

INTERNATIONAL EXCELLENCE FELLOWSHIPS

Experience Report 2021/2022

Name and title of fellow	Prof. Dr. Raffaella Mirandola
Duration and time of research stay	1 May 2022- 31 July 2022
Host professor and host institute at KIT	Prof. Dr. Ralf Reussner, Prof. Dr.-Ing. Anne Koziolk, KASTEL

Testimonial

My research field is
Software and systems engineering with a special focus on quality, resilience, antifragility and trustworthiness in software-intensive systems. My experience in this context covers two main areas: (i) software dependability requirements, modelling, analysis, and verification and (ii) formal methods for (self-)adaptive dependable systems under uncertainty.
How my research field is going to affect the world of science?
<p>We are moving towards a future where we can envision software-intensive autonomous and heterogeneous systems widely available as an open-ended collection of systems, collaborating to improve our lives. However, our world is dynamic, user behavior changes, and computer and communication infrastructures fail at different levels due to foreseen and unforeseen events. To master the challenges through unforeseen and unknown environmental events future software-intensive autonomous systems need to be able to absorb, adapt, and evolve to handle uncertainty, change, failure, and environmental stressors. In other words, the systems need to be antifragile and trustworthy.</p> <p>My research will advance the engineering of these future software-intensive autonomous systems contributing to design and analysis methods for these systems dealing with the uncertainty in environmental models, and the trust-creation for antifragile systems.</p>
My main finding / highlight during my research work at KIT was
The main outcome of my research stay is the definition of a new taxonomy for the characterisation of uncertainty in coupled models of cyber-physical systems. The new uncertainty taxonomy was applied to real use cases motivated by an automotive development scenario.

I have chosen the Karlsruhe Institute of Technology because

KIT is an outstanding and unique environment with its combination of software engineering, security, and dependability research in the context of systems engineering and mobility system research.

Besides, the existing KITs research labs offer the right platform to investigate the extension of my research from software engineering to autonomous systems engineering, in particular, design and analysis of autonomous mobile systems