Software engineering education and research @LUT

ICT-meeting 31.1.2017 presentation by
Prof. Jari Porras, team leader Software Eng.
Assoc. prof. Uolevi Nikula, head of CS degree prog.
Prof. Janne Huiskonen, head of dept. IEM (tuta)

LUT School of Business and Management
LUT – SCIENTIFIC SOLUTIONS

CLEAN ENERGY
- Energy markets and solar economy
- Energy conversion and storage technologies
- Sustainability science

CIRCULAR ECONOMY
- Water purification and reuse
- Processing of secondary and renewable raw materials
- Products and life cycle assessment

SUSTAINABLE BUSINESS RENEWAL
- Innovation and sustainable value creation
- SMEs and international entrepreneurship
- Digitalization and Business analytics

CROSS-CUTTING THEMES
- Digitalisation and data science
- Focus area research in the Russian context and with the best Russian partners

OUR VALUES | COURAGE TO SUCCEED. PASSION FOR INNOVATION THROUGH SCIENCE. WILL TO BUILD WELL-BEING.
LUT

Faculties

School of Business and Management
- Strategy, Management & Accounting
- Int.Business, Marketing & Entrepreneurship
- Industrial Engineering & Management

School of Energy Systems

School of Engineering Science

Teams

Software Engineering team

Key personnel:
- Prof. Jari Porras
- Prof. Ahmed Seffah
- Prof. Ajantha Dahanayake
- Assoc.prof. Uolevi Nikula
- Yht. 3 prof, 7 TkT, 6 jun.res.
# IEM – core competences in research

## INNOVATION AND TECHNOLOGY MANAGEMENT
- Practice-based innovation
- Service innovations
- Innovation policy and innovation ecosystems
- Front-end innovation
- Digitalization and innovations
- Sustainability innovations
- Open innovation
- Technology forecasting: patent and IPR-analysis

## SOFTWARE ENGINEERING
- Human-centric perspective of SE
- Sustainable ICT
- Data-as-a-service

## SYSTEMS ENGINEERING: DESIGN OF SOCIO-TECHNICAL SYSTEMS
- Invention and Inventive design, systematic idea generation
- Quantitative idea analysis and verification
- New product, technology, system, business design
- Modeling of complex socio-technical systems

## SUPPLY CHAINS AND OPERATIONS MANAGEMENT: SERVICE PROCESSES & BUSINESS MODELS
- Sustainable business models in supply chains and networks
- Professional service systems and operations management

## COST MANAGEMENT: INDUSTRIAL ASSET MANAGEMENT
- Asset management in business networks and ecosystems
- Life-cycle knowledge, IoT, cost models
- Working capital management in value chains

## PERFORMANCE MANAGEMENT
- Measurement and management of customer value
- Effectiveness, productivity and renewal of business
- Measurement and management of service operations

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*Lappeenranta University of Technology*
IEM for SUSTAINABLE BUSINESS RENEWAL

INNOVATIONS VALUE CHAIN
From ideas to innovations to business value

OPERATIONS VALUE CHAIN
From resources to offerings to business value

DATA-TO-KNOWLEDGE VALUE CHAIN
From data to knowledge to business value

Renewal of Business Models, Organizations, Processes, and Management

TECHNOLOGY & BUSINESS MODELS
Software engineering education
CSc & SWE Education

- Degree programme in Computer Science from 1987
  - BSc Computer Science, close collaboration with Industrial Engineering and Management programme, c. 30/yr
  - MSc & PhD Software Engineering, c. 40 graduates/yr
- Accredited BSc and MSc programmes: ASIIN, EQUANIE
- International programmes
  - PERCCOM
  - Double degree programmes, MSc and PhD
- The Bachelors graduated from the programme are able to participate in software projects as developers
- The Masters graduated from the programme are able to participate in software projects in the role of an expert or as a leader
Software engineering research
SWE Research

- Human-centric perspective of SE
  - How to take the human aspects into account while designing, implementing and maintaining apps, services and software systems (usability, co-design, gamification)
  - Living lab
- ICT for sustainability
  - How to use ICT, especially software, to solve sustainability challenges in ICT and other domains
  - LUT focus and thus main emphasis
- Data intensive software engineering (data-as-a-service)
  - How to gather data from various sources, store and analyze and finally provide as a service to those in need
- Process areas like requirements, architectures, testing, maintenance, process improvement
- Research has most of the time link to the business research due to location in LUT school of business and management
Research example – CODER Living Lab

- Collaborative Design, Innovation and Experimentation with User Experiences
- Living lab is the place to transform user stories/experiences to innovative products
- The four key activities that CODER supports
  1. Co-Creation
  2. Exploration
  3. Observation/Experimentation
  4. Evaluation
- CODER is
  1. A software factory for empirical evidence and human experiences-centric software and service systems design and engineering
  2. An arena for participatory design, design thinking and sustainability innovation by design
  3. A facility to supporting applied and fundamental research at the crossroads of ICT traditional disciplines (software engineering, CS, MIS and HCI), business and innovation
  4. An integrative classroom for teaching and training a new generation of software engineers and ICT designers and innovators
  5. A incubator for industry and university partnership
Professors

- Prof. Jari Porras
  - Distributed systems, ICT and sustainability
- Prof. Ahmed Seffah
  - Human aspects of SE, living labs
- Prof. Ajantha Dahanayake
  - Data intensive SE, Data-as-a-service
- Assoc. Prof. Uolevi Nikula – Requirements engineering
- Assoc. Prof. Jouni Ikonen – Mobile and wireless apps
- Assoc. Prof. Ossi Taipale – Testing in SE
- Assoc. Prof. Jussi Kasurinen – Entertainment SE, gamification
- Post doc Antti Knutas – SE for education