

Anastasia Mavridou

Curriculum Vitae

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Research Highlights

I am a member of the Robust Software Engineering (RSE) Group at NASA Ames Research Center, employed by KBR Inc, where I perform research on formal methods and software engineering. More specifically, I work on the NASA Ames' Formal Requirements Elicitation Tool (FRET) and my research focuses on requirement engineering, component-based system design, and compositional verification. I have authored more than 25 publications spanning the broad areas of formal methods and software engineering, with a focus on system design and formal analysis techniques. I have also served on the program committees of numerous workshops and conferences in those areas, including being the general chair of the NASA Formal Methods (NFM) 2020 symposium.

Education

- Doctor of Science in Computer Science** December 2016
École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
Thesis: *“Modelling Architecture Styles”*
Advisors: Prof. Joseph Sifakis & Dr. Simon Bliudze
- M.Sc. in Computer Science** May 2012
University of Tulsa (TU), Tulsa, USA
Thesis: *A Situational Awareness Framework for the Smart Grid*
Advisor: Prof. Mauricio Papa
- Diploma in Electrical & Computer Engineering** (5-year degree) February 2010
Aristotle University of Thessaloniki (AUTH), Thessaloniki, Greece
Thesis: *“Information Assurance for Cybersecurity and Critical Infrastructure Protection: policies, guidelines, and standards”*
Advisors: Prof. George Pangalos (AUTH, Greece) & Bernard Doherty (Aston University, UK)

Awards

- Outstanding Contributions and Efforts Employee Award, *KBR Inc.* 2020
- [Most Potential NASA Impact Award](#), NASA Digital Transformation Hackathon, *NASA* 2020
- [NASA Group Achievement Award](#), Formal Requirement Elicitation Tool (FRET) Team, *NASA* 2019
- Graduate Tuition Award, *University of Tulsa* 2010-2012
- Erasmus Scholarship, *Aston University* 2008

Employment

- Senior Technical Professional - Data Science** July 2018 – Present
KBR Inc. at *NASA Ames Research Center*
- Postdoctoral Scholar** January 2017 – June 2018
Vanderbilt University, *Institute for Software Integrated Systems*
Supervisor: Prof. Janos Sztipanovits

Visiting Research Scholar

June 2015 – August 2015

Vanderbilt University, *Institute for Software Integrated Systems*

Supervisor: Prof. Janos Sztipanovits

Research Assistant

September 2012 – December 2016

École Polytechnique Fédérale de Lausanne, *Rigorous System Design Laboratory*

Supervisors: Prof. Joseph Sifakis and Dr. Simon Bliudze

Research Interests

Formal Methods, Software Engineering, Requirements Engineering, Correctness-by-Construction.

Professional Service**General Chair**

NFM 2020 (12th International NASA Formal Methods Symposium)

Program Chair

FMICS 2021 (26th International Conference on Formal Methods for Industrial Critical Systems)

Workshop Organization

ICE 2021 (14th Interaction and Concurrency Experience)

ICE 2020 (13th Interaction and Concurrency Experience)

ICE 2019 (12th Interaction and Concurrency Experience)

Demos and Posters Chair

ICBC 2020 (2nd IEEE International Conference on Blockchain and Cryptocurrency)

Program Committee Member**2021**

COORDINATION 2021 (23rd International Conference on Coordination Models and Languages)

ESEC/FSE 2021 Demos (29th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering - Demonstrations track)

FM 2021 (24th International Symposium on Formal Methods)

FormalISE 2021 (9th International Conference on Formal Methods in Software Engineering)

ICBC 2021 (3rd IEEE International Conference on Blockchain and Cryptocurrency)

ICCCPS 2021 (12th ACM/IEEE International Conference on Cyber-Physical Systems)

NFM 2021 (13th International NASA Formal Methods Symposium)

2020

CAV 2020 (32nd International Conference on Computer-Aided Verification)

COORDINATION 2020 (22nd International Conference on Coordination Models and Languages)

FMAS 2020 (2nd Workshop on Formal Methods for Autonomous Systems)

FMBC 2020 (2nd Workshop on Formal Methods for Blockchains)

ICBC 2020 (2nd IEEE International Conference on Blockchain and Cryptocurrency)

ICTAC 2020 (17th International Colloquium on Theoretical Aspects of Computing) - external reviewer

InterAVT 2020 (Interactive Workshop on the Industrial Application of Verification and Testing)

ISSTA 2020 (29th ACM SIGSOFT International Symposium on Software Testing and Analysis)

2019

FM 2019 (24th International Symposium on Formal Methods)

FMBC 2020 (2nd Workshop on Formal Methods for Blockchains)

ICCPS 2019 (10th ACM/IEEE International Conference on Cyber-Physical Systems)
ICSE SEIP 2019 (41st ACM/IEEE International Conference on Software Engineering, Software Engineering in Practice Track)
ICSE Posters 2019 (41st ACM/IEEE International Conference on Software Engineering, Posters Track)
InterAVT 2019 (Interactive Workshop on the Industrial Application of Verification and Testing)
MeTRiD 2019 (2nd Workshop on Methods and Tools for Rigorous System Design)

2018 or earlier

ICE 2018 (11th Interaction and Concurrency Experience)
COORDINATION 2017 (19th International Conference on Coordination Models and Languages) - external reviewer
FOCLASA 2017 (15th International Workshop on Foundations of Coordination Languages and Self-Adaptive Systems) - external reviewer
ICE 2017 (10th Interaction and Concurrency Experience)

Reviewer for Journal

Information Processing & Management, Elsevier (2020)
Logical Methods in Computer Science, Computing Research Repository (2020)
Acta Informatica, Springer (2019)
Journal of Software: Practice and Experience, Wiley (2019)

Special Issue Editor

Journal of Logical and Algebraic Methods in Programming, Elsevier (2019-2021)

Invited Talks

Formal Requirements Elicitation with FRET
Carnegie Mellon University Silicon Valley
Host: Dr. Corina Pasareanu 2019

Correct-by-Design Smart Contracts with VeriSolid and FRET
Institute of Industrial Science, University of Tokyo & NTT Research
Host: Prof. Kanta Matsuura 2019

Bridging the Gap Between Requirements and Model Analysis
Cyber-Physical Systems Research Center, University of California at Santa Cruz
Host: Prof. Ricardo Sanfelice 2019

Modelling Architecture Styles Institute for Systems Research, University of Maryland
Host: Prof. John Baras 2017

Other Talks

Resilient and Trustworthy Transactive Platform for Smart and Connected Communities
18th Annual High Confidence Software and Systems Conference (HCSS'18) 2018

A Design Studio for Modeling, Analyzing, and Generating Systems with BIP
17th Annual High Confidence Software and Systems Conference (HCSS'17) 2017

Languages

English full professional proficiency
French intermediate (B1)
Greek native

Peer-Reviewed Publications

Journal

- [J1] Dimitra Giannakopoulou, Thomas Pressburger, Anastasia Mavridou, Johann Schumann Automated formalization of structured natural language requirements. *Information and Software Technology*, Volume 137, pp. 106590, 2021.
- [J2] Christos Grompanopoulos, Antonios Gouglidis, Anastasia Mavridou, Specifying and verifying usage control models and policies in TLA+. *International Journal on Software Tools for Technology Transfer*, Volume 8, pp. 1 - 16, 2021.
- [J3] Scott Eisele, Carlos Barreto, Abhishek Dubey, Xenofon Koutsoukos, Taha Eghesad, Aron Laszka, and Anastasia Mavridou, Blockchains for Transactive Energy Systems: Opportunities, Challenges, and Approaches. *IEEE Computer*, Volume 53, Issue 9, pp. 66 - 76, 2020.
- [J4] Emmanouela Stachtari, Anastasia Mavridou, Panagiotis Katsaros, Simon Bliudze, and Joseph Sifakis, Early Validation of System Requirements and Design through Correctness-by-construction. *Journal of Systems and Software*, Volume 145, pp. 52 - 78, 2018.
- [J5] Anastasia Mavridou, Eduard Baranov, Simon Bliudze, and Joseph Sifakis, Configuration logics: Modeling architecture styles. *Journal of Logical and Algebraic Methods*, Volume 86, pp. 2 - 29, 2017.
- [J6] Simon Bliudze, Anastasia Mavridou, Radoslaw Szymanek, and Alina Zolotukina, Exogenous coordination of concurrent software components with JavaBIP. *Software - Practice and Experience*, Volume 47, pp. 1801 - 1836, 2017.
- [J7] Anastasia Mavridou, Victor Zhou, Jerald Dawkins, and Mauricio Papa, A situational awareness framework for securing the smart grid using monitoring sensors and threat models. *International Journal of Electronic Security and Digital Forensics*, Volume 4, pp. 138 - 153, 2012.

Proceedings

- [C1] Ivan Perez, Anastasia Mavridou, Thomas Pressburger, Alwyn Goodloe, Dimitra Giannakopoulou. Automated Translation of Natural Language Requirements to Runtime Monitors. *To be presented at the 28th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, 2022.
- [C2] Anastasia Mavridou, Andreas Katis, Dimitra Giannakopoulou, David Kooi, Thomas Pressburger, and Michael W. Whalen. From Partial to Global Assume-Guarantee Contracts: Compositional Realizability Analysis in FRET. *Proceedings of the 24th International Formal Methods Symposium (FM)*, pp. 503 - 523, 2021.
- [C3] Hamza Bourbough, Marie Farrell, Anastasia Mavridou, Irfan Sljivo, Guillaume Brat, Louise A. Dennis, and Michael Fisher. Integrating Formal Verification and Assurance: An Inspection Rover Case Study. *Proceedings of the 13th NASA Formal Methods Symposium (NFM)*, pp. 53 - 71, 2021.
- [C4] Anastasia Mavridou, Hamza Bourbough, Dimitra Giannakopoulou, Thomas Pressburger, Mohammad Hejase, Pierre-Loic Garoche, and Johann Schumann. The Ten Lockheed Martin Cyber-Physical Challenges: Formalized, Analyzed, and Explained. *Proceedings of the 28th IEEE International Requirements Engineering Conference (RE)*, pp. 300 - 310, 2020.
- [C5] **Honorary mention - Among top 3 papers.** Dimitra Giannakopoulou, Thomas Pressburger, Anastasia Mavridou, and Johann Schumann. Generation of Formal Requirements from Structured Natural Language. *Proceedings of the 26th International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ)*, pp. 19 - 35, 2020.
- [C6] Dimitra Giannakopoulou, Anastasia Mavridou, Thomas Pressburger, Julian Rhein, Johann Schumann, and Nija Shi. Formal Requirements Elicitation with FRET. *Proceedings of the 26th International*

Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ - Demos Track), 2020.

[C7] **Best Poster Paper Award.** Anastasia Mavridou, Hamza Bourbough, Pierre-Loic Garoche, Dimitra Giannakopoulou, Thomas Pressburger, and Johann Schumann. Bridging the Gap Between Requirements and Simulink Model Analysis. *Proceedings of the 26th International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ - Posters Track)*, 2020.

[C8] Aaron Dutle, César A. Muñoz, Esther Conrad, Alwyn Goodloe, Laura Titolo, Iván Pérez, Swee Balachandran, Dimitra Giannakopoulou, Anastasia Mavridou, Thomas Pressburger. From Requirements to Autonomous Flight: An Overview of the Monitoring ICAROUS Project. *Proceedings of the Workshop on Formal Methods for Autonomous Systems (FMAS)*, pp. 23 - 30, 2020.

[C9] Mudabbir Kaleem, Anastasia Mavridou, and Aron Laszka. Vyper: A Security Comparison with Solidity Based on Common Vulnerabilities. *Proceedings of the 2nd Conference on Blockchain Research & Applications for Innovative Networks and Services (BRAINS)*, pp. 107 - 111, 2020.

[C10] Keerthi Nelaturu, Anastasia Mavridou, Andreas Veneris, and Aron Laszka. Verified Development and Deployment of Multiple Interacting Smart Contracts with VeriSolid. *Proceedings of the 2nd IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, pp. 1 - 9, 2020.

[C11] Anastasia Mavridou, Aron Laszka, Emmanouela Stachtari, and Abhishek Dubey. VeriSolid: Correct-by-Design Smart Contracts for Ethereum. *Proceedings of the 23rd International Conference on Financial Cryptography and Data Security (FC)*, pp. 446 - 465, 2019.

[C12] Scott Eisele, Aron Laszka, Anastasia Mavridou, and Abhishek Dubey. SolidWorx: A Resilient and Trustworthy Transactive Platform for Smart and Connected Communities. *Proceedings of the 2018 IEEE International Conference on Blockchain (IEEE Blockchain)*, pp. 1263 - 1272, 2018.

[C13] Anastasia Mavridou, Joseph Sifakis, and Janos Sztipanovits. DesignBIP: A Design Studio for Modeling and Generating Systems with BIP. *Proceedings of the Workshop on Methods and Tools for Rigorous System Design (MeTRiD)* 2018.

[C14] Antonios Gouglidis, Christos Grompanopoulos, and Anastasia Mavridou. Formal Verification of Usage Control Models: A Case Study of UseCON Using TLA+. *Proceedings of the Workshop on Methods and Tools for Rigorous System Design (MeTRiD)*, 2018.

[C15] Anastasia Mavridou and Aron Laszka. Designing Secure Ethereum Smart Contracts: A Finite State Machine Based Approach. *Proceedings of the 22nd International Conference on Financial Cryptography and Data Security (FC)*, pp. 523 - 540, 2018.

[C16] Anastasia Mavridou and Aron Laszka. Tool Demonstration: FSolidM for Designing Secure Ethereum Smart Contracts. *Proceedings of the 7th International Conference on Principles of Security and Trust (POST)*, pp. 270 - 277, 2018.

[C17] Anastasia Mavridou, Tamás Kecskés, Qishen Zhang, and Janos Sztipanovits. A Common Integrated Framework for Heterogeneous Modeling Services. *Proceedings of the 6th International Workshop on the Globalization of Modeling Language (GEMOC)*, 2018.

[C18] Anastasia Mavridou, Valentin Rutz, and Simon Bliudze. Coordination of Dynamic Software Components with JavaBIP. *Proceedings of the 14th International Conference on Formal Aspects of Component Software (FACS)*, pp. 39 - 57, 2017.

[C19] Anastasia Mavridou, Emmanouela Stachtari, Simon Bliudze, Anton B. Ivanov, Panagiotis Katsaros, and Joseph Sifakis. Architecture-Based Design: A Satellite On-Board Software Case Study. *Proceedings of the 13th International Conference on Formal Aspects of Component Software (FACS)*, pp. 260 - 279, 2016.

[C20] Anastasia Mavridou, Eduard Baranov, Simon Bliudze, and Joseph Sifakis. Architecture Diagrams: A Graphical Language for Architecture Style Specification. *Proceedings of the Interaction and Concurrency*

Experience (ICE), pp. 83 - 97, 2016.

[C21] Anastasia Mavridou, Eduard Baranov, Simon Bliudze, and Joseph Sifakis. Configuration Logics: Modelling Architecture Styles. *Proceedings of the 12th International Conference on Formal Aspects of Component Software (FACS)*, pp. 256 - 274, 2015.

[C22] Simon Bliudze, Anastasia Mavridou, Radoslaw Szymanek, and Alina Zolotukhina. Coordination of software components with BIP: application to OSGi. *Proceedings of the 6th International Workshop on Modeling in Software Engineering (MiSE)*, pp. 25 - 30, 2014.

[C23] Anastasia Mavridou and Mauricio Papa. A Situational Awareness Architecture for the Smart Grid. *Proceedings of the 7th International Global Security, Safety and Sustainability & 4th e-Democracy (ICGS3/e-Democracy)*, pp. 229 - 236, 2012.