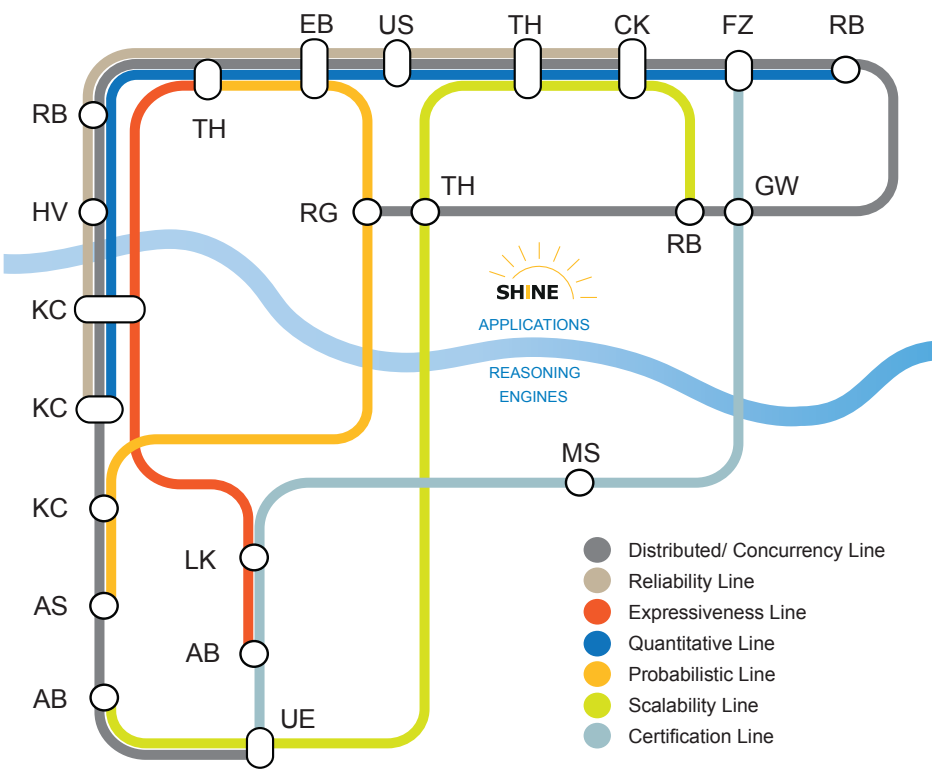


RESEARCH LINES

Mapping SHiNE

The individual tasks of the SHiNE project are connected by seven Research Lines as depicted by the “subway map” below. Tasks north of the river concern applications, and those south of the river are about reasoning engines. The “subway stops” represent tasks and the initials refer to the Principal Investigators of the respective task.



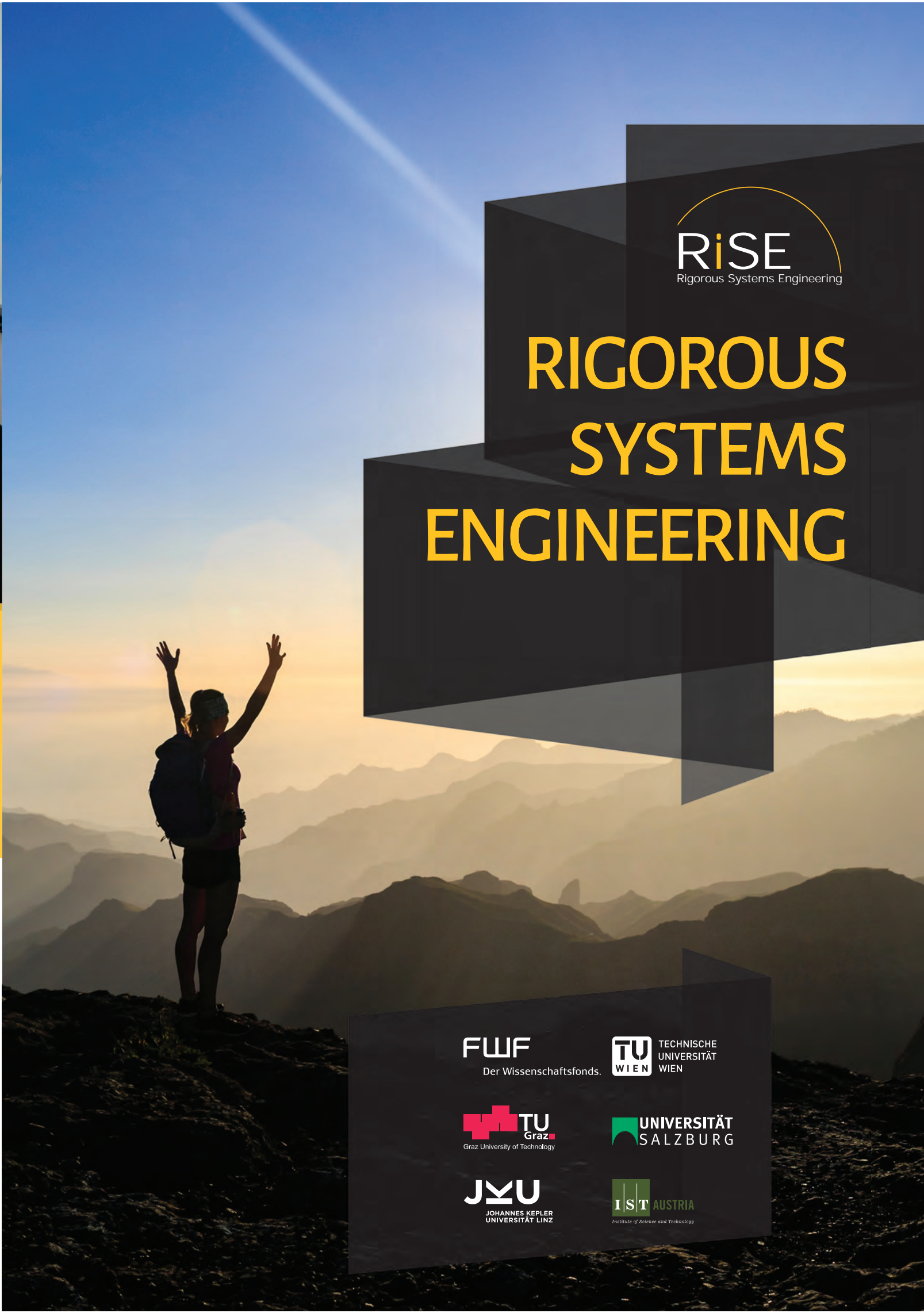
Principal Investigators

- | | | |
|--------------------------------------|-------------------------------------|----------------------------------|
| AB - Armin Biere (JKU Linz) | CW - Georg Weissenbacher (TU Wien) | RB - Roderick Bloem (TU Graz) |
| AS - Ana Sokolova (PLU Salzburg) | HV - Helmut Veith (TU Wien) | RG - Radu Grosu (TU Wien) |
| CK - Christoph Kirsch (PLU Salzburg) | KC - Krish Chatterjee (IST Austria) | TH - Tom Henzinger (IST Austria) |
| EB - Ezio Bartocci (TU Wien) | LK - Laura Kovacs (TU Wien) | UE - Uwe Egly (TU Wien) |
| FZ - Florian Zuleger (TU Wien) | MS - Martina Seidl (JKU Linz) | US - Ulrich Schmid (TU Wien) |



COORDINATOR
Roderick Bloem
Inffeldgasse 16a, 8010 Graz
+43 316 873 5580
fax: +43 316 873 105580
roderick.bloem@iaik.tugraz.at

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RiSE and SHiNE

Driving Austrian research in automatic formal methods

Key figures

- 15 researchers
- 1 Wittgenstein Prize
- 4 ERC Grants
- 1 START Award
- 2 WWTF Grants
- 322 publications in the first funding period

A NETWORK OF EXCELLENCE

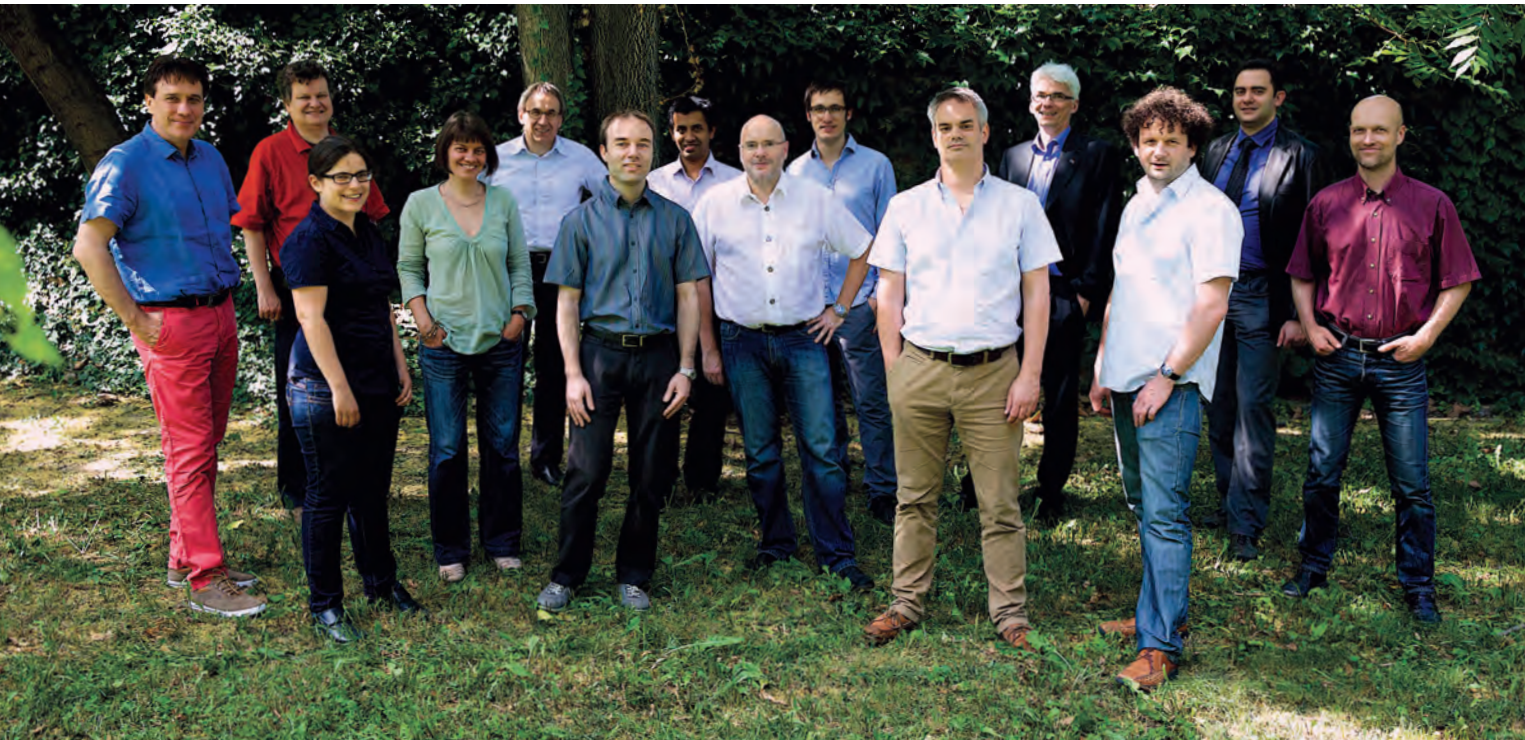
Rigorous Systems Engineering (RiSE), renamed Systematic Methods in Systems Engineering (SHiNE) in its second funding period, is a National Research Network supported by the Austrian Science Fund FWF. It is a consortium of nine computer science research groups at five different academic institutions in Austria, represented by internationally recognized scientists from the fields of model checking, software systems, distributed computing and computational logic. The network bundles the research in formal verification in Austria and pursues the long-term vision of a hardware/software system design process supported by automatic formal methods based on model checking, decision procedures, and game theory.

CONTINUOUS ASSESSMENT OF SYSTEM QUALITY

Rigorous Systems Engineering is the discipline that provides methods and tools for the design of complex systems, most notably software systems, that are grounded on a solid mathematical foundation. Instead of analyzing a program or a model after it has been completed, mathematical techniques are used for error detection during the whole design process.

FROM RiSE TO SHiNE

While the Research Clusters of the first period (RiSE) reflected the individual experience of the Principal Investigators, the second period (SHiNE) is organized along Research Lines which connect several tasks. Each of these lines addresses a non-functional aspect such as concurrency, probabilistic behavior, reliability, and quantitative measures (timing and resource consumption).



JOIN US

We have a lot of fun doing research

Are you interested in

- doing research in automatic formal methods?
- solving complex problems?
- becoming an experienced and internationally acclaimed researcher?
- becoming a research leader in a prestigious international company?
- pursuing an academic career?

Join us at RiSE!

We offer

- a collaborative environment with world-renowned researchers
- opportunities to grow professionally and socially, such as workshops, summer schools and group events
- help with internships at prestigious international companies
- an excellent stepping stone to a successful academic or industry career



OUR ALUMNI OBTAINED

- 2 tenured professorships (TU Wien and IST Austria)
- 3 assistant professorships (University of Colorado, Boulder and New York University, USA; TU Wien)
- 2 lecturer positions (Queen Mary University, London and Royal Holloway, University of London, UK)
- 1 researcher position (INRIA Paris Rocquencourt, France)
- 1 reader position (Tata Institute of Fundamental Research, Mumbai, India)
- 3 full time engineering positions at Google
- 5 internships at Google
- 6 internships at Microsoft Research

CORPORATE PARTNERS (selection)

- Amazon
- AVL
- Google, Inc. (CK Group Partner)
- IBM
- Infineon Austria
- Intel
- KAI
- Microsoft
- NextOp Software, Inc.
- NXP
- TTTech

INDUSTRY COLLABORATIONS

Boosting the technological innovation

From research to industry and back

Cross-overs between research and industry happen frequently in Computer Science. The RiSE group is no exception: We collaborate closely with many companies to make sure that the basic research performed in RiSE makes its way to industrial practice. Principal Investigator Armin Biere co-founded the software company NextOp Software, Inc. in 2006. The company provided design verification tools for semiconductor chip companies and was acquired by Atrenta, Inc. in 2012.

Messages from our collaborators

"Future hardware will behave unpredictably because of environment influences, but future systems must be absolutely free of errors. With RiSE collaborators as strategic partners, we are working on formal methods to turn this vision into reality."

ELI ARBEL,
Manager, formal verification technologies group, IBM Research Lab at Haifa

"99% of people who own computers do not have programming expertise. We share RiSE's vision that in the future, computers will aid such people to create small scripts to automate their repetitive tasks. We have seen first successes in features like Excel's FlashFill, and we are looking forward to many more."

SUMIT GULWANI,
Research Manager/Principal Researcher, Microsoft

"At Intel, verification of firmware, hardware and software is a key aspect of SoC design. The SMT solver Boolector, developed by RiSE researcher Armin Biere, was essential to finding multiple bugs in a security module with our tool iPave, which we use to verify critical properties of our designs."

ZURAB KHASIDASHVILI,
Senior Software Engineer, Intel

"Verified models of chip technology in an early development phase are key to satisfying increasing quality requirements. The sophisticated verification and test methodologies we are developing with RiSE collaborators will be essential for the development and production of advanced microchips."

DIETER HAERLE,
Project Manager,
KAI Kompetenzzentrum Automobil- u. Industrieelektronik GmbH, Austria