E-mail: graics@mit.bme.hu

Bence Graics

Education

2019 – (2023) **Budapest University of Technology and Economics**
Doctoral School of Informatics
Software Engineering, PhD
Field of research: model-driven software engineering, usability of formal methods

2017 – 2019 **Budapest University of Technology and Economics**
Faculty of Electrical Engineering and Informatics
Software Engineering, MSc, With Honors
Specialization: Critical Systems
Thesis: Mixed-Semantics Composition of Statecharts for the Model-Driven Design of Reactive Systems

2013 – 2017 **Budapest University of Technology and Economics**
Faculty of Electrical Engineering and Informatics
Software Engineering, BSc, With Honors
Specialization: System Design
Thesis: Model-Driven Design and Verification of Component-Based Reactive Systems

2009 – 2013 Pécs, PTE Babits Mihály Secondary School
Mathematics-informatics section

Internships and Research Visits

2022 summer **INPE, São José dos Campos, Brazil – Research visit, 4 weeks**
Main tasks: Lecturing, consulting, developing tools

2019 fall **INPE, São José dos Campos and Natal, Brazil – Research visit, 4 weeks**
Main tasks: Lecturing, preparing laboratory practices, consulting, developing tools

2017 summer **IncQuery Labs Ltd., Budapest, Hungary – Internship, 6 weeks**
Main tasks: Development of MagicDraw Development Kit (model transformations), benchmarking VIATRA with MONDO-SAM

2016 summer **IncQuery Labs Ltd., Budapest, Hungary – Internship, 6 weeks**
Main tasks: Development of the Gamma Statechart Composition Framework: language design (metamodel, grammar, validation), model transformations, code generation

Participation in Research Projects

2019 – present **ADVANCE**
Addressing Verification and Validation Challenges in Future Cyber-Physical Systems

2019 – 2022 **2018-1.3.1-VKE-2018-00040**
Development of a distributed electronic railway interlocking system (RIS)

2019 – 2020 **MTA-BME Lendület – Cyber-Physical Systems Research Group**
Research in the area of heterogeneous component modeling for reactive CPS

Honors, Awards & Scholarships

2019 **Academic Students Conference (National)**
Dissertation: Model-Driven Development of Reactive Systems with Mixed Synchronous and Asynchronous Hierarchical Composition *(2nd prize)*

2017 **Academic Students Conference (University)**
Dissertation: Model-Driven Development of Reactive Systems with Mixed Synchronous and Asynchronous Hierarchical Composition *(1st prize)*

2016	**Academic Students Conference (University)** *Dissertation:* Model-Driven Design and Verification of Component-Based Reactive Systems *(3rd prize)*
2017, 2019, 2020	**New National Excellence Program Scholarship**
2017, 2018	**National Higher Education Scholarship**
2019	**Nokia Bell Labs Junior Scholar Award**
2016, 2017, 2018	**Technical Scholarship of the Faculty**
2018	**EFOP 3.6.2-16 Scholarship** *Topic*: Guaranteeing dependability in CPS systems
2020	**Publication Award of Schnell Foundation** *Publication:* Mixed-semantics composition of statecharts for the component-based design of reactive systems
2021	**Best Presentation Award of Schnell Foundation** at the *28th Minisymposium of the Department of Measurement and Information Systems* *Presentation:* Mixed-semantics composition of statecharts for the component-based design of reactive systems

University Activities

Teaching assistant

System Modeling, Formal Methods: lecturing, preparing exam exercises, grading exams, preparing home assignments, grading home assignments
Software and Systems Verifications: lecturing, preparing and leading laboratory practices, preparing exam exercises, grading exams, grading home assignments
IT System Design: lecturing, preparing home assignments
System Design Laboratory 1: leading lab practices, grading lab reports

Supervisor

BSc thesis:

- *Model-Driven Development of Heterogeneous Cyber-Physical Systems (2020)*
- *Scenario-Based Modeling and Analysis of Reactive Systems (2020)*
- *Testing of Model Transformations in the Gamma Framework (2021)*
- *Exploiting the Byproducts of Model Checking for More Efficient Debugging in Model-Driven Development (2022)*

Academic Students Conference (University):

- *Model-Driven Development of Heterogeneous Cyber-Physical Systems (2020) (2nd prize)*
- *Formal Modeling and Verification of Process Models in Component-based Reactive Systems (2021) (2nd prize)*
- *Formal Methods for Better Standards: Validating the UML PSSM Standard About State Machine Semantics (2022) (2nd prize)*

University Projects and Tools

2016 – 2018	**MoDeS^3** project: design and verification of the distributed safety logic
2016 – present	Main developer of the **Gamma Statechart Composition Framework:** a framework for the design, verification and implementation of component-based reactive systems

Academical Activities and Services

Conference organizer	Local chair at the ***28th Minisymposium of the Department of Measurement and Information Systems****:* editing the website, organizing the program, editing the proceedings
Thesis reviewer	*Supporting and Improving the Extensibility of the "Odin" system* ***(NTNU)***
Paper subreviewer	DepCoS'19, DepCoS'20, MODELS'20, MODELS'21, SAC DADS'21, FMICS'21, SAC DADS'22, Minisymposium'22, FMICS,22

Skills

E-mail: graics@mit.bme.hu

Language skills:	Hungarian – native **English** – fluent (Language Certificate: combined advanced – Level C1, 2012) Russian – passive (Language Certificate: combined intermediate – Level B1, 2019)
Programming skills:	C, C++, C#, Python, Java/Xtend programming languages, Git Eclipse technologies: EMF, Xtext, VIATRA, Yakindu **Main skills: Eclipse technologies, Java**

Personal Skills

My greatest strength lies in my endurance and persistence. I am a hard worker, dedicated to my goals and strive to achieve them at all costs. I am accurate and always aim to carry out my tasks precisely. I love working with motivated people and consider myself as a great team worker. I find lifelong learning crucial in our modern society and I am always interested in getting to know new and interesting topics.

Budapest, 30 November 2022.

Bence Graics

Publications

[1] Bence Graics, Vince Molnár. Formal Compositional Semantics for Yakindu Statecharts. In *Proceedings of the 24th PhD Mini-Symposium, Pages 22–25*. Budapest University of Technology and Economics, Department of Measurement and Information Systems, 2017. ISBN: 978-963-313-243-2.

[2] Bence Graics, Vince Molnár. Mix-and-Match Composition in the Gamma Framework. In *Proceedings of the 25th PhD Mini-Symposium, Pages 24–27*. Budapest University of Technology and Economics, Department of Measurement and Information Systems, 2018. ISBN: 978-963-313-285-2.

[3] Vince Molnár, Bence Graics, András Vörös, István Majzik, and Dániel Varró. The Gamma Statechart Composition Framework. In *Proceedings of the 40th International Conference on Software Engineering: Companion Proceedings, ICSE 2018, Gothenburg, Sweden, May 27 - June 03, 2018, Pages 113-116.* ACM. DOI: 10.1145/3183440.3183489

[4] Bence Graics, István Majzik. Modeling and Analysis of an Industrial Communication Protocol in the Gamma Framework. In Proceedings of the 27th PhD Mini-Symposium, Pages 25–28. Budapest University of Technology and Economics, Department of Measurement and Information Systems, 2020

[5] Simon József Nagy, Bence Graics, Kristóf Marussy, András Vörös. Simulation-based Safety Assessment of High-level Reliability Models. In Proceedings MARS 2020, arXiv:2004.12403; EPTCS 316, 2020, pp. 240-260; DOI:10.4204/EPTCS.316.9

[6] Bence Graics, Vince Molnár, András Vörös, István Majzik, and Dániel Varró. Mixed-semantics composition of statecharts for the component-based design of reactive systems. Software and Systems Modeling, Volume 19, Number 6, Pages 1483–1517, 2020, DOI: 10.1007/s10270-020-00806-5

[7] Benedek Horváth, Bence Graics, Vince Molnár, Ákos Hajdu, Zoltán Micskei, Vince Molnár, István Ráth, Luigi Andolfato, Ivan Gomes, and Robert Karban. Model Checking as a Service: Towards Pragmatic Hidden Formal Methods. MODELS '20: Proceedings of the 23rd ACM/IEEE International Conference on Model Driven Engineering Languages and Systems: Companion Proceedings, October 2020, Article No.: 37, Pages 1–5, DOI:10.1145/3417990.3421407

[8] János Csanád Csuvarszki, Bence Graics, András Vörös. Model-Driven Development of Heterogeneous Cyber-Physical Systems. In *Proceedings of the 28th PhD Mini-Symposium, Pages 24–27.* Budapest University of Technology and Economics, Department of Measurement and Information Systems, 2021. ISBN: 978-963-421-845-6

[9] Bence Graics, Vince Molnár, and István Majzik. Contract-Based Specification and Test Generation for Adaptive Systems. In Proceedings of the 16th International Conference on Dependability of Computer Systems DepCoS-RELCOMEX, June 28 – July 2, 2021, Wrocław, Poland, in Advances in Intelligent Systems and Computing, Volume 1389, Pages 136–145, Springer Nature, DOI:10.1007/978-3-030-76773-0

[10] Danilo Almeida, Bence Graics, Ronan Chagas, Fabiano Luis de Sousa and Fatima Mattiello-Francisco, "Towards Simulation of CubeSat Operational Scenarios under a Cyber-Physical Systems View," *2021 10th Latin-American Symposium on Dependable Computing (LADC)*, 2021, pp. 1-4, DOI: 10.1109/LADC53747.2021.9672594.