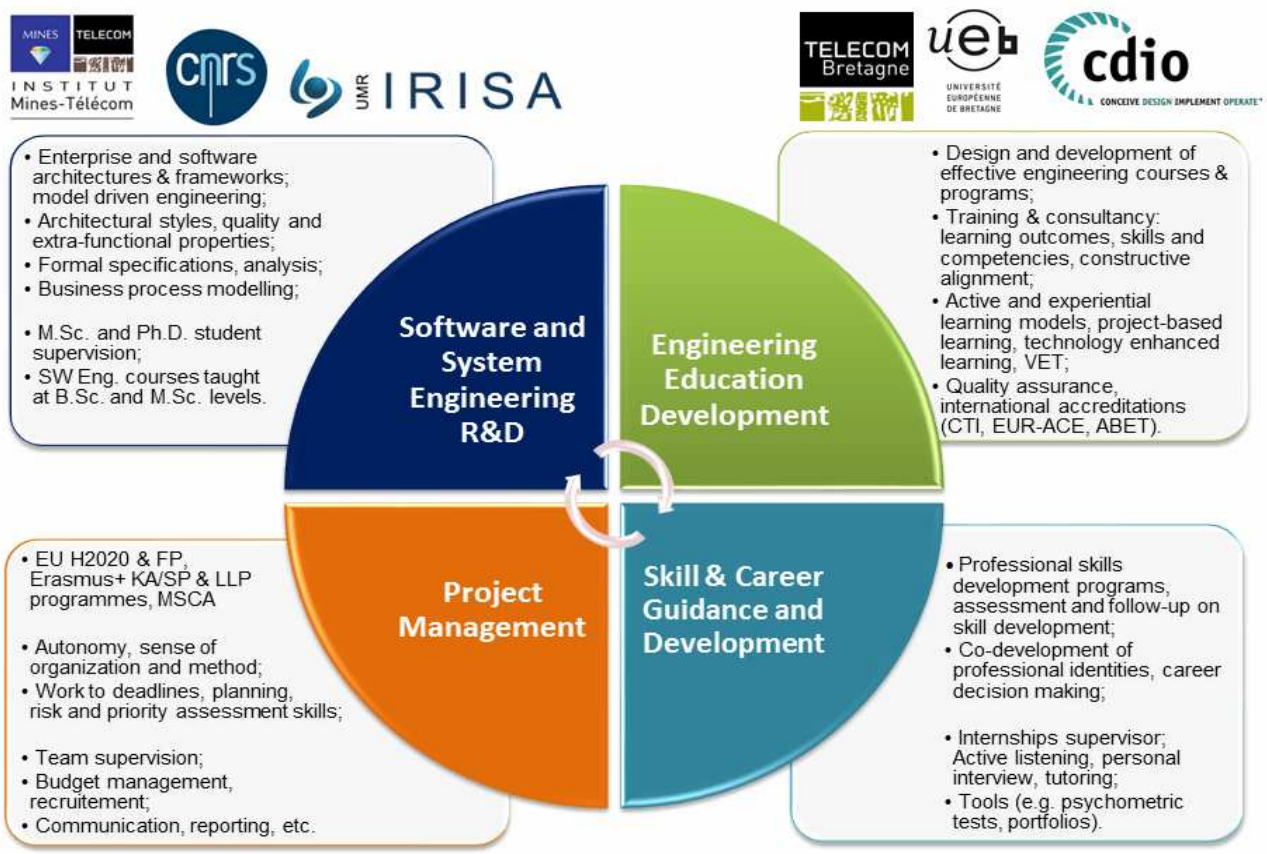
Siegfried ROUVRAIS
Telecom Bretagne, Technopôle Brest-Iroise
F-29238 Brest
45 years old (1970)
Phone: +33(0) 223.001.504

Associate Professor at Institut Mines-Télécom, CNRS
Ph.D. 2002, University of Rennes, France
siegfried.rouvrais@telecom-bretagne.eu
http://tinyurl.com/rouvrais

more than 15 years of experience in Software Engineering R&D and Engineering Education Design & Development

Main Skills



Professional Experiences & Academic Positions

Since 2012: Research Fellow in Computer Science
- o IRISA, UMR 6074 (i.e. French joint research CNRS unit, created in 1975)
  - Dpt. 4: Language & Software Engineering, member of the *Adaptive Software Systems* team

Since 2002: Researcher and Associate Professor in Software & System Engineering
- o Institut Mines-Télécom: French scientific public institution and research centre, under the authority of the French Ministers for Industry and Communications (national leading group of Engineering & Business Schools, since 2012)
  - member of the *Architectures and Engineering of Services and Software Systems* (AE3S);
- o TELECOM Bretagne (formerly *Ecole Nationale Supérieure des Télécommunications,* 1977): French selective Engineering *Grande Ecole* in ICT (Master level, 1,000 students each year), ranked 15+/300
  - member of *the Software Engineering* Group, Dept. of Computer Science;
  - co-director of the *Transdisciplinary Research in Engineering Education* Group (TREE)

2000-2001: Assistant Professor: ENSSAT, French graduate engineering School in Applied Science

1998-2000: Assistant Lecturer: ISTIC, University of Rennes, France

Titles and Diplomas

2008: ***Maître de Conférences*** **qualification** by the French National University (CS, section 27)

2002: Ph. D. in Computer Science, University of Rennes, France & INRIA research Lab.

- areas of examination: software architectures and distributed systems; dissertation: *Mobile agents for distributed service compositions*, with honours; full grant from the French Ministry of Education

1997: Research M.Sc. in Computer Science, University of Rennes, France

- thesis: *Software architectures and security properties*; major: Software Engineering

Some Responsibilities & Academic Specialization

2014-16: EU Erasmus+ KA2 project (Quality Assurance and Enhancement Marketplace for Higher Education): Work Package leader on Process Assessment Models, n° *2014-1-IS01-KA203-000177*, 207 000 Euros; **http://projects.au.dk/cross-sparring/**

2014-17: EU Erasmus Mundus A2 project (INternational Science Promoting Innovation and entREpreneurship, with South Africa): institutional manager, n° *2014-0879/001-001-EM*, 2.2 Million Euros; **http://inspiresouthafrica.eu/**

2015: S2PE grant "*Soutien à la Préparation de Projets Européens*", Brittany regional action for internationalization and European agenda, n°9017-LEEF: Life Long Engineering Education for the Future;

2013: EU-CEDEFOP study visit "Scottish Credit and Qualifications Framework: cross boundaries", n°*106*; **http://scqf.org.uk/**

2013: International CDIO council member: elected during the 9th MIT/Harvard conference, 6 members at large, secret ballot vote; French CDIO correspondent since 2010;

2013: Marie Curie International Outgoing Fellowship for Career Development (applicant): EU 7th Framework Programme for Research; application scored over the thresholds on each criteria, ranked B;

2012-13: EU QUESTE-SI project (Quality System of European Scientific and Technical Education, Lifelong Learning Programme): self-assessment report manager for sustainable education; **http://plone.queste.eu/**

2012: International CDIO meeting at Telecom Bretagne: organizer (100 participants over 3 days); http://conferences.telecom-bretagne.eu/cdiofallmeeting2012/

2010: Vocational program for adults in Information System technical architectures: full program manager (600-hour, M.Sc. level, more than 20 teachers managed, liaison with professional branches);

2009: Non formal learning recognition and qualification: mentor for adult candidates to master of engineering diplomas based on their years of professional experiences, RPL processes;

Since 2008: Educational program alignment and evaluation: EU ENAEE, CTI French accreditation body, and CDIO standards requirements (support for Academic Affairs at TELECOM Bretagne);

2008: 5th International French-speaking colloquium "Questions of Pedagogy in Higher Education": co-organiser (more than 200 participants, 140 paper submissions, 1100-page proceedings managed); http://www.colloque-pedagogie.org/?q=node/550

Since 2007: Professional and personal pathways: designer and co-pilot of a 63-hour course (definition of workshops, monitoring of student individual learning, portfolio, career counselling, MBTI psychometric test debriefings, preparation to recruitment procedures, assessment centres, etc).;

2003-2007: Educational program reform (transversal and professional skills): co-design and implementation of an integrated project-based curriculum at TELECOM Bretagne (one 120h-project per semester);

2002-2005: EU LLP Leonardo project (Internet-based vocational training of communication students, engineers, and technicians): Work Package leader, 204 000 Euros; http://www.invocom.et.put.poznan.pl/

1998-2001: EU ESPRIT C3DS project (Control and Coordination of Complex Distributed Services): 4th EU Framework Programme, European Commission's Information Technology Research Programme, NoE: INRIA Rennes WP member, *n°24962* ;

Publications

	Book Chapters	Intl. Journals	French Journals	Intl. Confs.	French Confs.	Intl. WS	French WS
Engineering Education		2		24	9	2	1
Software Engineering	1	1	1	15	2	2	
Total (60)	**1**	**3**	**1**	**39**	**11**	**4**	**1**

Program Committee memberships: IEEE Frontiers In Education, CDIO, IEEE LaTiCE (Learning & Teaching in Computing and Engineering), QPES (*Questions de pédagogie dans l'enseignement supérieur*), Intl. Conf. on Software Engineering Advances, Advanced Intl. Conf. on Telecommunications, *Conférence francophone sur les Architectures Logicielles*, etc.

Miscellaneous

- Qualities: system thinking, strong analytical skills, conceptualization, inter & pluri-disciplinarity;
- Main personality traits: curious and open-minded, initiative with a strong team spirit, cooperative and consensual, conscientious and reflective, observant and analytical, organized with a long-term vision;
- Communication skills: written and verbal (conferences, publications, project reporting, etc.);
- Various: first aid certified, fire prevention and rescue services;
- Hobbies: sailing, racing and team coordination (e.g. inshore Intl. Formula 18 catamaran 1993-98, offshore IRC3-4 competitions 1994-2011, Diam24OD *Tour de France à la Voile* 2015).

Main Publications in Engineering Education (non French)

- Bennedsen, J., Clark, R., Rouvrais, S., and Shrey-Niemenmaa, K**. Using Accreditation Criteria for Collaborative Quality Enhancement***. In Proceedings of the 5th World Engineering Education Forum*, 20-24 September 2015, Florence, Italy.

- Clark, R., Bennedsen, J., Rouvrais, S., Kontio, J., Heikkenen, K., Georgsson, F., Matthiasdottir, A., Soemundsdottir., I., Karhu, M., Shrey-Niemenmaa, K., and Hermon, P. **Developing a Robust Self Evaluation Framework for Active Learning : The First Stage of an Erasmus+ Project.** *In Proceedings of the 43rd Annual SEFI Conference*, June 29-July 2, 2015, Orléans, France. *ERA ranked B*

- Kontio, J., Heikkinen, K., Georgsson, F., Bennedsen, J., Clark, R., Matthiasdottir, A., Hermon, P., Rouvrais, S., and Karhu, M. **QA and Enhancement Marketplace for HEIs: An Erasmus+ project.** *In Proceedings of the 11th intl. CDIO Conference*: 8-11 June 2015, Chengdu University of Information Technology, Sichuan, P.R. China.

- Rouvrais, S. and Lassudrie, C. **An Assessment Framework for Engineering Education Systems.** *In Proceedings of the 14th intl. SPICE Conference. Springer CCIS series, no 447*. A. Mitasiunas et al. (Eds.), pp. 250--255. 4-6 November 2014, Vilnius University, With talk. *ERA ranked B*

- Rouvrais, S., Le Locat, C., and Flament, S. **Return on Experience from Sustainability Audits in European Engineering Educational Institutions.** *In Proceedings of the 41th intl. SEFI Conference: "Engineering Education Fast Forward"*. 16-20 September 2013, KU Leuven, Belgium. With talk. *ERA ranked B*

- *In Proceedings of the 9th intl. CDIO Conference: "Engineering Leadership in Innovation and Design*". 9-13 June, 2013, MIT & Harvard School of Engineering and Applied Sciences, Cambridge, MA, USA:
  - Lassudrie, C., Kontio, J., and Rouvrais, S. **Managing the Continuous Improvement Loop of Educational Systems: Students as key actors in program evaluation**. With talk.
  - Gourvès-Hayward, A., Morace, C., and Rouvrais, S. **The Global Village: A Student-led Initiative for Intercultural Skills**
  - Theodorsdottir, A. H., Saemundsdottir, I., Malmqvist, J., Turenne, S., and Rouvrais, S. **Comparison of Hiring and Promotion Criteria Linked to Teaching, Educational Development and Professional Engineering Skills.**

- *In Proceedings of the 8th International CDIO Conference*, Queensland University of Technology, Brisbane, July 1-4, 2012:
  - Rouvrais, S. and Landrac G. **Resistance to Change in Institutionalizing the CDIO Standards: From a Waterfall to and Agile Improvement Model.** With talk.
  - Rouvrais, S. and Chelin, N. **Introducing Personality Tests to Clarify Engineering Student Self-perception and Demystify Recruitment Procedures***.* With talk.

- Rouvrais, S. and Chiprianov, V. **Architecting the CDIO Educational Framework Pursuant to Constructive Alignment Principles***. International Journal of Quality Assurance in Engineering and Technology Education (IJQAETE). Developments in Engineering Education Standards: Advanced Curriculum Innovations*. Vol. 2(2), April 2012. Editors: A. Patil and P. Gray. IGI Global (USA).

- Rouvrais, S. **Recognizing non Formal Learning Experiences: Top-down or Bottom-up Approaches for Skills Alignment***. In proceedings of the 3rd IEEE Global Engineering Education Conference (IEEE EDUCON 2012), Collaborative Learning & New Pedagogic Approaches in Engineering Education.* Marrakech, Morocco, April 17-20, 2012. With talk.

- Rouvrais, S. and Kanellos, I. **Facing Computer Science Misconceptions: An Introductory Course Based on Historical Strands and Career Paths at a Glance**. *In Electronic Proceedings of the 41th ASEE/IEEE Frontiers in Education Conference (IEEE FIE 2011)*, Rapid City, South Dakota, October 12-15, 2011. With talk. *ERA ranked A*

- Rouvrais, S., Mallet, J., and Vinouze, B. **A Starter Activity Design Process to Deepen Students Understanding of Outcome-related Project Learning Objectives***. In Electronic Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference (IEEE FIE 2010)*, Arlington, Washington D.C., October 27-30, 2010. With talk. *ERA ranked A*

- Rouvrais S. and Chelin N. **Engineer Professional Identity: For an Early Clarification of Student's Perceptions**. *In Electronic Proceedings of the 6th International CDIO Conference*, École Polytechnique, Montréal, June 15-18, 2010. With talk.

- Rouvrais S., Ormrod J., Landrac G., Mallet J., Gilliot J-M., Thepaut A., and Tremenbert P. **A Mixed Project-based Learning Framework: Preparing and Developing Student Competencies in a French**

Grande Ecole. *SEFI-European Journal of Engineering Education, "Engineering Competencies"*. Volume 31, Number/Issue 1. Pages 83--93. March 2006. *Journal ERA ranked*

- Rouvrais S., Gilliot J-M., Graton G., and Degrugillier D. **Electronic Simulations within a Polymorph Pedagogical Canvas for Online Education**. *In Proceedings of IEEE ICSES'04: IEEE International Conference on Signals and Electronic Systems*. September 13-15 2004, Poznan, Poland, 2004. With talk.

- Gilliot J-M. and Rouvrais S. **A Pedagogical Canvas for On-line Simulation-based Lessons**. In Cantoni, L. and McLoughlin C. (Eds). *Proceedings of ED-MEDIA'04, World AACE Conference on Educational Multimedia, Hypermedia and Telecommunications (Association for the Advancement of Computing in Education)*, pages 3727-3732. Switzerland, Lugano, June 2004. With talk.

Main Publications in Software and System Engineering (non French)

- Alloush, I., Charbel, A., Kermarrec, Y., and Rouvrais, S. **A Domain-Specific Framework for Creating Early Trusted Underwater Systems Relying on Enterprise Architecture**. IEEE MASCOTS 2014, 22nd International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems, Paris, France, September 9-11th, 2014.

- Chiprianov, V., Kermarrec, Y., Rouvrais, S., and Simonin, J. **Extending Enterprise Architecture Modeling Languages for Collaboration**. *Software and Systems Modeling journal (SoSyM), Enterprise Modelling*. Editors: B. Barn and T. Clark. November 2012. *ERA ranked*

- Chiprianov, V., Kermarrec, Y., Rouvrais, S. **Integrating DSLs into a Software Engineering Process: Application to Collaborative Construction of Telecom Services**. *Chapter 15 in book: Formal and Practical Aspects of Domain-Specific Languages: Recent developments*. M. Mernik editor. IGI Global Publishing (USA), pp. 415-442, September 2012.

- Chiprianov, V., Kermarrec, Y., and Rouvrais, S. **Extending Enterprise Architecture Modeling Languages: Application to Telecommunications Service Creation**. *ACM SAC 2012, 27th Symposium on Applied Computing*, Trento, Italy, March 26-30, 2012. *ERA ranked*

- Chiprianov, V., Kermarrec, Y., and Rouvrais, S. **On the Extensibility of Plug-ins.** ICSEA 2011, 6th Intl. Conf. on Software Engineering Advances, Barcelona, Spain, October 23-28, 2011.

- Chiprianov, V., Alloush, I., Kermarrec, Y., and Rouvrais, S. **Telecommunications Service Creation: Towards Extensions for Enterprise Architecture Modeling Languages**. *ICSOFT 2011, Intl. Conf. on Software and Data Technologies*, Seville, Spain, July 2011. *ERA ranked*

- Chiprianov, V., Kermarrec, Y., and Rouvrais, S. **Practical (meta-)Model Extension for Modeling Language Profiles. An Enterprise Architecture Modeling Language Extension for Telecommunications Service Creation**. IDM2011, *French Colloquium on Ingénierie Dirigée par les Modèles*, Polytech Lille, June 2011.

- Chiprianov, V., Kermarrec, Y., and Rouvrais, S. **Towards Semantic Interoperability of Graphical Domain Specific Modeling Languages for Telecommunications Service Design**. *MOPAS 2011, 2nd International Conference on Models and Ontology-based Design of Protocols, Architectures and Services.* pp. 21-24. Budapest, Hungary. April 2011. (Best paper award).

- Chiprianov V., Kermarrec Y., and Rouvrais S. **Meta-tools for Software Language Engineering: A Flexible Collaborative Modeling Language for Efficient Telecommunications Service Design**. *FlexiTools'2010: Workshop on Flexible Modeling Tools (in conjonction with 32nd ACM/IEEE ICSE Intl. Conf. on Software Engineering).* Cape Town, South Africa. May 2010.

- Mallet J. and Rouvrais S. **Style-Based Model Transformation for Early Extrafunctional Analysis of Distributed Systems**. In *Proceedings of the 4th International Conference on the Quality of Software Architectures (QoSA 2008): "Models and Architectures". LNCS(c) No5281, pages 55-70, Springer Verlag*, S. Becker and F. Plasil Eds. Karlsruhe, Germany. October 2008. With talk. *ERA ranked A*

- Nguyen T.D. and Rouvrais S. **A Socially Inspired Peer-to-Peer Resource Discovery Service for Delay Tolerant Networks**. *In Proceedings of PPN'07 (OTM International Workshop on Peer to Peer Networks), LNCS (c) No4806, Springer Verlag, pages 960-969.* Vilamoura, Portugal. November 2007.

- Nguyen T.D., and Rouvrais S. **Towards a Peer-to-peer Middleware for Context Provisioning in Spontaneous Networks**. *In Proceedings of the 5th ESF-MiNEMA Workshop (Middleware for Network Eccentric and Mobile Applications), pages 54-57.* Magdeburg, Germany. September 2007.

- Fradet P., Issarny V., and Rouvrais S. **Analysing Non-Functional Properties of Mobile Agents**. *In Proceedings of the 3rd International Conference on Foundamental Approaches to Software Engineering, FASE (in conjonction with ETAPS'00). LNCS (c) No1783, Springer Verlag, pages 319-333.* Berlin, March 2000. With talk. *ERA ranked B*

- Rouvrais S. **Mobile Agents for Distributed Service Composition ;In French : Utilisation d'agents mobiles pour la construction de services distribués**. *Ph.D. Thesis. University of Rennes, France.* 5th July 2002.

Ongoing Research Project

Thematic: Teaching & Learning, Pedagogy & Higher Education

Context

As a changing socio-economic context, even more in engineering education, we can note that:

- **due to the international dimension of higher education**, more and more European HEIs will enrol students from third countries [EU, 2010]. Existing instruments and tools should further be put into coherence (e.g. LMD model, ECTS, European Qualification Frameworks, TUNING & AHELO projects for learning outcomes) ;
- **due to globalisation of the sector** [OECD, 2008-09], European HEIs in engineering suffer from an international harsh competitiveness: innovative and world-class pedagogy and curricula are required;
- **due to the Eurozone crisis**, public funds decline, some universities prefer to cut down new enrolment rather than scale back on quality: rationalisation can be a matter of fact;
- **due to professional and governmental regulations**, quality assurance systems are putting more pressures on processes (cf. ENQA, EUR-ACE accreditation system in engineering education): resistance to changes is to be reduced via shared, transparent and understandable reference models. An open framework to facilitate coherence and synergies between HEI, fully respecting their autonomy and identity, is now a challenge.

[EU, 2010] "Council Conclusions on the Internationalisation of Higher Education". Official Journal of the Union, C 135/12. 26 May 2010.

[EU Commission, 2013] "European Higher Education in the World". Androulla Vassiliou, Commission to the European Parliament, the Council, the European economic and social committee, and the committee of the regions. Brussels, 11 July 2013, COM(2013) 499.

[OECD, 2008-09] "Higher Education to 2030". Organisation for Economic Co-operation and Development. Centre for Educational Research and Innovation. Volume 1:Demography (December 2008); Volume 2: Globalisation (November 2009).

Higher Education Systems (HESs) still need profound transformations to meet key national and European priorities. The topical globalisation of Higher Education (HE) raises a range of challenges and strategic opportunities for HEIs. In an increasing competitive context, higher education program leaders and regulation authorities are more and more looking for ways to improve quality of educational systems. Reforms, curriculum renewal processes, transparency instruments, or rationalization methods are thus part of the new challenges. In engineering education, program leaders still have very few resources to guide them. HE programs rarely start from a green field. Curriculum renewal processes, transparency, comparability tools, so as rationalization methods are part of these regular challenges for educational program leaders and managers. Several European HEIs are changing thanks to quality instruments or accreditation systems. But, aligned with the European strategic objectives of the Education & Training 2020 framework, there urgently remains a need of accessible methodologies likely to provide guidance. Following a recent study conducted by Ruth Graham for the Royal Academy of Engineering [Graham, 2012], and concerned with the facilitators and barriers to educational change in engineering programs, it is clear that there is a growing appreciation that the slow pace of change reflects the difficulties of catalysing and sustaining educational reform. The case for reform is recognised; the challenge is to make it happen. The pressing issue for engineering education is not whether but how to change.

[Graham, 2012] "Achieving Excellence in Engineering Education: The ingredients of successful change". The Royal Academy of Engineering & MIT, also JEE, vol 101(4), pp.596—600.

The American psychologist Robert M. Gagné developed some of the earliest instructional design models in the 60's, based on his theory of learning retention and categories. As of today, learning outcomes are increasingly pivotal for reference knowledge & skill based syllabus (cf. TUNING Educational Structures in Europe, project started in 2000) and in the requirements of educational program development at all levels [ENQA, 2010]. But now, common languages, models and methods are now needed to better support HESs renewal and changes, whatever the instructional styles or learning outcomes are to be. As a source of inspiration, in the early 70's, Edsger Dijkstra ACM Turing Award Lecture exposed the problem of the "software crisis". It referred to the difficulty of writing correct, understandable, and verifiable computer programs. At that time, software project were inefficient, and systems were too often of low quality and finally did not meet their requirements, if ever delivered. The roots of this crisis were requirement changes and complexity. Even more, projects deliverables were too difficult to maintain and make evolve over lifetime. By analogy, are we in an era of "Higher Education crisis"?

[ENQA, 2010] "Quality Assurance and Learning Outcomes". European Association for Quality Assurance in Higher Education. ENQA Workshop report 17. September 2010.

Aims

Quality is conformance to requirements. Quality properties are not easily grasped at an abstract description level, though they are rough to manage once the program is implemented and operated. What are the structural quality attributes and properties of educational programs in engineering in contrast with external accountability? What are the properties, or even "illities", open to systematic analysis and not taken into account in rankings (cf UNESCO publication "Rankings and Accountability in Higher Education: Uses and Misuses", June 2013)? What about flexibility, interoperability among EU institutions out of ECTS quantitative aspects, scalability, efficiency, internal cost,

openness, extensibility, reactivity, completeness, testability, etc.? The general aim of Dr. Siegfried Rouvrais actual research project is to bring to light sound methods and processes for quality and interoperability of Higher Educational Institutions, in their operational contexts and with respect to the requirements of stakeholders.

Expected Results

The ongoing research activity strives to propose and develop a coherent and innovative framework for catalyzing curriculum changes and sustaining transformations of higher education in engineering (ie Engineering Education R&D field, from a systemic perspective). This work proposes and structures a coherent and innovative quality framework for catalyzing curriculum changes and sustaining transformations of higher education systems in engineering. The resulting quality framework may become a prominent and reliable tool to facilitate communication and cooperation between stakeholders and to catalyze continuous improvements in line with the latest modernisation strategies for higher education. The resulting modelling framework, quality workbench and tools may thus become a prominent and reliable architecture standard to facilitate communication and cooperation and to catalyze continuous improvements in line with the latest European modernisation strategies for higher education.

Transdisciplinary Dimension

With topical descriptors in engineering and in education, this project is located at the intersection of two disciplines, systems engineering and curriculum & instructional design (and to some extent education sciences). It focuses on conceptualizing existing education models and methods in line with principles of the software and systems engineering fields, but from a systemic perspective. As such, it has a large holistic dimension, more open than traditional engineering education research methodologies. Thus, this project "*raison d'être*" is deliberatively transdisciplinary.

2015 Planned visits

Objectives

1. To discover the research landscape for Engineering Education, to identify rigorous research methods applicable for engineering education R&D at Institut Mines Telecom and its transdisciplinary context; To present field studies and grounded theories elaborated at Institut Mines Telecom to other educational program designers and researchers;

2. For 2015/16, to identify collaboration opportunities in the context of the Erasmus+ calls (Key or Strategic Alliances, 2 & 3) so as deeper research collaboration opportunities in the context of H2020 calls (SEAC and Infrasupp calls for STEM, higher and vocational education, Software Engineering & ICT calls in line with IMT and CNRS UMR topical areas in ICT);

3. At a longer term, to foster collaboration at a European & international level between engineering education research centres (eg TREE at Institut Mines Telecom, Education Research Centers at visited institutions, etc.).

4. To disseminate to the *Institut Français de Finlande*, *Institut Mines Telecom, and visited Institutions* the results of the mobility and information about actions. A 2 pages document, as executive summary, to increase the general awareness of French researchers about the interrelations of science and education and increase the consideration of visited universities.

Relevance and Alignment of the planned visit with ongoing research activities

In an increasing competitive context, higher education program leaders and regulation authorities are more and more looking for ways to improve quality. Reforms, curriculum renewal processes, transparency instruments, or rationalization methods are thus part of the new challenges.

On the one hand, **French Higher Education Institutions and Systems still need profound transformations to meet key national strategies**. In France, the creation of the Institut Mines-Télécom (IMT) on March 2012 formed the largest and most prominent cluster of highly selective engineering and business schools in France, making it a key player in HE, research and innovation ("Grande Ecole"), with several programs at the top of French accreditation requirements and national rankings in engineering education. French *Grandes Ecoles* are in three years, after preparatory schools in 2 years and associated selective national *concours*. Close to the labor market, Engineering *Grandes Ecoles* are the principal medium to create a tank of future high skilled managers for large industries, in France and abroad. Sister school of TELECOM ParisTech and founded in 1977 by the minister of Telecommunications, TELECOM Bretagne (TB, the return host) is a French public research institute and graduate engineering school with two campuses in Brittany

(Brest and Rennes). TB is ranked in the top 15 of the French engineering school (ranked 1 in Brittany). TB has a long lasting tradition of success in research thanks to a manpower of about 500 researchers and PhD students, supported by an active contracts policy (more than 9M€ in 2012). One of TB greatest success has been the notable Turbo Codes invention of Professor Berrou (2005 Marconi Prize), who has also been awarded a European Research Council advanced grant for his new project on neural coding in 2011 (NEUCOD). TB research is recognized through formal contribution of some of its researchers to high reputation French CNRS laboratories (e.g. UMR IRISA in Computer Science, LabSTICC in Systems engineering) and participation to LABelled EXcellence structures (e.g. LabEx CominLabs). TB is also founding member of a regional pole for HE and research: the French PRES *Université européenne de Bretagne*. For rationalization purposes and more international visibility, TB strategically investigates a merge with Ecole des Mines de Nantes.

On the other hand, **Higher Education Institutions and Systems are to meet European strategic priorities**. In that context, Finnish Higher Education Institutions (HEIs) have acquired the virtues of adaptation and innovation: its research crosses disciplinary boundaries. Finnish researchers on educational topics were actively involved in internationally funded projects (eg FP7, LifeLong Learning Programme). As an inspiring research environment, the strength of the Finnish international network is evidenced by the publishing output: high-standard. Finnish institutions are active in the Nordic Network for Engineering Education Research (NNEER, financed by NordForsk), STEAM--LET network, and have significant achievements in the areas of engineering pedagogy and new methods for teaching and learning, as well as significant contributions in the area of developing future tools for teaching and learning and the evaluation of tools in an educational context (eg http://www.peda--forum.fi/), so as links with professionals (eg Academic Engineers and Architects in Finland, TEK, http://www.tek.fi/en/tek). As an other example of top evidence closed to higher education, the *iSchools* organization is a collection of Information Schools dedicated to advancing the information field in the 21st Century initiated by a group of leading US Information Schools. iSchools share a fundamental interest in the relationships between information, people, and technology and have expertise in understanding the uses and users of information, as well as information technologies and their applications. They promote an interdisciplinary approach to understanding the opportunities and challenges of information management, harnessing the power of information and technology, and maximizing the potential of humans. TB is member of iSchools, so as University of Tampere: School of Information Sciences.

The applicant is co-director of the first French research Group in Engineering Education (TREE: Transdisciplinary Research in Engineering Education). The objectives of the group are to reflect on future possibilities for Engineering Education, to configure and develop a research and development activity in the field of Engineering Education (federate existing activities or projects, support new research activities or projects), and to promote Telecom Bretagne and Institut Mines Telecom as a French leader in Engineering Education and as European HEI activists. In the context of Engineering Education Research and Development and Innovation (EE RD&I), TREE topics areas span a range of categories: supporting internationalization and diversity in engineering education, transforming engineering education systems for better quality alignments.

The applicant researcher will deeply benefit from networking at the visited hosts (ie. Aalto, Tampere University of Technology, Turku University of Applied Sciences), even for one week. The scientific, technical and educational environment at Institut Mines Telecom and Finnish Universities is highly favorable to carry out and share problematic on some activities of the aforementioned project.

Research groups & teams targeted

The researcher may genuinely profit from this mobility SAMPO programme opportunity to meet and share scientific collaboration opportunities with mature and recognized experts in Finland and in the European Research Area for engineering education conceptualization. Thus, the following divisions and research groups are targeted for this mobility.

1. **Aalto University (A?): School of Science**
   - LeTech: The *Learning + Technology Group* focuses on computing education, educational technology and software visualization. We adopt a research perspective on learning and teaching that allows us to improve education through better educational technologies and teaching methods. Much of their work is related to improving the learning and teaching of computing and is based on constant communication between education in practice and educational research. Actual learning and teaching that takes place at A? serves as data for their research, which in turn creates innovations that can be put into practice locally as well as globally.
     - Responsible leader: Prof. Lauri Malmi (lauri.malmi@aalto.fi)

   - Department of Computer Science and Engineering: study both the activities and processes that create artifacts. Research is grounded in industrial practice, and use multiple research approaches including empirical, constructive, iterative, participatory, multidisciplinary and user driven methodologies
     - Related research groups: Product Requirements and Architecture, Software Process

2. **Tampere University of Technology (TUT):**
   - New learning Environments Research Project: a multidisciplinary research approach for user needs as a driving force to develop models for future learning environments according to latest knowledge about learning and working places, indoor environment and energy efficiency and facilities management. The research effort on the New Learning Environments by the named TUT units is focusing on university facilities. The driver for the focus is the renewal of university system.
     - Responsible leader is Prof. Kalle Kähkönen kalle.e.kahkonen@tut.fi

3. **Turku University of Applied Sciences (TUAS):**
   - Institutional Research Group: focuses on multidisciplinary research of higher education institutions. At TUAS, it supports the work of researchers, administrative personnel and others interested in higher education institutions and in developing higher education. The group maintains relations with the national and international research community and has representation in the board of the Consortium of Higher Education Researchers in Finland, Cherif. The consortium is a member of the Federation of Finnish Learned Societies (TSV).
     - Director: Mr Mauri Kantola (mauri.kantola@turkuamk.fi)

   - Innovation Pedagogy Group: developed at TUAS, the concept of innovation pedagogy contributes to the development of new generations of professionals, whose ways of producing, adopting and utilizing knowledge make innovative thinking and creating added value possible. The pedagogical strategy is applied in all study fields. TUAS have implemented training and development processes for several organizations, published numerous books, articles and conference presentations as well as led several national and international projects on innovation pedagogy. The Innovation Pedagogy Research Group is a developer of learning and teaching, a training provider and a research body. The central aim of the research group is to be involved in the development of innovation pedagogy and consequently future experts and business achievers.
     - Research Group leader: Ms Taru Penttilä (Taru.Penttila@turkuamk.fi)