

Paulius STANKAITIS

PERSONAL DATA

ADDRESS: Urban Science Building, Newcastle upon Tyne, United Kingdom, NE4 5TG
PHONE: +44 759 646 5570
EMAIL: p.stankaitis@ncl.ac.uk
WEBSITE: www.stankaitis.uk

EDUCATION

SEPTEMBER 2016 July 2020 exp.	Doctor of Philosophy (FT) in COMPUTER SCIENCE, Newcastle University, UK PhD research project - "Modeling and Verification of Heterogeneous Railway Networks" The objective of this research study is to investigate complex mixed-signalling networks (e.g. Crossrail or Thameslink networks in London). There is no single theory describing how to formally model distributed railway networks with continuous behaviour and adequate verification tools which could include continuous aspects of the system. This research is driven by a real-world railway challenge and supported by Siemens Rail Automation.
DECEMBER 2016	Master of Philosophy (PT) in COMPUTER SCIENCE, Newcastle University, UK MPhil research project - "Automating Verification of Event-B Models" Project objective is to apply the state-of-the-art automating theorem proving techniques to increase automation in proving Event-B models. In a joint work with colleagues from Newcastle University we developed and integrated a new verification plug-in for Rodin platform. A plug-in to the Rodin Platform was realised to map between the Event-B mathematical language and Why3 theory input notation. The verification plug-in utilized Why3 tool, which is provides a common interface to a large number of theorem provers. In a joint work several papers were published on this research, see Iliasov <i>et al.</i> [3, 4, 5].
JULY 2014	BEng Hons Degree in ELECTRONIC ENGINEERING, Newcastle University, UK Final year project - "Algebraic specifications of ARM Cortex M0+ Instruction Set" The objective of the research project was to model microprocessors instruction sets using a graph-based formalism, called Conditional Partial Order Graphs. ARM Cortex M0+ Instruction Set benchmark was used for a case study to investigate instruction set design methodology based on the formalism. In the project, benchmark specifications were translated a formal graphical model and experiment with different encoding. Project discovered some interesting correlations between partial-order encoding and size of the final control unit. The research resulted in a conference publication, see A. d. Gennaro <i>et al.</i> [2,6].
JULY 2011	Higher Education Diploma, Silutes Pirmoji Gymnasium, Lithuania Involved A levels in Mathematics, Physics, IT, English, History, Lithuanian. Regional mathematics contest prize-winner and annual participant in international mathematics competition.

WORK EXPERIENCE

- September 2017
present
- Teaching Assistant (Modules: Mathematics for Computer Science and Understanding Concurrency)
School of Computing, Newcastle University
- As a teaching assistant I'm responsible for helping students to understand new material, assist in tutorial sessions and grade assignments. Mathematics for Computer Science (1st year) module aims to provide essential mathematical knowledge for studying computer science. The spectrum of background student knowledge is wide, so different approaches must be used to suit a particular student. Understanding Concurrency (3rd year) module aims to teach students different modelling techniques (Petri nets, Signal Transition Graphs, etc.) for modelling concurrent systems. As module encompasses many modelling approaches, as a course assistant, I'm required to be comfortable with variety of formalism and aware of how to apply them for various systems (e.g. biological, microelectronics, etc.)
- March 2018
May 2018
- Research Assistant (internship)
National Institute of Informatics, Tokyo, Japan
- Throughout, the 2 month internship I was working with colleagues from the National Institute of Informatics on developing a refinement based technique for developing distributed protocols. The research materialised into a paper (see [1]) and further co-operation is being continued.
- September 2014
- Junior Research Assistant
School of Computing Science, Newcastle University
- Working on the RSSB SafeCap+ project (<http://safecap.co.uk/>), which aims to develop modelling techniques and tools for improving railway capacity, while assuring safety. The project is funded by Rail Safety and Standards Board (RSSB) and work closely with industry e.g. Siemens Rail Automation. SafeCap platform uses state-of-the-art model checking (ProB) and theorem proving (SMT) techniques. As Junior Research Assistant my responsibilities included novel method, tool development and integration. I have been working on one of the key directions of the project, which aims to address a mixed traffic operation problem in railway networks. I helped to develop a new expressive simulation tool, which allows railway engineers to design and analyse exotic, conventional and mixed signalling systems. I have been also involved in other work packages e.g. static railway data verification, see Iliasov *et al.* [5]. Throughout two years period I was required to report our progress regularly to the RSSB and Siemens Rail Automation in form of a presentation or a written report.
- Summer 2014
- Summer Intern
Electrical & Electronic Engineering School, Newcastle University
- Helped to integrate several new features to existing software - Workcraft tool (www.workcraft.org/). The software upgrades focused on graphical user interface, which would simplify the use of the tool. Also, work was started on graph verification based on SAT and SMT automated reasoning technologies.

SUMMER SCHOOLS, PRESENTATIONS AND ATTENDED EVENTS

NOVEMBER 2018	<p>NII Shonan Meeting on "Towards industrial application of advanced formal methods for cyber-physical system engineering" Shonan Village, Japan</p> <p>Shonan meetings organised by National Institute Of Informatics in Japan, aims to gather leading scientists for work and discussion based workshop. As one of the participants, I presented my work with industrial partners on developing formal techniques for reasoning about cyber-physical systems.</p>
NOVEMBER 2017	<p>Public INSIGHT Talks series on "Mathematics to the rescue!" Newcastle upon Tyne, United Kingdom</p> <p>Public INSIGHT Talks is a series of events organised by Newcastle University which are open for everyone aims to inform and encourage debate about various issues. Most of the invited speakers are typically leaders in their field. I was selected to present after a rigorous process and in the talk I outlined how mathematics (formal methods) can be used to develop more reliable computer based systems. The recording of the talk can be found at Mathematics to the rescue!.</p>
AUGUST 2016	<p>Marktoberdorf Summer School: Dependable Software Systems Engineering Marktoberdorf, Germany</p> <p>The summer school covered a wide range of formal methods topics including reactive systems, verification technologies, theoretical foundations etc.</p>
AUGUST 2015	<p>Summer School: Verification Technology, Systems and Applications (VTSA15) Koblenz, Germany</p> <p>A summer school with a high focus on verification technology (SMT and SAT), also its implementation in a system in order to successfully apply the approach to real world verification problems. I also participated in the student session, where I presented work on Event-B and Cloud provers.</p>

INDUSTRIAL COOPERATION

The SafeCap team at Newcastle University has a close working relationship with Siemens Rail Automation (Chippenham, UK). As part of SafeCap team we continuously working together to further develop formal modelling techniques and verification tools for real-world railway problems. Siemens Rail Automation is also co-funding and supporting my PhD research.

The SafeCap+ project where I worked as a Junior Research Assistant was funded by Rail Safety and Standards Board (RSSB) body. A non-profit railway body established by several railway companies provided our team with industrial expertise on a number of issues as well as real-world data for our research.

SELECTED PUBLICATIONS

- 1 P. Stankaitis, A. Iliasov, Y. Ait-Ameur, T. Kobayashi, A. Romanovsky and F. Ishikawa, "A refinement based method for developing distributed protocols.," In 19th IEEE International Symposium on High Assurance Systems Engineering (HASE). 2019.
- 2 A. d. Gennaro, P. Stankaitis and A. Mokhov, "Efficient Composition of Scenario-based Hardware Specifications.," In IET Computer and Digital Techniques. 2018.

- 3 A. Iliasov, P. Stankaitis, and A. Romanovsky,
"Proving Event-B Models with Reusable Generic Lemmas,"
In Proc. of the 18th International Conference on Formal Engineering Methods. ICFEM 2016, November, Tokyo, Japan. Springer, LNCS – 10009, Pp. 210 – 225.
- 4 A. Iliasov, P. Stankaitis, D. Ebo Adjepon – Yamoah and A. Romanovsky,
"Rodin Platform Why3 Plug-In,"
In Proc. of the 5th International Conference on Abstract State Machines, Alloy, B, TLA, VDM and Z. ABZ 2016, May 23 – 27, Linz, Austria. Springer, LNCS – 9675, Pp. 275 – 281.
- 5 A. Iliasov and P. Stankaitis and D. Ebo Adjepon – Yamoah,
"Static verification of railway schema and interlocking design data,"
In Proc. of the 1st International Conference on Reliability, Safety and Security of Railway Systems: Modelling, Analysis, Verification and Certification. RSSR 2016, June 28-30, Paris, France. Springer.
- 6 A. d. Gennaro, P. Stankaitis and A. Mokhov,
"A Heuristic Algorithm for Deriving Compact Models of Processor Instruction Sets,"
15th International Conference on Application of Concurrency to System Design (ACSD), Brussels, IEEE, pp. 100-109. 2015.

LANGUAGES

ENGLISH: Full professional proficiency
LITHUANIAN: Mother-tongue