Christian Berger
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Towards Thinking Cars

General topics of interest:

- Autonomous driving for various platforms (1:10, cars, trucks)
- Continuous deployment and experimentation for automotive systems
- Simulations for autonomous driving solutions
Dr. Thorsten Berger
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• Research on Highly Configurable Systems (HCS)
  – Software Product Lines
  – Software Ecosystems

• In the Domains of
  – Systems Software
  – Automotive, Avionics, and Embedded Systems
  – Mobile Apps

• Developing Methods and Tools for
  – Adopting and Evolving HCS
  – Modeling and Configuring HCS
Jan Bosch
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General interests:
- Software architecture and platforms
- Evidence-driven development
- Software ecosystems
- Innovation and startups
Thesis Project suggestions:

- **Automated Program Explanation = AI for program understanding**
  To design and build software that can explain (other) software based on the automated analysis of software project artefacts such as: UML design + source code (including comments) + commit message + tests + ...

- **Analysing the correspondence between design and code over time**

- **Analysing the impact of architecture design on source code modularity**

- **Analysing the relation between source code commenting patterns and importance of classes in software design (BSc)**

- **Automated Lay-outing of Class Diagrams**
  - Based on: class-role, importance, user preferences, machine learning from examples

- **Software Design Environment on a Whiteboard**
  - Support distributed awareness in remote collaboration
Ivica Crnkovic
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- component-based software engineering
- software architecture
- software configuration management
- software development environments and tools
- software engineering in general
• Software Evolution
  • Software Comprehension
  • Software Clones and Refactoring
  • Software Maintenance & Changeability
  • System Migration and Updating

• Model-Driven Engineering (MDE) & Low-Code Development

• Hybrid Software Processes

• Digital certification in additive manufacturing (Co-operation with SWEREA)
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- **Requirements Engineering & Early Requirements Modeling**
  - Goal Modeling and Creativity ([http://creativeleaf.city.ac.uk/](http://creativeleaf.city.ac.uk/))

- **Requirements Modeling and Game Development (with S. Björk)**

- **Strategic API Value and Measurements**
  - (Software Center Project #26)
  - With Axis, Bosch, Ericsson, Grundfos, & Tetra Pak

- **Large-Scale Agile Requirements Engineering**
  - (Software Center Project #27, with Eric Knauss)
  - With Bosch, Ericsson, Grundfos, Siemens, Tetra Pak, Volvo Cars, & Volvo Trucks

Full academic page: [www.cs.utoronto.ca/~jenhork](http://www.cs.utoronto.ca/~jenhork)
Research interests:

- Software **Testing Techniques**
  - Test case selection, minimization, prioritization;

- (Meta-)**Empirical** Software Engineering
  - Reproducibility, replication, re-analysis;

Ideas for thesis proposal:

- Platform for **automated experiments** with software testing techniques;
- A **formal experiment** to investigate disparate software testing techniques;
- Integration between test tools and **automated testing techniques**;
- **Meta-heuristics** and synthesis test artefacts through meta-heuristics;
- **Reproducible research**!

What will we explore **together**?

- Statistics, quantitative research, test processes, development of tools.
Main topics:
• Requirements Engineering
• Agile Methods

Especially when applied to:
• Global Software Development
• Continuous Integration and Deployment
• Software Ecosystems
• Areas and keywords:
  – Cloud computing (AWS, Google, ...)
  – Services computing (Microservices, ...)
  – Performance monitoring / testing (load testing, JMH, ...)
  – Deployment and middleware (Docker, Kubernetes, ...)
  – Continuous experimentation (A/B testing, canaries, ...)
  – ... many other things that relate to SE for Web systems

• Types of theses:
  – Systems thesis ➔ build and evaluate a cool prototype
  – Empirical thesis ➔ form an interesting hypothesis, test it on data

• More info: http://philippleitner.net/theses/
Grischa Liebel
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- Model-Driven Engineering (MDE)
- Requirements Engineering
  - Integration of Requirements Engineering into MDE
- Requirements Communication & Knowledge Management
- Tool Interoperability

- Check my publications to get an overview over my topics and possible connection points!
• Change Management / Software Process Improvement
  – Organizing and managing ways of working – transformations
  – From Traditional to Agile and Continuous Deployment

• User Experience
  – Integrating UX practices into SE practices
Modeling and Verification of Software Architectures

Interoperability among tools and languages

Automatic construction of models

Autonomous quadrotors
Riccardo Scandariato
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• Security
• Privacy
Measuring organizational performance

• Industrial problem formulation
  – How to use existing formal and informal metrics at the partner companies and the role these metrics play in decision making (as well the quality of these decisions)?

• Approach in the project
  – Mine data from source code, defect repositories, effort reporting systems
  – Compile the data into ISO 15939 indicators & measurement systems

• Milestones/results so far
  – Objective release-readiness indicators
  – Source code risk assessment using heatmaps
  – Product stability assessments before release
• Traceability Management
How can you figure out what you need to change in your design/code/tests/requirements when something changes in your project?

• Variability
How can you handle the different variations of a hardware and software in a large embedded systems product?

• Agile Processes for Self-Adaptive Systems
How do you build a system in an agile fashion that self-adapts to the environment?
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- Software testing
- Software quality
- Applied statistics
  - Bayesian statistic
  - Machine learning