

# The specialization Software Engineering

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- Prof. Dr.-Ing. Peter Liggesmeyer \*, apl-Prof. Dr.-Ing. Mario Trapp \*\*:  
Software Engineering: Dependability
- Prof. Dr. Ralf Hinze, Programming Languages
- Prof. Dr. Arnd Poetzsch-Heffter\*\*\*:  
Software Technology; currently being offered by Dr. Annette Bieniusa
- Dr. Annette Bieniusa
- Many lecturers from Fraunhofer IESE

\* Executive director of Fraunhofer IESE

\*\* Executive director of Fraunhofer ESK, Munich

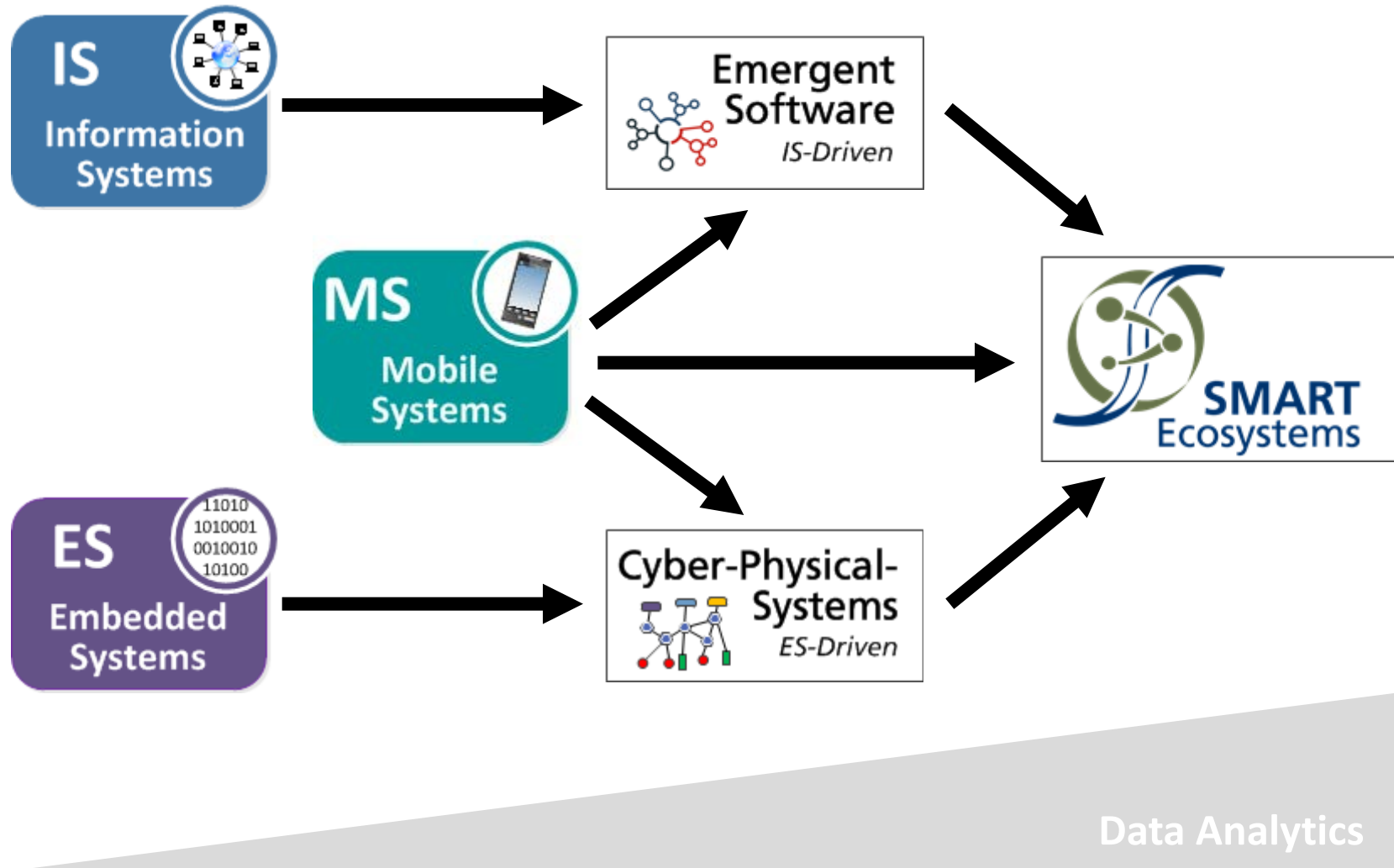
\*\*\* Vice president for research at TUK

# Why Software Engineering?

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- Software Engineering provides many facets => Techniques, methods, processes, management
- Software Engineering influences every domain (e.g., banking, insurance companies, automotive, aerospace, medical, automation, ....)
- Software Engineering is a discipline in computer science, that always needed more workforce than available (more open positions than applicants)
- Software Engineering is international
- The market for Software Engineers ist still growing => good career opportunities

# Future systems: Smart Ecosystems



# The Software Engineering Chairs

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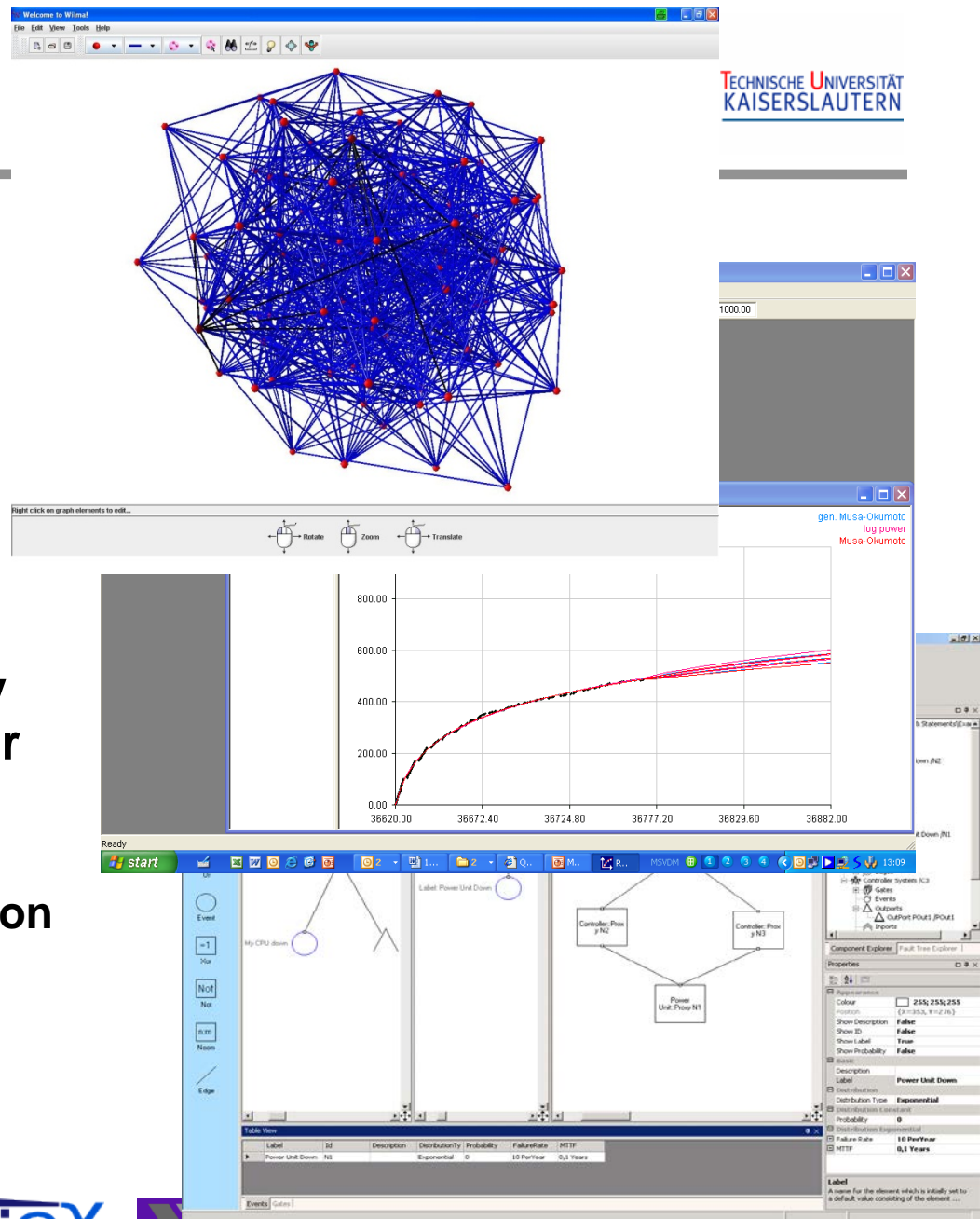
- Software has to have specific properties (e.g., safety, availability) => Quality assurance:  
**Software Engineering: Dependability**
- Definition and processing of software => Models, techniques and tools:  
**Software Technology**
- Writing software requires appropriate programming languages =>  
**Programming Languages**

# Software Engineering: Dependability (Prof. Liggesmeyer)

- Software Engineering for technical systems (Cyber-physical systems)
- Safety, reliability, availability

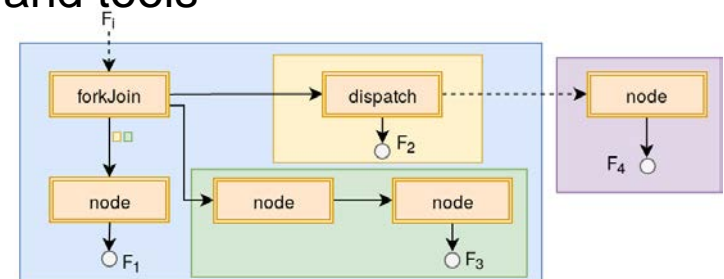
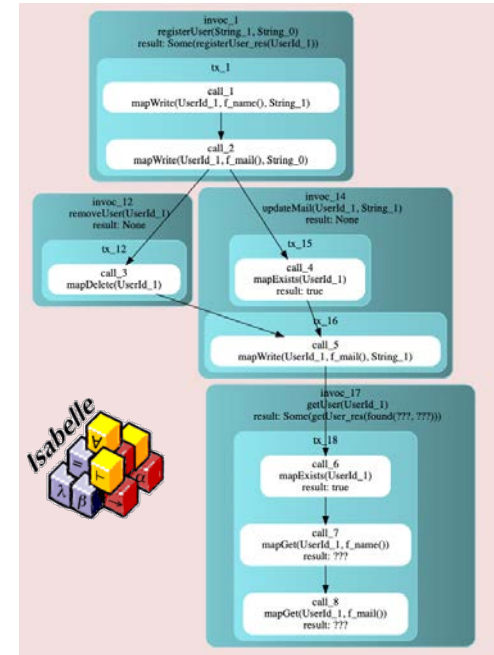
**Research topic:  
Development and quality assurance techniques for safety-critical systems**

**=> Assessment and reduction of risks**



## Research topics

- **Object-oriented and component-based programming**
  - Component models and their integration
  - Parallel and distributed programming
- **Modeling and generation of software**
  - Software modeling on higher abstraction levels
  - Domain specific models
  - Generation of efficient code based on models
- **Specification and verification of software properties**
  - Specification and verification languages and tools
  - Dynamic property checking



## Research topics

- Functional and generic programming
- Semantics of programming languages, Category theory
- Systematic algorithm design (Algebra of Programming)
- Persistent data structures

Our long-term goal is to develop theory, languages, and tools that simplify the construction of reliable software systems.

# The specialization Software Engineering

Prof. Dr.-Ing. Liggesmeyer, Prof. Dr. Poetzsch-Heffter, Prof. Dr. Hinze, Dr. Bieniusa and Lectures from Fraunhofer IESE

Software Engineering: Dependability (seda)

Fraunhofer IESE

Prof. Dr. Liggesmeyer

**Kontakt:** C. Frey, frey@informatik.uni-kl.de, http://seda.cs.uni-kl.de

- Modellierung, B, 2V+1Ü, SS (D), *Liggesmeyer*
- Foundations of Software Engineering (FSE), B/M, 2V+1Ü, SS (E), *Lig.*
- Safety and Reliability of Embedded Systems (SRES), B/M, 2V+1Ü, WS (E), *Lig.*
- Software Quality Assurance (SQA), M, 2V+1Ü, every 2. WS (E), *Liggesmeyer*
- Quality Management of Software and Systems (QMSS), M, 2V+1Ü, every 2. WS (E), *Liggesmeyer*

- Empirical Model Building & Methods, M, 2V+1Ü, SS (E), *Jedlitschka*
- Bus Systems, M, 2V+1Ü, WS (E), *Kuhn*
- Requirements Engineering, M(Inform.), B(SoziInform.), 2V+1Ü, WS (E), *Dörr*
- Einführung in die Sozioinformatik, B(SoziInform.), 2V+1Ü, WS (D), *Dörr et al.*
- Process Modeling, M, 2V+1Ü, SS (E), *Heidrich*
- Software Project and Process Management, M, 2V+1Ü, SS (E), *Heidrich*
- System and Software Architecture, M, 2V+1Ü, SS (E), *Oliviera*
- Automotive Software Engineering, M, 2V+1Ü, SS (E), *Trapp*
- Product Line Engineering, M, 2V+1Ü, WS (E), *Becker*
- Projekt Agile Methoden, B(SoziInform.), 2P, SS (D), *Dörr*

Programming Languages (AGPL) / Software Technology (softech)

Prof. Dr. Hinze / Prof. Dr. Poetzsch-Heffter / Dr. Annette Bieniusa

**Kontakt:** J. Stengel, stengel@informatik.uni-kl.de, https://pl.cs.uni-kl.de

- Grundlagen der Programmierung, B, 4V+4Ü, WS (D), *Hinze*
- Programmierpraktikum, B, 2P, SS (D), *Hinze*
- Training für Programmierwettbewerbe, B, 2S, SS(D) unregelmäßig, *Bieniusa*
- Funktionale Programmierung, M, 4V+2Ü, SS (D, ggf. E), *Hinze*
- Compiler and Language Processing Tools, 3V + 3Ü, WS (E), *Bieniusa*
- Programming Distributed Systems, 3V+3Ü, SS (E), *Bieniusa*
- Replication and Consistency, 2V+1S, WS (E), *Bieniusa*
- Programmieren in C, B(Hörer anderer FBs), 2V+2Ü, SS (D), *Bieniusa*
- Programmieren in Anwendungen, B(Hörer anderer FBs), 2V + 2Ü, SS (D), *Bieniusa*
- Programmierprojekt, B (Hörer anderer FBs), 2P, SS (D), *Bieniusa*

Common offers

- Projekt, B/M, 4P, WS/SS (D/E), *all*
- Bachelor-/Masterseminar, B/M, 2S, WS/SS (D/E), *all*
- Bachelor-/Masterarbeiten, B/M, (D/E), *all*

