edge in material sciences and involve chemical synthesis, interface studies, thermal physics, electrical, electrochemical and structural characterization, device physics. The project is held at Linkoping University holding a world leading research in polymer electronics.
THIS RESEARCH ASKS how pharmaceuticals prescribe the healthy subject. It examines the cultural meanings and expectations attached to four prescription drugs, and compares the policies and practices around their use in two countries, Sweden and the UK.

Empirically, it studies prescription medicines on the outer edges of adulthood: the HPV vaccine; hormone treatments for early puberty; alpha-blockers against Benign Prostate Hyperplasia; and pharmaceutical developments against Alzheimer’s disease. This view from the edges of the mature subject will bring into focus the practices and pleasures, responsibilities and rewards the adult subject position contains (or at least promises), the gendered positionalities it entails and culturally specific expectations articulated by medical prescriptions. The project conceptualizes of pharmaceuticals as flexible technologies, as actors which influence our identities but which also work within and are constrained by institutional policies, social values, medical practices and the material world.

The study will open new research horizons on two levels: The groundbreaking methodological approach, with hands-on, collaborative analytical work in PhD courses and analysis workshops between the participants and sites, will ensure an interdisciplinary approach by truly in actual research practice combining approaches from Science Technology and Society, Gender Studies and Posthumanist Studies. In addition, while firmly grounded in concepts of performative subjecthood, identity, the Self and materialities, this project will force a re-reading of the empirical material through ideas from early medical sociology texts, work which viewed health, illness and treatments as embedded in and performed by communities rather than as possessions and responsibilities of the individual patient. This collaborative re-reading will challenge theoretical ideas about the medicalization of the healthy subject and critical pharmaceutical.
ABUNDANT AND HIGHLY TRAINED QUALIFIED RESEARCHERS are a necessary condition to advance science and to underpin innovation, but also an important factor to attract and sustain investments in research by public and private entities. Against the background of growing competition at world level, the development of an open European labour market for researchers free from all forms of discrimination and the diversification of skills and career paths of researchers are crucial to support a beneficial circulation of researchers and their knowledge, both within Europe and in a global setting. Special measures to encourage early-stage researchers and support early stages of scientific career, as well as measures to reduce the ‘brain drain’, such as reintegration grants, will be introduced. Building on the experiences with the ‘Marie Curie actions’ under previous framework programmes, this will be done by putting into place a coherent set of ‘Marie Curie actions’, particularly taking into account the European added value in terms of their impact on the ‘European research area’ (ERA). These actions will address researchers at all stages of their careers, from initial research training specifically intended for young people to life-long learning and career development in the public and private sectors. Mobility, both transnational and intersectoral, including the stimulation of industrial participation and the opening of research careers and academic positions at European scale, is a key component of the ‘European research area’ and indispensable to increasing European capacities and performance in research. International competition between researchers will remain central in order to ensure the highest quality of research under this activity. Increasing the mobility of researchers and strengthening the resources of those institutions which attract researchers internationally will encourage centres of excellence around the European Union. To ensure training and mobility within new research and technology areas, appropriate coordination with other parts of the ‘Seventh framework programme’ will be ensured and synergies will be sought with other Community policies, e.g. on education, cohesion and employment. Actions on linking science education to careers, and research and coordination actions on new methods in science education are foreseen under the ‘Science in society’ part of the ‘Capacities’ programme.
**ATBEST**
ADVANCED TECHNOLOGIES FOR BIOGAS EFFICIENTCITY  
SUSTAINABILITY AND TRANSPORT

**THE ATBEST ITN** will develop innovative research and training for the biogas industry in Europe. It comprises eight training sites located in the UK, Ireland, Germany and Sweden and is a multidisciplinary collaboration between internationally-renowned research teams and industrial partners, each with complementary expertise in a wide range of environmental technologies. 12 ESRs and 2 ERs will be recruited and each will participate in secondments, industrially relevant training and 3 Summer Schools. The aim is to establish long-term collaborations and develop structured research and training relevant to industry and academia along the biogas supply chain (biogas production from feedstock to its utilisation as energy). The project will reinforce and expand existing research links to standardise and advance biogas training.

The Renewable Energy Directive (2009/28/EC) sets EU targets of a 20% share of energy from renewable sources in the overall energy mix by 2020. However, current technologies are not sufficient to reach these targets in a sustainable manner. ATBEST will develop new and innovative technologies for the biogas sector, to enable Europe to implement its Energy 2020 strategy and to address the challenges of increasing energy demand and energy generation costs. The young researchers will create new knowledge for the biogas industry, and will develop advanced technical and commercial skills to enhance their employment opportunities upon completion of the programme. ATBEST outputs will be disseminated across Europe – to policy makers, applicable sectors (including energy, agri-food and transport), academia and to the general public. An Innovation, Exploitation and Employability Steering Group will input industrial and policy expertise from the Associate Partners to the training programme. The Associate Partners will also provide feedback to each fellow and provide additional industrial secondment opportunities.

**PROFESSOR BO SVENSON**
The Department of Thematic Studies
RAPID DEVELOPMENT WITHIN the biomedical engineering field, especially Brain-Neural-Computer Interaction (BNCI) area, provides a solid technological base for new applications aimed at improving health and quality of life. In this project, aimed at combining research and training components, Dr. Valjamae will design, validate and optimize a novel multimodal system - B-Reactable - linking a tangible musical tabletop interface with BNCI technology for collaborative physiology monitoring and training in future health and professional applications. This interdisciplinary research project is based on the joint pilot work with Prof. Jorda, University of Pompeu Fabra, Barcelona in 2010-11. The project is designed to be a vehicle for the training and consolidation of the research outcomes for further exploitation in the EU.

In the envisioned B-Reactable applications, users will explicitly or implicitly learn to monitor and control their physiological signals using tangible objects, and hence, understand and influence their cognitive or emotional states. The project will reinforce the international dimension of applicants' scientific career by giving them the opportunity to be trained and acquire new knowledge in the Russian Federation, under direct guidance of Prof. Kropotov at the Institute of Human Brain, Russian Academy of Science (IHB-RAS) and Dr. Ossadtchi at St. Petersburgs State University (SPSU). Prof. Kropotov is one of the leading neurofeedback scientists, with over 30 year research in computational models, normative databases, new paradigms and analysis methods, and extensive work on healthy adults, children and various patient groups. After training at IHB-RAS, Dr. Valjamae will bring his new experience and tangible outcomes to the renowned Swedish Institute for Disability Research at Linkoping University, where together with Prof. Vastfjall he will test and further refine B-Reactable, targeting cognitive aging for improving users quality of life and wellbeing.

PROFESSOR DANIEL VÄSTFJÄLL
The Department of Behavioral Sciences and Learning
THE KEY OBJECTIVE of the DEVELOPMENT OF NANOTECHNOLOGY BASED BIOSENSORS FOR AGRICULTURE project is the coordinated transfer of knowledge and training activities between participating teams in the EU (Riga, Linköping, Montpellier), in the Ukraine (Odessa and Kyiv) and the Belarus (Minsk) with the aim of strengthening the existing scientific partnerships and developing new collaboration for long lasting synergy, and to enhance the scientific excellence of participating early stage and experienced researchers. The transfer of knowledge and forming of an intellectual critical mass will occur through theoretical exercises and laboratory research in the important and growing field of optical fibre biosensors, aiming towards applications in agriculture and taking opportunities offered by the latest achievements in nanotechnology and biotechnology.

The challenge is to create a unique devices for detecting animal diseases, viruses and toxins using fundamental phenomena such as light absorbance, reflectance, transmittance, fluorescence and photoluminescence.

The consortia have theoretical and experimental experience and specific skills for making advances in research on biosensors for agriculture applications. The aim is to amplify their knowledge and skills via joint research on specific tasks in work packages and to ensure the transfer of knowledge via seminars, workshops and summer schools and training courses. Through these, the results will be disseminated effectively and interactions will be stimulated amongst experienced researchers and community of young researchers, PhD and MSc students. Mutual research efforts and contacts, including cross-generation interactions, young researchers meetings and appropriate creative environment will grant necessary pre-conditions for sustainability of cooperation among consortia partners after the project is concluded.

In total 164 secondment months are planned, 7 summer schools or training courses and 2 conferences.
APPROACHING NEW HORIZONS of capacity and energy efficiency is foundational for next-generation broadband wireless communications. Toward this goal, the IOF proposal Career LTE pursues fundamental research with inter-disciplinary efforts, and integrates the outcome with engineering practice, to push forward the state-of-the-art of performance and energy efficiency for heterogeneous Long Term Evolution Advanced (LTE-A) deployment.

Capacity and energy have been dealt with from the perspectives of information theory, optimization, physical layer technologies, and networking. To go beyond the cutting edge, the time has come to depart from each of these perspectives alone, toward producing new knowledge by synergizing these fields.

The outgoing phase develops computational models for analysing emerging capacity-enhancing concepts, and investigates fundamental performance-energy tradeoffs. Here, the fellow extends his knowledge with information theory, and cross-layer and green networking, and fuses them with his strong background in optimization and industrial experience in 4G radio access. Integrating the molded knowledge with the fellows experience in European industry, the return phase develops new methodologies for energy-efficient heterogeneous LTE-A deployment.

The applicant has an excellent track record in publications and funding, along with industrial experience. His professional achievements so far demonstrate his ability to quickly absorb new knowledge and develop leadership skills. In addition to the scientific objectives, the IOF project benefits: 1) the fellows long-term career goal of becoming a world-class ICT research leader, 2) a long-standing European-USA research and educational link for life-long learning, 3) the formation of a knowledge-dynamic team to attract young and talented researchers for careers in ICT Europe, 4) European industrial competitiveness by turning scientific findings into innovation via the fellows background at Ericsson.

PROFESSOR DI YUAN
The Department of Science and Technology
WE PROPOSE A training and research project within the Marie Curie Initial Training Network (ITN) call, led by Gjovik University College (HIG), in collaboration with five full network partners and six associated partners from academia and industry throughout Europe. The project is entitled Colour Printing 7.0: Next Generation Multi-Channel Printing and addresses a significant need for research, training, and innovation in the European printing industry. Through our project, we will not only take the colour printing field to its next generation of technological advancement, by fully exploring the possibilities of using more than the conventional four colorants cyan, magenta, yellow and black, focusing particularly on spectral properties, but we will also train a significant new generation of printing scientists (seven ESRs and two ERs) who will most certainly be able to assume science and technology leadership in this traditional technological sector. The main variables in printing technology are the ink, the paper, and the marking technology employed by the printer.

While many aspects of these are well known and extensively studied, there are four key areas of science and technology which future advances in multi-channel printing depend on:

1. Spectral modeling of the printer/paper/ink combination
2. Spectral gamut prediction and gamut mapping
3. The effect of paper optical and surface properties on the colour reproduction of multi-channel devices
4. Optimal halftoning algorithms and tonal reproduction characteristics of multi-channel printing.

Related to the above research areas are the need to have optimal methods for ink selection, and methods for the evaluation of reproduction quality. Together these areas form a large problem domain that cannot be addressed by a single manufacturer or research group, and the proposed project will bring together leading researchers with expertise in the different strands of this problem domain.
WIRELESS COMMUNICATIONS VIA optical, unguided carriers opens up new horizons of information and communications (ICT) technologies. Up to now, radio-frequency (RF) based systems have been dominating wireless communications. The RF bands, however, have to accommodate a large variety of communication devices and modes. At the same time, there is a huge amount of unregulated bandwidth available in the upper portions of electromagnetic spectrum. In this context, wireless, unguided optical transmission systems utilizing the largely unexploited portion of the spectrum frequencies are highly promising.

Designing future optical wireless system solutions calls for research and development (R&D) efforts. The DETERMINE project develops concepts, models, algorithms, and architecture for free space communication over the optical spectrum. To this end, the project follows the approach of intensive knowledge exchange and competence integration between the partners of the consortium.

Optical wireless communications systems are expected to rely on a layered structure, and solution integration across layers is highly desirable. Toward this end, DETERMINE is built around combining knowledge and know-how via exchange of expertise from the physical layer, medium access, network optimization, to end applications.

In addition to technological development, DETERMINE contributes to skill acquisition by training early-stage researchers. The knowledge transfer actions are built on a mutual-beneficial basis between the two European partners and the Chinese partner. DETERMINE also implements knowledge exchange with other European efforts in the area, particularly with COST Action IC1101. For the European Research Area (ERA), the exchange actions foster human capital to simulate career development of young and talented researchers in European ICT.

**DETERMINE**

**DESIGNING FUTURE OPTICAL WIRELESS COMMUNICATION NETWORKS**

**PARTNERS**

1. Linköpings universitet, Sweden (coordinator)
2. Aston University, United Kingdom
THE MAIN OBJECTIVE of GHG-LAKE joint research programme is to increase mobility and exchange of researchers between EU countries, Russia and US to obtain better understanding of energy and greenhouse gases (methane and carbon dioxide) budgets in lake ecosystems at high-latitude, which are potentially most prone to on-going and future climate changes. Factors controlling the carbon cycles are investigated by means of intensive field measurements and process based modelling. This program focuses on four research aspects: 1) gas exchange processes; 2) carbon cycle, including greenhouse gases (GHG) flux database development for lacustrine ecosystems; 3) energy and greenhouse gas flux measurements, including research and knowledge transfer of key methodological aspects for comprehensive measurement sites; 4) process based biogeochemical modelling for GHGs production and transport in water bodies, as well as state of art large eddy simulation modelling for resolving non-homogeneous and non-stationary atmospheric boundary layer flow over heterogeneous surfaces (e.g. small lake surrounded by forest).

GHG-LAKE programme builds a basis for long-term collaboration between the leading EU, Russian and US research organizations in the area of limnology, GHGs monitoring and modelling and climate change research in order to achieve new scientific results and breakthroughs. The proposed programme is interdisciplinary and the expected results will touch in particular the environmental sciences, limnology, biogeochemistry and micrometeorology research communities. GHG-LAKE will exploit complementary expertise of the participant organizations in order to create synergies among participants and to establish long-lasting partnership. As multi- and cross-disciplinary studies essential in climate change research are lacking in Russia, this programme will essentially also work towards an integrated approach for future joint international projects.
BACKGROUND: Cardiovascular diseases (CVD), e.g. Myocardial Infarction (MI) and stroke, are the leading cause of death, accounting each year for more than 17.5 million people worldwide, 25% of which is in Europe. Cardiac bioengineering is a new research area to develop grafts and patches to replace or repair damaged heart tissue. However, a fully functional graft has not yet conceived. The main goal of this project is to develop bioengineered heart patches to induce regeneration of the tissue and restore heart functions after MI.

Aims: the aims and the results hoped for are:
1. To develop collagen-based nanofibrous scaffolds that are:
   a. Biocompatible and biodegradable, e.g. favour cell growth, and allow regeneration of the host tissue and remodel with the growing heart.
   b. Robust, elastic, and contractile that matches heart muscle.
   c. Conductive to electrical impulses generated by the heart.
   d. Porous enough to enable exchange of nutrients and waste from the patch.
   e. Non-thrombogenic to ensure the patch will not cause thrombosis.
2. To significantly reinforce the biomedical research in Europe through efficient use of the allocated budget toward my integration into a more permanent position in Sweden, as well as enhancing knowledge transfer and cooperation between EU and Canada.

Research Strategy: I have previously developed hybrid interpenetrating polymer networks (HIPN) as bioengineered corneas that were mimetic of the natural cornea and successfully implanted into corneas of pigs with seamless host-graft integration and regeneration of the host cornea. HIPN is a core concept that can be tailored for various tissue applications. I therefore propose to engineer HIPN scaffolds for cardiac patches mainly comprised of collagen, and carbon nanotubes. I joined Linkoping University in March 2011 as an Assistant Professor from Canada. My expertise in tissue engineering combined with expertise of the host in Nanobiotechnology is an excellent match for this project.

HEART PATCH
DEVELOPMENT OF A BIOENGINEERED HEART PATCH FOR THE TREATMENT OF MYOCARDIAL INFARCTION

RESEARCH ASSOCIATE
MEHRDAD RAFAT
The Department of Clinical and Experimental Medicine
IAAP@RANPLAN
IAAP FOR AUTOMATIC RADIO ACCESS NETWORK PLANNING AND OPTIMISATION

THE AIM OF this project is to establish lasting relationships between Ranplan, and two academic partners to research and develop automatic planning and optimisation (P&O) tools for emerging broadband radio access networks such as HSPA (High Speed Packet Access) and WiMAX and the hybrids of such networks with UMTS and Wi-Fi, i.e., Heterogeneous Radio Access Network (HRANs). The research topics are very important for EU’s ICT infrastructure. The project is highly interdisciplinary as it covers wireless communications, Operations Research (OR), and High End Computing (HEC).

PROFESSOR DI YUAN
The Department of Science and Technology
Communication through language is vital to develop and maintain everything around us. By 15 years of age, about 5 out of 1000 children suffer from a moderate, severe or profound hearing impairment that can potentially affect communication, learning, psychosocial development and academic achievement if not appropriately handled.

The EU promotes the active inclusion and full participation of disabled people in society. However, full active inclusion in an oral society can only be achieved through cooperation and involvement across disciplines (language, psychology, audiology, engineering, special education,...). It is therefore of fundamental importance to approach the inclusion of children with hearing impairment in an interdisciplinary manner, and to train future experts to adopt such principles in their research and practice.

The objectives of improving Children's Auditory REhabilitation (iCARE) are twofold: 1) to provide training create a new generation of researchers capable of exploiting the synergies between different disciplines to optimize spoken communication in children with hearing impairment, and 2) to combine research across disciplines to develop novel methods, training skills and procedures for improving auditory rehabilitation.

iCARE is an international and interdisciplinary consortium from academia, industry and socio-economic agencies. The proposed training consortium is unique because the partners are specialized in a variety of disciplines, both technical and non-technical, all of utmost importance to the core issue: optimizing inclusion of children with hearing impairment in an oral society through evidence-based research. The consortium will provide comprehensive training of fellows to become ‘communication experts’, and enable the development of novel methods, tools and evaluation material that will suit the evolving needs of children with hearing impairment in a holistic manner.

**ICARE**

**IMPROVING CHILDREN'S AUDITORY REHABILITATION**

**PARTNERS**

1. Katholieke Universiteit Leuven, Belgium (coordinator)
2. Rheinisch-Westfälische Technische Hochschule Aachen, Germany
3. University College London, United Kingdom
4. Linköpings universitet, Sweden
5. Noldus Information Technology BV, The Netherlands
6. Cochlear Research and Development Limited, United Kingdom
7. Högskolan i Gävle, Sweden
8. Stichting Katholieke Universiteit, The Netherlands
9. University of Macedonia, Greece

**PROFESSOR BJÖRN LYXELL**

The Department of Behavioural Sciences and Learning
CONVENTIONAL INCANDESCENT LAMPS are being phased out in Europe due to their low energy efficiency. Organic light-emitting electrochemical cells (OLECs) are potentially a promising alternative to them. This proposal aims to tackle two major challenges currently limiting practical applications of OLECs, i.e. their relatively short lifetime and low efficiency. The short lifetime of OLECs is due to the fact that the illumination zone is positioned close to the cathode. We have designed several experiments to examine possible causes for this close-to-cathode illumination zone. A better understanding of the reason for the close-to-cathode illumination position could help to increase the device lifetime. In terms of efficiency, the host group has recently demonstrated a novel approach to significantly improve the efficiency of white-light organic light-emitting diodes by incorporating biological materials into the device. We propose to extend this promising approach to OLECs. We will also perform photophysical experiments to examine the exact function of the biological materials. A better understanding of physics behind efficiency improvement will help to improve the device efficiency further. In addition to the research objectives, the proposal also aims to train the fellow with new knowledge and skills which are necessary for him to reach his medium- and long-term career goals by means of the personalised project. The fellow will also expect to gain transferable skills (including leadership skills, teaching skills, etc.) through attending workshops and teaching courses for PhD students. The proposed project falls directly under European Organic and Large Area Electronics of the 7th Framework Programme, which underlines the relevance of the work. By addressing two challenges currently faced by the OLEC research community, the expected research findings will enhance the European Research Area competitiveness.

LEOLEC
TOWARDS LONG-LIVED AND EFFICIENT ORGANIC LIGHT-EMITTING ELECTROCHEMICAL CELLS

PROFESSOR OLLE INGANÄS
The Department of Physics, Chemistry and Biology
The usage of new Internet-based services with the wireless mobile devices has an unlimited potential as we have just witnessed in the Egyptian revolution and disaster relief in Haiti. However, currently available wireless cellular technology 3G has been unsuccessful in delivering multimedia with acceptable level of quality due to the low transmission rate and high service costs. Thus, a 4G standard LTE-Advanced has been developed intended for larger capacity and higher speed of mobile networks. However, despite its promising potential, LTE-Advanced-based technology is still at infant stages and there is much work need to be done for wider commercial operation. The objective of this application is to advance 4G-based wireless mobile network utilizing multidisciplinary research approach. It is a step toward attainment of my long-term career goal, which is to further develop my expertise in wireless network communications while advancing academic career. The motivation of the project is that evaluating LTE-Advanced-based protocols and applying the technology for practical applications will improve our mobile communication. The rationale for the proposed research is that once effective LTE-Advanced-based technologies are established, it enables a wide range of commercial operation throughout the world thereby stimulating economy in EU countries where major mobile communication industries are concentrated. Furthermore, the general population will be benefited from 4G-based mobile communication services, which are currently not available e.g. Intelligent Transportation Systems. I plan to accomplish my objective by pursuing the following Workpackages (WP): Specific WP1) Evaluate LTE advanced protocols to identify potential bottleneck of LTE network, Specific WP2) Develop an energy-efficient wireless network solution, Green Network, for LTE/LTE-Advanced, Specific WP3) Apply LTE/LTE-Advanced communication technology to Intelligent Transportation Systems (ITS).

Professor Di Yuan
The Department of Science and Technology
 SENSOR TECHNOLOGY HAS become ubiquitous in almost every area of our daily life. Its application has the potential to significantly improve our quality of life, for example through systems for independent living (ambient assisted living) or accident prevention in traffic. The MC IMPULSE consortium has identified sensor data processing as a key technological area where Europe can make a difference. Additional investment in research and technological development, training of researchers and networking the existing research capacities both in academia and industry are prerequisites for success.

MC IMPULSE exactly aims at these strategic objectives. MC IMPULSE aims to develop and execute a multidisciplinary and networked European research training programme. To date no specific training programme in this field is available in Europe while well trained researchers and engineers are scarce. The MC IMPULSE consortium unites highly complementary partners from industry (including Thales, Saab and 2 SMEs) universities and a research institute, guaranteeing an interdisciplinary research and training programme. Within MC IMPULSE 13 early stage researchers and two experienced researchers will be trained. The MC IMPULSE consortium will build a durable cooperation in research and training in the field of sensor data processing.

The research programme will focus on the development of novel methods for real-time signal and data processing, based on data collected from sensors or networks of sensors. Specific innovations expected to be achieved through MC IMPULSE are: detecting and tracking objects by processing information from (a network of) sensors, fusing information from multiple sensors and their efficient processing for on-line applications. Dissemination methods to realize optimal impact on the European academic community, industry and society include scientific publications, presentations at conferences and dissemination through websites.

MC IMPULSE
EUROPEAN RESEARCH TRAINING IN MONTE CARLO BASED INNOVATIVE MANAGEMENT AND PROCESSING FOR AN UNRIVALLED LEAP IN SENSOR EXPLOITATION

PROFESSOR FREDRIK GUSTAFSSON
The Department of Electrical Engineering
WIRELESS MESH NETWORKING is being considered as a promising solution for scalable and ubiquitous Internet access for one decade already. Still, major limitations remain to be overcome before the concept matures to fulfil the promise. What’s more, the potential of integrating the mesh networking paradigm in the context of heterogeneous technologies has not been yet sufficiently explored. Pursuing advancement along these lines, towards shaping next generation mesh networking, calls for cutting-edge research and development (R&D) efforts with inter-sector knowledge renewal and integration.

The MESH-WISE project responds to these needs by mobilising a joint academic-industry task force on two complementary themes. First is the development of novel mechanisms for deployment and resource allocation of self-organising mesh networks. The second theme comprises the investigation of multi-purpose and heterogeneous mesh networking and its emerging applications such as traffic offloading, emergency deployment and provisioning, and sensor integration.

Designing future wireless mesh systems based on heterogeneous radio technologies with self-organising capabilities necessitates original R&D actions. The MESH-WISE project takes a holistic view in developing models, protocols, and algorithms in a wide spectrum, from theoretical analysis to proof-of-concept and prototyping. Towards these ends, the MESH-WISE project follows the approach of intensive inter-sectorial exchange of knowledge and know-how between the consortium partners.

In addition to R&D, MESH-WISE contributes to competitiveness development by training researchers. The knowledge transfer programme is designed on a mutual-benefit basis between the academic and industrial partners, to promote new career opportunities and development in the European Information and Communication technologies (ICT) arena, and thereby generate new types of expertise and human capital for the European Research Area (ERA).
MICROCORNEA

IN-VIVO MICROSTRUCTURE OF THE CORNEA: IMPLICATIONS FOR VISION, HEALTH AND DISEASE

THE RESEARCH PROPOSAL  MICROCORNEA will bring knowledge and expertise concerning in-vivo microstructural analysis of the cornea from Canada to Sweden, to be applied in innovative clinical and basic science research projects.

The objectives of this proposal are to utilize in-vivo microstructural analysis to evaluate the biointegration of novel materials implanted in patient eyes for the restoration of vision, to detect the recurrence of dystrophic changes in patients after excimer laser treatment, to describe the microstructural corneal features in Swedish families with new, hereditary corneal dystrophies, to develop a means to detect lymphangiogenesis non-invasively in a live cornea, and to non-invasively observe phenotypic changes in corneal stromal cells in real-time.

These objectives will be achieved by first imaging the microstructural characteristics within live corneas by using in-vivo laser-scanning confocal microscopy, and subsequently quantifying, analyzing, observing, and interpreting the various anatomic features of the cornea at the microscopic level, and relating the findings to the specific research questions posed.

Research results will be disseminated at conferences and scientific meetings and will result in the submission of a minimum of six articles to international, peer-reviewed scientific journals.

The expertise of the Incoming Research Fellow will be additionally applied to train researchers from Sweden and the Scandinavian countries to perform in-vivo laser-scanning confocal microscopy and microstructural analysis of the cornea.

Once completed, the innovative research outlined in this proposal will establish the Host Institution in Sweden as a premier facility for innovative corneal microscopy research in Europe and will promote long-term research relationships between Canadian and Swedish corneal researchers within the two institutions.

PROFESSOR PER FAGERHOLM

The Department of Clinical and Experimental Medicine
THE MAIN SCIENTIFIC objective of NetFISiC is to provide Silicon carbide material (of various polytypes) with improved and adequate functional interfaces for getting a step forward in electronic devices performance. Research efforts will be dedicated to solve the problems faces by important devices like MOSFET and Schottky diodes. Besides, some fundamental research will be performed both on the growth aspect and on new and innovating devices. Applications in high temperature, high power and harsh environment are targeted. Based on this research program, the ambitious target of NetFISiC is to train the next generation of researchers on various semiconductor related fields (such as physics, material science and engineering), taking the emerging SiC technology as an appropriate tool for study.

This shall contribute to long-term strengthening of the European position on a technologically important semiconductor.

13 ESRs and 2 ERs will be recruited and trained within this network, on multi-disciplinary subjects like material growth, characterization and devices fabrication, with a particular focus on SiC. NetFISiC consortium is mainly composed (11 out of 12) of the members of the presently running Marie Curie RTN “MANSiC” (MRTN-CT-2006-035735). The 12 partners of NetFISiC include 3 companies (SiCED, ACREO and NOVASiC). One associated partner (LIP company) will complement the consortium by providing key training offer and administrative/management assistance. Obviously NetFISiC network will be efficient from its beginning, with members having a very good experience of network implementation and functioning. On the other hand, NetFISiC will not be just a continuation of MANSiC network, which was targeting only 3C-SiC polytype, but significantly go one step beyond by focusing on surface and interfaces of different polytypes in order to find solution to specific technological issues related to SiC technology.

PROFESSOR ROSITSA YAKIMOVA
The Department of Physics, Chemistry and Biology
PARTNERS

1. Technische Universität München, Germany (coordinator)
2. Imperial College of Science, Technology and Medicine, United Kingdom
3. Dublin City University, Ireland
4. Linköpings universitet, Sweden
5. Stmicroelectronics SRL, Italy
6. Plasma Solutions SRL, Italy
7. Helmholtz Zentrum München Deutsches Forschungszentrum Für Gesundheit und Umwelt GmbH, Germany
8. Università Degli Studi di Bari »Aldo Moro«, Italy
9. Universidad del Pais Vasco Ehu UPV/ehu Spain
10. Ecole Nationale Supérieure des Mines de Saint-Etienne, France
11. Sveuciliste u Rijeci, Croatia
12. Centre National de la Recherche Scientifique, France
13. Ibidi GMBH, Germany

OEAN
ORGANIC ELECTRONICAL ARTIFICIAL NEURONS

DISORDERS OF THE nervous system effect hundreds of millions of people worldwide and the costs of these afflictions, both in terms of life lost and healthcare expenditure, are a heavy burden on us all. We propose to employ the delivery property of the ion pump, coupled with sensing electrochemical transistors to build an organic electronic artificial neuron for intervention into the malfunctioning signalling pathways implicated in specific neurological disorders. Of particular importance is the ion pumps ability to precisely deliver the neurotransmitters glutamate and 3-aminobutyric acid, the primary excitatory and inhibitory neurotransmitters of the central nervous system, respectively. By regulating delivery of these and other molecules, the practitioner could selectively raise and lower the relative neural excitability within a small, well-defined region of the brain, such as one generating seizures, using a device easily integrated into standard surgical procedures developed for electrode implants. Moreover, auto-regulation is made possible by incorporating a sensing transistor to monitor variation in neurotransmitters concentration that will trigger release with the ion pump. The organic electronic nature of the ion pump and the electrochemical sensing transistor technologies makes them optimal for interfacing both biological systems and traditional electronics. Furthermore, the use of polymers and other bio-compatible soft materials, make them well suited for implant into the body. Using the bodies endogenous signalling system as the cue, self-regulated artificial neurons will enable new therapies whereby patients health can be restored by supplementing their malfunctioning signalling pathways, rather than invading them with substances and signals alien to the body. The artificial neuron can therefore provide therapy for a wide range of previously untreatable neurological disorders and help patients with these afflictions return to health.

POSTDOC LOIG KERGOAT
The Department of Science and Technology
ORGANIC BIOELECTRONICS IS a new discipline which holds promise to shape, direct, and change future medical treatments in a revolutionary manner over the next decades. At the moment Europe has a unique leading position in this area, being almost all the world-leading groups in this field located in Europe and constituting the core of this international training network. However, realizing the promise of “Organic bioelectronics” requires research and training not only crossing disciplines, such as electrical engineering, biology, chemistry, physics, and materials science, but also crossing our European countries.

“The EU will add value on the global scene only if it acts jointly”.

OrgBIO is at the core of European technological innovation and will become an indispensable part of the educational canon. It will establish a world-class training platform spreading around the highly interdisciplinary / intersectorial European-led area of organic bioelectronics.

Education along with science and entrepreneurial mindsets and attitudes is the core of the OrgBIO training programme, which aims at excellence and innovation, at all level. Excellence in science is guaranteed by the world-leading groups which founded this research area.

Innovation in education is guaranteed by the involvement of researchers on education, business experts.

Using different sensors, actuators, electronic and interconnect technologies the network will develop multifunctional systems based on organic devices and materials with high sensitivity that are also flexible, conformable and present over large areas for various biomedical / biological applications in the life science. Multi-analyte and disposable analytical systems manufactured by large-area printing methods will provide services to the individuals and healthcare community. Targeted implemented interactions with a wide network of venture capitals and business actors will immediately transfer the research outcome to the European Industry.
PICTURES OF ORGANIZED SEX: THE PORNOGRAPHY INDUSTRY IN INDIA AND SWEDEN

THE AIM OF the project is to inquire into the gendered commercial-industrial bases of pornography within the dynamics of transnationalisation and to critically examine the regulatory policies that pertain to it. Despite the size and influence of the industry, there is little research and information available on its commercial-industrial aspects. Research will be carried out in India and Sweden, both welfare states with pro-abolitionist stands on commercial sex-work. Both governments are concerned with systemic and sexualised violence against women and children. Both are concerned with the spread of the industry and the impact of new technologies of convergence on it. Yet while Sweden does not practice censorship by and large, India has a large, active and complex censorship regime. The research will draw on postcolonial feminist political economy approaches. Over 24 months, the project will undertake a comparative study of the porn industries of both countries. It will 1. Carry out fieldwork in both countries; 2. track networks of commercial-industrial relationships; 3. examine all pertinent legislation and policies; 4. analyse the ways in which patriarchy and technology impact on and structure the phenomenon of porn; 5. Disseminate findings through diverse methods throughout the project period.

The anticipated impacts of the project are: 1. The reconceptualisation of porn as a set of representational practices that are inseparable from the conditions of their production. 2. To draw attention to the many and varied stakes in maintaining the porn industry. 3. To broach a debate on the vast Indian porn industry. 4. To make the Nordic debates and the Swedish case available to a larger intellectual community. 5. A strengthened collaboration between EU and India especially on issues of gender-equity and justice. 6. To provide information for policy-makers.

PROFESSOR JEFFERY HEARN
The Department of Thematic Studies
THE INTRODUCTION OF new ionic moieties (cations and anions) into polymers is giving rise to a new family of functional polymers with particular properties and new applications which is provoking a RENAISSANCE of the chemistry and applications of classic polyelectrolytes. However, further developments and a better understanding of the properties and applications of innovative polyelectrolytes are still necessary to develop their actual and emerging applications. RENAISSANCE will aim at excellence in developing high quality training opportunities through a synergistic collaborative research programme between industry and academia in the field of polymer science as applied to needs in Energy & Environment areas.

RENAISSANCE ITN allows the assembly of a truly world class multidisciplinary and intersectoral research and training network, capable to locate Europe at the forefront of emerging polyelectrolyte research. The six academic partners of the network (POLYMAT, LCPO, MPI CI, BIORGEL, ULg and IMDEA) and the three industrial participants (Kitozyme, P&G and REP-SOL) are internationally renowned for their research and training activities in the fields of competence that they represent. RENAISSANCE training program includes local training activities such as individual research projects, PhDs, master courses, supervision and mentoring, specific local courses, as well as network-wide activities such as secondments, local courses open to the network participants, four workshops, one summer schools and one conference. Both scientific training and complementary skills training will be taken into account. The network will offer training to 11 Early Stage Researchers and 1 Experienced Researchers. The ultimate goal will be to train ESRs as quality researchers, prepare them for positions in industry and academia suitable to become future leader scientists in the multidisciplinary emerging field of innovative polyelectrolytes.

PROFESSOR OLLE INGANÄS
The Department of Physics, Chemistry and Biology
SEACOAT
SURFACE ENGINEERING FOR ANTIFOULING - COORDINATED ADVANCED TRAINING

THE MAIN RESEARCH goal of SEACOAT is to improve understanding of biointerfacial processes involved in the colonisation of surfaces by marine fouling organisms. Our vision is that this enhanced understanding will inform the future development of new, environmentally-benign materials and coatings for the practical control of marine biofouling.

Our principal objective is to discover which nano- and micro-scale physico-chemical properties of surfaces influence the adhesion of fouling organisms, through the use of surface engineering technologies to fabricate coatings that vary systematically in relevant surface properties, and length scales.

We will use advanced surface analytical methods to characterise test surfaces for relevant physico-chemical surface properties and how these change after immersion. Parallel adhesion bioassays using a range of representative marine organisms will test intrinsic antifouling properties of surfaces. The network is an interdisciplinary cooperative of chemists, physicists and marine biologists. Intersectoral aspects unite basic and applied scientists working in universities, a large company and an SME.

The project’s S&T objectives will be delivered through research in 4 main Work Packages: viz. WP1-Surface Engineering, WP2-Surface Analytics, WP3-Bioadhesion, WP4-Integration. Two additional Work Packages (WP5, WP6) will be concerned with the Dissemination of project results and the Management of the Network respectively.

The aim of the Training Programme is to increase the knowledge base and experience of trainees in each of the Thematic Areas and to develop their transferable skills for future careers in industry or academia. Six training objectives will be delivered through a suite of 7 Core Skills Areas (Research Project, Advanced Training Courses, Project Conferences, International Winter Workshop, Career Development Plan, Generic Research Skills, Transferable Research Skills).
**SMART**

STIMULI-RESPONSIVE ZIPPER-LIKE NANOBIOREACTORS

**THE CURRENT NANOBIOREACTOR** research is focused on the fabrication of simple-to-use, inexpensive and ultra-sensitive devices which are highly selective, sensitive and stable. Thus, the fundamental goal of this research project is to design, develop and verify a novel bioreactor with self-control abilities for advanced applications (e.g. switchable bio-catalysis) utilising nanotechnology.

This subject will be exploited by developing stimuli-responsive nanomaterials to construct zipper-like nanobioreactors, which could bring more attractive advantages: (i) ease of preparation; (ii) auto-switchable structure in contact with external stimuli; (iii) fast responsive/sensing time; (iv) high selectivity and sensitivity; (v) excellent storage stability; and (vi) cost-effectiveness.

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**PROFESSOR ANTHONY TURNER**
The Department of Physics, Chemistry and Biology
ONCOLOGISTS STILL RELY heavily on biological characterisation of tumours and a limited number of biomarkers which have demonstrated clinical utility. Routine cancer diagnostic tools may not be always sensitive enough and may only detect proteins at levels corresponding to an advanced stage of the disease. Recently, new genomic and proteomic molecular tools (molecular signatures) are being employed which include genetic and epigenetic signatures, changes in gene expression, protein profiles and post-translational modification of proteins. Such advanced diagnostic tools are not always readily adapted to clinical cancer screening due to their complexity, costs and the requirement for highly-qualified operators. Novel bioanalytical methodologies for detection of specific biomarkers/biomolecules, based on nanostructured electronic sensors (rapid, sensitive devices capable of miniaturisation and deployment on site or in small clinics), fulfil the necessary requirements and have the potential to compliment time- and labour consuming clinical analysers used in medical laboratories currently. The primary objective of this proposal, therefore, is to gather together an international and interdisciplinary consortium of ten research teams from EU Member States, Third (including ENP) countries with EU agreements on S&T, in order to share and jointly exploit knowledge and expertise in the development of micro/nanosensors as tools in early cancer diagnosis. A key scientific target is the realisation of intelligent electronic devices which respond to biomolecules such as formaldehyde, amines, metal ions, saccharides, activities of amine oxidases, arginase and glutathione-S-transferase. This will entail design, development and characterisation of nano-scale transducers suitable for testing in clinical samples.
INTELLIGENT GREEN BUILDINGS are based on heterogeneous networks of diverse Smart Objects. These cooperate to sense the environment and act autonomously to improve the quality of life of the inhabitants. State of the art Building Management Solutions (BMS) have severe limitations due to closed architectures, limited object interconnectivity and centralized management. Meanwhile, the robust and reliable interconnection of a large number of wireless heterogeneous objects for Intelligent Buildings has not been yet sufficiently explored. These problems urgently call for solutions, in view of the growth of the Internet of Things (IoT), as they are key enablers for the realization of robust management of energy efficient buildings. The need for advancements along these lines demands cutting-edge research and development (R&D) efforts and the renewal and integration of intersectoral knowledge.

The SOrBeT project addresses these challenges mobilizing a joint industry-academic group on two complementary areas: (i) Internet of Things and (ii) Building Automation and Energy Management. SOrBeT aims to investigate solutions to leveraging classic BMS systems and developing a highly distributed, self-organizing, platform with reliable and trustworthy machine-to-machine communication as the basis for management of green buildings. In R&D terms SOrBeT builds upon the IoT concept of “reliability by design”. It will thus develop and prototype a state-of-the-art software platform for BMS with a focus on the robust, efficient and reliable communication of large numbers of heterogeneous wireless smart objects. Knowledge-wise SOrBeT contributes to enhancing competitiveness of the partners by a comprehensive transfer of knowledge program. This is designed on a mutual-benefit basis, to promote new skills, career opportunities, and development in the European Information and Communication technologies arena, generating new expertise and high-value human capital for the European Research Area.

**PROFESSOR DI YUAN**
The Department of Science and Technology
STEM CELL THERAPY is believed to be the most viable method for restoration of cardiac function after Myocardial Infarction (MI), the leading cause of death in Europe. Despite numerous attempts at injecting stem cells into post-MI heart to affect regeneration, the consensus is that anoikis (cell death) induced by the lack of contact between the cells and the tissue scaffold during injection, the harsh environment at the injection site, and powerful myocardial contractions cause massive cell loss rendering the therapy ineffective. The goal of this project is to enhance treatment efficacy by individual cocooning of bone marrow stem cells in bioengineered collagen-based microspheres. The cocoon provides the tissue support for cell survival, promotes integrin up-regulation for better engraftment of the cells onto the heart tissue, and protect the cells from the harsh post-MI environment. The spheres will be grafted with recognition moieties for the infarct areas, e.g. NGR peptide to enhance targeting. They will also contain growth factor VEGF to promote re-vascularization of ischaemic areas, and gold-coated silicon nanoparticles for in vivo tracking. The cocooned cells will be tested in vitro for their safety and efficacy (e.g. spheres degradation rate, cytotoxicity), and in vivo in MI mice models for their effectiveness in restoring heart functions by echocardiography, and for their traceability by dual-energy CT. As a Canadian researcher, I already joined the Liedberg group at Linkoping University, Sweden, in March 2011 as an Assistant Professor on a temporary, short-term basis to establish this project. My expertise in biomaterials and cell encapsulation combined with peptide, nanoparticle, and imaging expertise of the host laboratory are an excellent match for the success of the project. If the funding is granted, it enables me to extend my stay in Sweden to meet the goals of this beneficial project that will enhance collaborative research between Europe and Canada.
THE SUMA2 NETWORK is designed to collaborate in the field of materials surface modification for advanced applications, and is composed of 3 Universities and 1 research centre in Europe (Saarland University and Fraunhofer Institut for Material and Beam technology (GER), National Politecnical Institute of Lorraine (FRA) and Linkoping University (SWE)), and 5 Universities in Latinamerica (Universidad Nacional de Rio Cuarto, Universidad Nacional del Comahue, Universidad Tecnologica Nacional (ARG), Potificia Universidad Catolica de Chile (CHI), Universidade de Caxias do Sul (BRA)).

The purpose of this multidisciplinary network is to combine different areas of expertise in physics, chemistry, materials science, materials engineering, mechanical engineering and electronic engineering towards the development of optimized surfaces for different applications, such as: gas sensors, transparent p-n junctions, organic solar cells, electrochemical electrodes and wear resistant and anticorrosive surfaces.

To achieve this goal different processing techniques will be applied and combined, like plasma-based deposition techniques, plasma-assisted thermo-chemical diffusion treatments, and laser patterning. This will be complemented with excellent characterization facilities including FIB/SEM, high resolution TEM, and atom probe tomography. Moreover, specially designed facilities for property testing (electrical, mechanical, sensing) are available. 54 exchanges with the participation of 41 scientists with different levels of experience (from PhD students to professors) will be carried out within the project. The total cost of the project is 184,800 . Three workshops will be organized in order to exchange experience among the partners, to enhance knowledge transfer as well as to discuss further common activities.

PROFESSOR MAGNUS ODÉN
The Department of Physics, Chemistry and Biology
IN TODAY’S SOCIETY, massive amounts of electronic sensors surround us that are tracking objects for the purpose of healthcare, surveillance, retail oriented commercial purposes and many others. Modern sensors generate very large amounts of data, however, due to current technical limitations, it is nearly impossible to integrate large scale data from many different and complex sensors to track very large groups of objects and people. Major advancements in various important areas in our society, such as traffic and crowd management, movement science in healthcare, smart surveillance, security and defense are hindered by this limitation, slowing down European industrial growth. The Training programme on Tracking in Complex Sensor Systems (TRAX) project aims to investigate and design innovative algorithms and techniques for dealing with raw data from complex and advanced tracking systems. This will be achieved through the establishment of a novel research training programme on Tracking in Complex Sensor Systems, covering interdisciplinary and intersectoral aspects in this newly emerging supra-disciplinary field. The TRAX consortium comprises two large companies (Thales Nederland B.V., Ericsson A.B.); two SMEs (Rinicom Limited, Xsens Technologies B.V.); a research institute (Fraunhofer) and three universities (University of Lancaster, Linköping University and University of Twente); and is supported by two associated partners: SME SenionLab A.B. and University of Bonn. 12 early stage researches and 3 experienced researchers get the opportunity to work on the state-of-the-art complex tracking field. The uniqueness of TRAX is that while all research is being performed under one umbrella, it is being exploited by different branches of industry and implemented in various applications, resulting in significant benefits for EU industry and society and delivering highly wanted, currently scarcely available, young researchers in the multidisciplinary field of complex tracking.
Unmanned Aerial Systems have been an active area of research in recent years all around the world. Top research centres in the world are working on new applications, improving previous ones, solving specific problems in the different areas. Each centre has taken a special area of the whole field into focus and they are taking specialization on it. It makes a huge scattered network of knowledge.

The project that we present here is an attempt to connect some relevant nodes of this network putting in contact 4 leading research centres whit experience in different fields connected and complementary, but not superposed. Thus, the opportunities and strength of each partner will be increased.

The members of the consortium are:
- The ASU (Arizona State University) Robotics Laboratory (http://robotics.asu.edu) has significant experience in designing, building and deploying aerial and aquatic mobile robot systems. The present inventory of robots includes multiple fixed wing, rotary aerial vehicles and autonomous underwater vehicles with varied capabilities in sensing and actuation.
- The Linkoping University, Artificial Intelligence & Integrated Computer Systems Division (http://www.ida.liu.se/~patdo/aiicssite1), contributes with his experience in quadrotor systems for indoor and outdoor, visual navigation and with Software Architectures for micro-uavs.
- The Universidad Politecnica Madrid, Computer Vision Group (www.disam.upm.es/colibri), contributes with his experience in visual guidance and visual control for rotatory UAVs.

All the above makes a great opportunity to share knowledge, expertise, work-styles, etc. different operative test beds, laboratories and R&D leading technology facilities and no less importance, cultural aspects.

Professor Patrick Doherty
The Department of Computer and Information Sciences

Partners
1. Universidad Politecnica de Madrid, Spain (coordinator)
2. Linköpings universitet, Sweden
IN CELLULAR NETWORKS, it is estimated that 2/3 of the calls and 90% of data services take place indoors. Smart meters are being and will be deployed across the world. Smart meters are connected with other meters and appliances wirelessly at homes. Smart buildings, e-health, assisted living applications also rely on quality in-building wireless communications. Thus pervasive wireless communications are very important.

There still remain many challenges to achieve high quality pervasive indoor wireless communications, for example, it is not well understood how various indoor wireless networks will interfere each other, how traffic models look like in smart homes/buildings, which new frequency bands can be used to meet exponential traffic growth indoors and how to make use of various wireless technologies with consideration of energy consumption, and so on.

The main objectives of the project are as follows:
- To characterise material properties (permittivity, permeability, transmission, reflection loss, etc) for new and existing building/insulation materials that are used in Europe and China for frequencies up to 65GHz
- To investigate indoor and indoor-outdoor wireless propagation channels;
- To investigate how different indoor wireless networks will interfere each other and the interference to and from wireless networks in the neighbourhood;
- To identify new frequency bands that can be used to meet the exponential traffic growth indoors;
- To investigate traffic models for indoor networks, e.g., in smart homes/buildings;
- To investigate how to reduce energy consumption of indoor wireless networks;
- To explore the synergy of complementary competences at the project partners and establish and/or strengthen the long-term collaborations between them.

The methodology of this project will adopt a combination of theoretical research that will be verified by experiment and simulation. The interactions between academia and industry will also be promoted. It is expected that the project will benefit more than 15 early stage researchers. The project partners will disseminate the project results in journals, conferences and workshops organised by the project partners.
IN THE SPECIFIC PROGRAMME ‘CAPACITIES’ for Community action in the area of research and technological development, including demonstration activities, support will be provided to develop research and innovation capacities throughout Europe and ensure their optimal use. This aim will be achieved through: optimising the use and development of research infrastructures; strengthening the innovative capacities of small and medium-sized enterprises (SMEs) and their ability to benefit from research; supporting the development of research-driven clusters; unlocking the research potential in the EU’s convergence and outermost regions; bringing science and society closer together for their harmonious integration in European society; horizontal actions and measures in support of international cooperation; and provide support for the coherent development of research policies.
A GLOBALLY DISTRIBUTED computing Grid now plays an essential role for large-scale, data intensive science in many fields of research. The concept has been proven viable through the Enabling Grids for E-sciencE project (EGEE and EGEE-II, 2004-2008) and its related projects. EGEE-II is consolidating the operations and middleware of this Grid for use by a wide range of scientific communities, such as astrophysics, computational chemistry, earth and life sciences, fusion and particle physics. Strong quality assurance, training and outreach programmes contribute to the success of this production Grid infrastructure.

Built on the pan-European network GEANT2, EGEE has become a unique and powerful resource for European science, allowing researchers in all regions to collaborate on common challenges. Worldwide collaborations have extended its reach to the benefit of European science.

The proposed EGEE-III project has two clear objectives that are essential for European research infrastructures: to expand, optimize and simplify the use of Europe’s largest production Grid by continuous operation of the infrastructure, support for more user communities, and addition of further computational and data resources; to prepare the migration of the existing Grid from a project-based model to a sustainable federated infrastructure based on National Grid Initiatives.

By strengthening interoperable, open source middleware, EGEE-III will actively contribute to Grid standards, and work closely with businesses to ensure commercial uptake of the Grid, which is a key to sustainability.

Federating its partners on a national or regional basis, EGEE-III will have a structuring effect on the European Research Area. In particular, EGEE-III will ensure that the European Grid does not fragment into incompatible infrastructures of varying maturity. EGEE-III will provide a world class, coherent and reliable European Grid, ensuring Europe remains at the forefront of scientific excellence.

EXPERT JENS LARSSON
National Supercomputer Centre in Linköping
SCIENTIFIC RESEARCH IS no longer conducted within national boundaries and is becoming increasingly dependent on the large-scale analysis of data generated from instruments or computer simulations housed in trans-national facilities, by using e-Infrastructure (distributed computing and storage resources linked by high-performance networks).

The 48 month EGI-InSPIRE project will continue the transition to a sustainable pan-European e-Infrastructure started in EGEE-III. It will sustain support for Grids of high-performance and high-throughput computing resources, while seeking to integrate new Distributed Computing Infrastructures (DCIs), i.e. Clouds, SuperComputing, Desktop Grids, etc., as they are required by the European user community. It will establish a central coordinating organisation, EGI.eu, and support the staff throughout Europe necessary to integrate and interoperate individual national grid infrastructures.

EGI.eu will provide a coordinating hub for European DCIs, working to bring existing technologies into a single integrated persistent production infrastructure for researchers within the European Research Area. EGI-InSPIRE will collect requirements and provide user-support for the current and new (e.g. ESFRI) users. Support will also be given for the current heavy users as they move their critical services and tools from a central support model to ones driven by their own individual communities.

The project will define, verify and integrate within the Unified Middleware Distribution, the middleware from external providers needed to access the e-Infrastructure. The operational tools will be extended by the project to support a national operational deployment model, include new DCI technologies in the production infrastructure and the associated accounting information to help define EGI’s future revenue model.
The objective of the ELIXIR preparatory phase is to produce a memorandum or memoranda of understanding between organisations (government agencies, research councils, funding bodies and scientific organisations) within the member states, with the purpose of constructing a world class and globally positioned European infrastructure for the management and integration of information in the life sciences.

To achieve this, we will address the following tasks and issues:
1. Define the scope of the infrastructure, its role and benefits
2. Define an appropriate governance and legal structure
3. Define a long term funding structure to provide a sustainable infrastructure
4. Define the requirements for the European Data Centre in the next 5-10 years and makes plans to meet these needs
5. Involve all relevant stakeholders, including users, data providers, tools providers to ensure that the infrastructure meets their needs
6. Explore integration and interoperability between core and specialised data resources and the development of standards in newly emerging fields
7. Define the critical interdisciplinary links that need to be forged between the biological and related scientific disciplines, including medicine, agriculture and the environment
8. Define the needs of related European industries
9. Define a training strategy to ensure that Europe effectively exploits all the available information.
THE AIM OF the GenderTime project is to identify and implement the best systemic approach to increase the participation and career advancement of women researchers in selected institutions where self-tailored action plans are implemented. Institutions involved in GenderTime are intentionally very different in terms of size, discipline, history, etc. in order to experiment in various situations and to create a synergy among scientific partners. The plans will involve activities as recruitment, retention and promotion policies, supporting work-life balance measures, updated management and research standards, supporting policies for dual careers-couple, etc.

To guarantee the real implementation of structural change in each Institution a central role will be assumed by the transfer agents. A crucial point will be the real commitment of organizational heads of each participant. Among the 10 partners, there are 8 scientific partners across Europe, they implement self-tailored action plans in their institutions. An external partner is in charge of the evaluation. A technical partner coordinates the project. The consortium will cooperate on common actions to transfer knowledge between relative newcomers and institutions with experience on gender aware management. Besides a measurable change in the participating institutions through evaluation instruments such as tailor-made indicators, the outcome of the project will be to produce tested toolbox and management tools for future action plans in institutions interested in similar approaches. Comparative analysis of GenderTime experiences will identify the best self-tailored actions according to cultural contexts, disciplines, etc. and the factors for a successful sustainable implementation. GenderTime objective is to contribute to an organizational and structural change in European research and to disseminate at all levels the tools to implement it.
**GENSET**

INCREASING CAPACITY FOR IMPLEMENTING GENDER PLANS IN SCIENCE

**THE GOAL OF** GenSET is to develop practical ways in which gender knowledge and gender mainstreaming expertise can be incorporated within European science institutions in order to improve individual and collective capacity for action to increase women’s participation in science. This will be achieved by facilitating a sustainable, collaborative dialogue between gender experts and science leaders to agree on practical guidelines for implementing gender action plans within existing institutional mechanisms.

Involved in the debate are 100 European science stakeholder institutions, 15 international gender experts, and eight European strategy decision-makers. Together with the Consortium, they will work towards improvements in five key areas where gender bias disadvantages women’s participation in science:
- assessment of women’s work
- recruitment and retention
- science knowledge-making
- research process
- science excellence value system

The dialogue will be facilitated by GenSET consortium through a range of capacity building support activities, including consensus seminars, interactive workshops and dissemination and valorisation events. The outcome will be increased capability of European institutions to implement gender equality policy recommendations and a strengthened position on research excellence in the European Science Area.

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**PROFESSOR JEFFREY HEARN**

The Department of Thematic Studies
IS-ENES
INFRASTRUCTURE FOR THE EUROPEAN NETWORK FOR EARTH SYSTEM MODELLING

IS-ENES WILL DEVELOP a Virtual Earth System Modelling Resource Centre (V.E.R.C.), integrating the European Earth system models (ESMs) and their hardware, software, and data environments. The overarching goal of this e-infrastructure is to further integrate the European climate modelling community, to help the definition of a common future strategy, to ease the development of full ESMs, to foster the execution and exploitation of high-end simulations, and to support the dissemination of model results and the interaction with the climate change impact community.

The V.E.R.C. encompasses models, the tools to prepare, evaluate, run, store and exploit model simulations, the access to model results and to the European high-performance computing ecosystem in particular the EU large infrastructures DEISA2 and PRACE. The V.E.R.C. developed by IS-ENES is based on generic ICT, Grid technology and subject-specific simulation codes and software environments. The European Network for Earth System Modelling (ENES) leads IS-ENES. This network gathers the European climate and Earth system modelling community working on understanding and prediction of future climate change.

This community is strongly involved in the assessments of the Intergovernmental Panel on Climate Change and provides the predictions on which EU mitigation and adaptation policies are elaborated. IS-ENES combines expertise in Earth system modelling, in computational science, and in studies of climate change impacts. IS-ENES will provide a service on models and model results both to modelling groups and to the users of model results, especially the impact community. Joint research activities will improve the efficient use of high-performance computers, model evaluation tool sets, access to model results, and prototype climate services for the impact community. Networking activities will increase the cohesion of the European ESM community and advance a coherent European Network for Earth System modelling.

EXPERT TORGNY FAXÉN
National Supercomputer Centre in Linköping
PARTNERS

1. Centre National de la Recherche Scientifique, France (coordinator)
2. Science and Technology Facilities Council, United Kingdom
3. Barcelona Supercomputing Center, Spain
4. Max Planck Gesellschaft zur Förderung der Wissenschaften E.V., Germany
5. Universidad de Cantabria, Spain
6. Universitetet i Bergen, Norway
7. Linköpings universitet, Sweden
8. The University of Manchester, United Kingdom
9. Koninklijk Nederlands Meteorologisch Instituut, The Netherlands
10. Deutsches Klimarechenzentrum GMBH, Germany
11. Sveriges Meteorologiska och Hydrologiska Institut (SMHI), Sweden
12. Deutsches Zentrum für Luft- und Raumfahrt EV, Germany
13. Centro Euro-Mediterraneo Per i Cambiamenti Climatici Scarl, Italy
14. Meteo-France, France
15. Danmarks Meteorologiske Institut, Denmark
16. Institutul National de Hidrologie si Gospodarirea a Apelor, Romania
17. The University of Reading, United Kingdom
18. University of Cape Town, South Africa
19. Centre Europeen de Recherche et de Formation Avancée en Calcul Scientifique, France
20. Wageningen University, The Netherlands
21. Meteorologisk Institutt, Norway
22. Fundacio Institut Catala de Ciencies del Clima, Spain
23. Met Office, United Kingdom

IS-ENES2

INFRASTRUCTURE FOR THE EUROPEAN NETWORK FOR EARTH SYSTEM MODELLING - PHASE 2

IS-ENES2 is the second phase project of the distributed e-infrastructure of models, model data and metadata of the European Network for Earth System Modelling (ENES). This network gathers together the European modelling community working on understanding and predicting climate variability and change. ENES organizes and supports European contributions to international experiments used in assessments of the Intergovernmental Panel on Climate Change. This activity provides the predictions on which EU mitigation and adaptation policies are built.

IS-ENES2 further integrates the European climate modelling community, stimulates common developments of software for models and their environments, fosters the execution and exploitation of high-end simulations and supports the dissemination of model results to the climate research and impact communities. IS-ENES2 implements the ENES strategy published in 2012 by: extending its services on data from global to regional climate models, supporting metadata developments based on the FP7 METAFORE project, easing access to climate projections for studies on climate impact and preparing common high-resolution modelling experiments for the large European computing facilities. IS-ENES2 also underpins the community efforts to prepare for the challenge of future exascale architectures.

IS-ENES2 combines expertise in climate modelling, computational science, data management and climate impacts. The central point of entry to IS-ENES2 services, the ENES Portal, integrates information on the European climate models and provides access to models and software environments needed to run and exploit model simulations, as well as to simulation data, metadata and processing utilities. Joint research activities improve the efficient use of high-performance computers and enhance services on models and data. Networking activities increase the cohesion of the European ESM community and advance a coordinated European Network for Earth System modelling.
BROAD BAND ANTI-REFLECTIVE coatings need a low-index material at the top position. Normally SiO2 is used. This layer is in direct contact to the environment. While a number of high- and medium-index layers with a high hardness (up to 30 GPa) have been developed in the past, the hardness of the low-index layer on the top is limited to about 10 GPa. Under hard conditions this layer is then the weak point of the total layer stack. This excludes a number of possible applications. The goal of the project is to develop a new, ultra-stable AR-coating and the relevant deposition processes. Therefore a new optical material based on a Al-Si-x-O-y-Fz composite will be developed. The hardness of this material should exceed 20 GPa and must have a refractive index of lower than 1.60 (at 550 nm). The deposition process shall be based on magnetron sputtering with a special focus on highly ionized sputtering. This ensures that the process can be upscaled and can be used for high deposition rates. The result is a broad band antireflective coating which shows a significant higher scratch resistance (from about 10 to 1000 cycles Taber-abraser test) and a doubled hardness (> 20 GPa). In addition, the coating must be stable against hydrothermal corrosion (1000 cycles autoclave). The project focusses not only on precision optical products but potentially on all flat glass products such as glasses for instruments, photovoltaic modules, automotive, sensors, displays.
PHM-ETHICS

PERSONALIZED HEALTH MONITORING (PHM) - INTERDISCIPLINARY RESEARCH TO ANALYSE THE RELATIONSHIP BETWEEN ETHICS, LAW AND PSYCHOSOCIAL AS WELL AS MEDICAL SCIENCES

THE AIM OF PHM-Ethics is to scientifically analyse the dependencies between ethics, law and psychosocial sciences in a dynamic part of IT development, i.e. personalized health monitoring (PHM), from a European perspective. First, the development of PHM will be reviewed to identify core steps that delineate major changes from an ethical, legal and psychosocial point of view.

A taxonomy will be elaborated based on research evidence in each of the disciplines, and interrelations will be documented into a map.

The project will be situated at the development phase of new technologies, however also at the early application phase. As a major step, the implementation of ethical constraints contained in EU/ international instruments into the national laws or regulations will be analysed, and gaps will be identified. At the end of project phase 1, the taxonomy will be validated in an international expert workshop.

The aims of the second project phase are to develop and test an interdisciplinary methodology that allows assessing PHM technologies regarding their ethical, legal and psychosocial consequences.

The interdisciplinary methodology will be pilot-tested on a qualitative basis and validated in selected personal health monitoring applications at different stages of the taxonomy. The objective of the study is to gain scientific input from the patient and provider point of view. Results of an empirical study will be analysed in terms of differences between development stages and sociodemographic factors.

The third project phase is related to the exploitation of knowledge and research products, with regard to policy-making and implementation of technological innovations. PHM-Ethics will provide a tool that allows studying future PHM applications on different taxonomic levels concerning their consequences to serve both internal and external dissemination purposes within the 7th framework, also projecting the methodology to other technological field (e.g. the security area).
ESFRI has identified High Performance Computing (HPC) as a strategic priority for Europe. Scientists and engineers must be provided with access to capability computers of leadership class in Europe to remain competitive internationally and to maintain or regain leadership. Supercomputers are an indispensable tool to solve the most challenging problems through simulations.

PACE, the Partnership for Advanced Computing in Europe, has the overall objective to prepare the creation of a persistent pan-European HPC service, consisting of three to five centres, similar to the US HPC infrastructure. PACE will be the tier-0 level of the European HPC ecosystem. It will build on the experience of the partners and use concepts and services from EC-funded projects like GEANT2 and DEISA.

The hosting centres of the planned tier-0 systems will provide the expertise, competency, and the required infrastructure for comprehensive services to meet the challenging demands of excellent users from academia and industry.

PACE will prepare for the implementation of the infrastructure in 2009/2010 by defining and setting up a legal and organisational structure involving HPC centres, national funding agencies, and scientific user communities to ensure adequate funding for the continued operation and periodic renewal of leadership systems, coordinated procurements, efficient use and fair access.

In parallel PACE will prepare the deployment of Petaflop/s systems in 2009/2010. This includes the procurement of prototype systems for the evaluation of software for managing the distributed infrastructure, the selection, benchmarking, and scaling of libraries and codes from major scientific user communities, the definition of technical requirements and procurement procedures, as well as collaborations with the European IT-industry to influence the development of new technologies and components for architectures that are promising for Petaflop/s systems to be procured after 2010.

PARTNERSHOP FOR ADVANCED COMPUTING IN EUROPE

EXPERT CHANDAN BASU
National Supercomputer Centre in Linköping
LARGE SCALE SIMULATIONS are the third pillar of science today alongside theory and experiment. They produce scientific insights, technological advances, and solve problems in many fields of society. Their tools are high-end computers and effective software. PRACE, the Partnership for Advanced Computing, has been created as a not for profit association in May 2010 as a permanent pan-European High Performance Computing service providing world-class systems for world-class science. Up to six systems at the highest performance level (Tier-0) will be deployed the first one being the already installed BlueGene/P in Germany. Funding for the next three systems has been committed by France, Italy, and Spain. Twenty European states are members of the PRACE Research Infrastructure (RI). Access to the PRACE resources will be through a single peer review process. The Scientific Steering Committee represents the user communities and guides the strategic directions. PRACE works closely with national, regional, and topical centres to shape the European HPC ecosystem. The PRACE-1IP project is designed to support the accelerated implementation of the RI. The project supports the evolution of the RI by refining and extending the administrative, legal and financial framework with focus on the specific requirements of industry. To enable world-class science on novel systems the project assists users in porting, optimising and peta-scaling applications to the different architectures and deploys consistent services across the RI. The tools and techniques will be selected to have broad applicability across many disciplines. This is accompanied by advanced training in modern programming methods and paradigms, establishing a permanent distributed training infrastructure. The PRACE brand is already well established in the international HPC scene; extensive dissemination and outreach will be continued. The project advises PRACE on procurements of the next generation of systems. Finally, promising technologies, especially with respect to energy efficiency, will be evaluated with the ultimate goal to collaborate with industrial partners to develop products exploiting STRATOS, PRACE advisory group for Strategic Technologies created in the PRACE Preparatory Phase project.
PRACE-2IP SUPPORTS THE accelerated implementation of the pan-European HPC Research Infrastructure created in April 2010 as the result of the preparatory phase PRACE project. It complements and extends the work of the PRACE-iIP project that was started in July 2010.

PRACE-2IP addresses the computational and simulation needs of European scientific communities to keep them at the forefront of discovery. Our vision is the formation of an integrated HPC ecosystem of facilities and services enabling researchers to realise the full potential of computational science within the supportive environment of the European Research Area.

Building on the implementation work of the preceding PRACE and DEISA projects, PRACE-2IP will enable seamless access to HPC systems and services at the Tier-0 and Tier-1 level to users, regardless of their country of work. This provides the means and motivation to undertake ambitious, ground-breaking computational science. In particular, DEISA-like services will be integrated into the ecosystem.

Applications enabling expertise will support researchers in code development, optimisation and peta-scaling to help them make effective use of the Tier-0 and Tier-1 systems. Training and dissemination activities will ensure that European scientists have the knowledge and the skills enabling them to take full advantage of the facilities on offer. Through collaboration with technology providers and vendors, novel architectures, systems and technologies will be evaluated to ensure that Europe remains at the forefront of HPC and that the future needs of the research community are understood and met. Targeted research activities will investigate possible solutions to challenges in programmability and scalability of future multi-petaflop systems.

PRACE-2IP will considerably strengthen and deepen the co-operation between HPC centres, funding bodies and research communities in a mutually beneficial partnership to enhance European scientific competitiveness.

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CAPACITIES

PARTNERS
1. Forschungszentrum Juelich GMBH, Germany (coordinator)
2. The University of Edinburgh, United Kingdom
3. Stichting Academisch Rekencentrum Amsterdam (SARA), The Netherlands
4. The Cyprus Research and Educational Foundation, Cyprus
5. Vysoka Skola Banska - Technicka Univerzita Ostrava, Czech Republic
6. Uninett Sigma AS, Norway
7. Københavns Universitet, Denmark
8. Consorzio Interuniversitario Cineca, Italy
9. Association National Centre for Supercomputing Applications, Bulgaria
10. CSC-Tieteen Tietotekniikan Keskus OY, Finland
11. Inter University Computation Centre, Israel
12. Universidade de Coimbra, Portugal
13. Barcelona Supercomputing Center, Spain
14. National University of Ireland, Galway, Ireland
15. Univerza V Ljubljani, Slovenia
16. Grand Equipement National de Calcul Intensif, France
17. Istanbul Teknik Universitesi, Turkey
18. Gauss Centre for Supercomputing (GCS) E.V., Germany
19. Partnership for Advanced Computing in Europe AISBL, Belgium
20. Universitaet Linz, Austria
21. Eidgenoessische Technische Hochschule Zurich, Switzerland
22. Nemzeti Informacios Infrastruktura Fejlesztesi Iroda, Hungary
23. Institut Za Fiziku, Serbia
24. Greek Research and Technology Network S.A., Greece
25. Uppsala universitet, Sweden

PRACE-3IP

PRACE - THIRD IMPLEMENTATION PHASE PROJECT

PRACE-3IP supports the accelerated implementation of the pan-European HPC Research Infrastructure (RI) created in April 2010. It continues, complements, and extends the work of the PRACE-1IP and -2IP projects.

PRACE-3IP addresses the computational and simulation needs of European scientific communities and of industry to keep them at the forefront of discovery. Our vision is the formation of an integrated HPC ecosystem of facilities and services enabling researchers to realise the full potential of computational science within the supportive environment of the ERA.

The project will undertake a joint pre-commercial procurement (PCP) pilot to obtain a solution for a ‘Whole System Design for Energy Efficient HPC’. This pilot is the first of its kind on a Europe-wide level and the lessons learned will be invaluable for PRACE in its future procurement strategy and for Europe as a whole in using PCP as a driver for innovation.

PRACE-3IP will deliver a broad set of services suitable for use by industry and commerce. The PRACE RI will be open for use by SMEs and large European businesses, offering Tier-0 and Tier-1 access, training, and applications support.

Applications support and enabling will have a bias towards addressing major socio-economic challenges. New tools will be made available under Open Source. Best practises will be identified, documented and made available to the European HPC community in academia and industry.

PRACE-3IP will have a broad training and outreach activity designed to engage more user communities, including industry, in the use of HPC. The next generation of students and researchers will be introduced to the benefits of HPC and the technologies and knowledge required applying it successfully in their discipline.

PRACE-3IP will considerably strengthen and deepen the co-operation between HPC centres, funding bodies and research communities in a mutually beneficial partnership to enhance European scientific and industrial competitiveness.

EXPERT CHANDAN BASU
National Supercomputer Centre in Linköping
THE PROFILES PROJECT promotes IBSE through raising the self-efficacy of science teachers and in so doing aiding a better understanding of the changing purpose of teaching science in schools and the value of stakeholder networking. The proposal innovation is in utilizing existing science teaching materials to support teachers, through an inspired, longitudinal training programme reflecting stakeholder views and needs, while simultaneously promoting a reflective IBSE school-based, training related, intervention to promote learning through creative, scientific problem solving and socio-scientific decision making procedures. The measures of success are through a) determining the self efficacy of science teachers in teaching innovative science education approaches allowing student acquisition of life skill competencies and b) in the attitudes of students toward this more context-led, student centered, IBSE emphasised learning. Dissemination of approaches, reactions, and reflections form a further key project target.

Initially PROFILES involves the development of lead teachers on four fronts (teacher as learner, as teacher, as reflective practitioner and as leader) consolidating their ownership of the context-led approach and incorporating use-inspired research, evaluative methods and stakeholder networking. The project enhances its dissemination approaches with lead teachers spearheading training of further teachers at pre- and in-service levels and initiating workshops for key stakeholders nationwide. The project focuses on the secondary level so that ‘open inquiry approaches’ are a major teaching target. PROFILE pays much attention to student motivation for the learning of science both in terms of intrinsic motivation (relevance, meaningful, as considered by the students) and extrinsic motivation (teacher encouragement and reinforcement) and attempts to make school science teaching more meaningful by paying attention to cultural differences, esp. at the gender level.
SATORI
STAKEHOLDERS ACTING TOGETHER ON THE ETHICAL IMPACT ASSESSMENT OF RESEARCH AND INNOVATION

SATORI IS A 45-month project, comprising 16 partners from 13 countries, including an intergovernmental organisation, the aim of which is to improve respect of ethics principles and laws in research and innovation, and to make sure that they are adequately adapted to the evolution of technologies and societal concerns. The partners will develop an ethics assessment framework based on thorough analysis, commonly accepted ethical principles, participatory processes and engagement with stakeholders, including the public, in Europe and beyond.

The project comprises 12 work packages, starting with a systematised inventory of current practices and principles in ethics assessment. WP2 reviews existing projects and identifies stakeholders. WP3 investigates the impact of globalisation and the extent to which research is conducted outside Europe to profit from more flexible frameworks. In WP4, the partners outline an ethical assessment framework and create a roadmap for a fully developed framework. WP5 concerns the cost-effectiveness and risk-benefit of ethics assessment. WP6 address other impacts and gathers stakeholder views on those impacts. The partners will study the prospects for standardising the framework in WP7. In WP8, the partners will develop a strategy for sustainability of the SATORI network. In WP9, which runs throughout the project, the partners will monitor policy developments and other initiatives at the EU, MS and local levels which merit ethical assessment and alert our network accordingly. The partners have devised a multi-pronged communications strategy to interact with stakeholders in WP10. WP11 is project management. In WP12, the partners have created an independent evaluation of and reflection upon the project, which will enable any necessary remedial actions to enhance it. SATORI’s experienced partners bring complementary perspectives and knowledge from academia, industry, research institutes, science academies, journalism and other sectors.

PROFESSOR GÖRAN COLLSTE
The Department of Culture and Communication
Duration Call
XX
EU Funding
€ XX

PARTNERS
1. Selex ES SPA, Italy (coordinator)
2. Elbit Systems Ltd, Israel
3. EFPC (UK) Ltd, United Kingdom
4. Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V, Deutschland
5. intracom SA Telecom Solutions, Greece
6. National Center for Scientific Research Demokritos, Greece
7. Skytek Ltd, Ireland
8. Politecnico di Torino, Italy
9. Centrum Badan Kosmicznych Polskiej Akademii Nauk, Poland
10. Pyro Fire Extinguisher SL, Spain
11. The University of Westminster, United Kingdom
12. EADS - Construcciones Aeronauticas S.A., Spain
13. Ministry of National Defence Greece, Greece
14. Universitat Politecnica de Valencia, Spain
15. Empresa de Transformacion Agraria SA, Spain
16. Linköping University, Sweden
17. Aria Technologies SA, France
18. Ministry of Public Security, Israel
19. Ministero Dell’Interno, Italy

EU Funding
€ 3 662 800