

Ph.D. Position at the LIT AI School

## Using Machine Learning in Support for Software Engineering

[Institute of Software Systems Engineering](#)  
[Johannes Kepler University, Linz, Austria](#)

### The big picture:

Engineering is an inherently creative process that requires rigorous attention to details. However, engineering is also a collaborative, human-centric process with ad hoc activities. Engineering automations are few and rare – not just during programming but also during modeling, testing or maintenance. This Ph.D. topic explores uses for machine learning within the context of software engineering. On the most basic level, we envision the application of machine learning for reasoning with incomplete, uncertain, and/or incorrect software engineering knowledge. Justifiably, most engineering tools follow the philosophy of “garbage in/garbage out.” How could a tool reason correctly in the presence of errors? How could a tool reason at all if the input is incomplete? Yet, we must. Much of engineering is about uncertainty, incompleteness, and incorrectness. If our tools are only useful once we have complete and correct information, then arguably these tools are not useful during much of the engineering process.

### The goal:

The goal of this thesis is to utilize machine learning techniques in software engineering. The candidate will be part of the LIT | AI Ph.D. School – which is an interdisciplinary Ph.D. program at the Johannes Kepler University (JKU) Linz for highly talented and motivated students who want to actively perform research on Artificial Intelligence and its applications at the forefront. In terms of topics, the position is quite open, for as long as it connects software engineering and AI. Possible Ph.D. topics are:

- Predicting the Impact of Software and Systems Changes onto various Engineering Artifacts (i.e., what is affected when a requirement changes?)
- Understanding Traceability from Requirements Models to Code
- Handling the Exponential Features Combinations of Software and System Variants
- Self-Optimization, Self-Adaptation, and Self-Healing of Partially and/or Fully Autonomous Systems (e.g., Smart Factory or Smart City)

### Required expertise:

- A Master’s degree in computer science or a closely related discipline
- Strong programming skills (for example in Java, C++, or C#)
- Ability to work on own initiative and also as a part of a team
- English language proficiency, written and spoken

### Application Instructions:

Applications should include a cover letter, CV, preferably also letters of reference, and a brief statement describing the applicant's research motivation in relationship to this topic. Electronic submissions are required. Review of applications will begin immediately and continue until suitable candidates are appointed.

### Contact:

- Prof. Dr. Alexander Egyed ([alexander.egyed@jku.at](mailto:alexander.egyed@jku.at))

- Dr. Atif Mashkooor ([atif.mashkooor@jku.at](mailto:atif.mashkooor@jku.at))

**Starting date:** Spring/Summer 2019



**About the Institution:**

The JKU Institute for Software Systems Engineering is a 30+ people strong research institute that is ranked among the best in the world (e.g., recently Microsoft ranked JKU 16<sup>th</sup> in the world in software engineering). Research at the institute covers a wide area of software engineering from requirements to capture software, systems architecture, design and testing, to maintenance. Engineering is an inherently creative process that requires rigorous attention to details. However, engineering is also a collaborative, human centric process with adhoc activities. Engineering automations are few and rare – not just during programming but also during modeling, testing or maintenance.

**About the Advisor:**

Prof. Dr. Egyed received his Doctorate from the University of Southern California, USA and previously worked at Teknowledge Corporation, USA and the University College London, UK. He is most recognized for his work on software and systems design – particularly on variability, consistency, and traceability. Dr. Egyed has published over 200 refereed scientific books, journals, and conferences with over 6000 citations to date. He was recognized a Top 1% scholar in software engineering in Communications of the ACM, Springer Scientometrics, and Microsoft Academic Search. He was also named an IBM Research Faculty Fellow in recognition to his contributions to consistency checking.

**Location:** Linz, Austria

**Website:** <http://isse.jku.at/>