

Background

As of November 2023, I am a research fellow with an [EPSRC Doctoral Prize Fellowship](#) for the topic "Reliable AI-Enabled Design of Cyber-Physical Systems" mentored by [Dr Abolfazl Lavaei](#).

Previously, I was a PhD student in the [School of Computing](#) at [Newcastle University](#), United Kingdom supervised by [Dr Sadegh Soudjani](#) - I was awarded an EPSRC Studentship (EP/R51309X/1) in October 2019. My research focused on the intersection of formal methods in computer science and control theory applied to power system frequency regulation. In 2019, I completed an integrated Masters in Computing for Computer Science (Security and Resilience) with 1st Class Honours also at [Newcastle University](#). For the project and dissertation I received 92%.

I have contributed to the international academic community with published works, program committee memberships, conference paper and journal paper reviews, and conference presentations. I was also a website chair for the VARS2021 Workshop, a part of [CPS-IoT week](#).

At [Newcastle University](#), I spent 4 years as the chair of [AMBER](#), I have given multiple internal research presentations, and assisted widely by teaching as a demonstrator and marking. I have experience with supervising BSc, MSc and PhD students. Alongside these I have been co-lead of the research communication and dissemination in the [HyCoDeV Lab](#).

Academic Degrees

Oct.19-Sep.23 **PhD** in Formal Methods of Cyber-Physical Systems, School of Computing, Newcastle University, UK
Thesis: *Model-Based and Data-Driven Formal Synthesis of Power Systems*

Oct.15-Sep.19 **M.Comp (Hons.)** in Computer Science (Security and Resilience), Newcastle University, UK
Dissertations: (i) *Using Formal Methods and Proof to Verify a CANDO Epilepsy Medical Device (2019)*
(ii) *Modelling Computer Security Principles as a Strategy Game (2018)*

Research Interests

Trustworthy Autonomy & AI, Cyber-Physical Systems, Formal Learning & Control, Compositional Formal Methods, Data-Driven Optimisation

Honours and Awards

Nov.23-Nov.25 EPSRC Doctoral Prize Fellowship
Oct.19-Mar.23 EPSRC Studentship (EP/R51309X/1)
Oct.15-Sep.20 Newcastle University Sports Scholarship

Publications: Journal

- [J1] A.S. Laino, **B. Wooding**, S. Soudjani, R. Davenport, "Logic-Based Robustness for Resilience of Water Resource Recovery Facilities (WRRFs)", *under submission*, 2023
- [J2] **B. Wooding**, A. Lavaei, S. Soudjani, "Formal Control for the New England 39-Bus Test System: An Assume-Guarantee Contract Approach", *under submission to IEEE Transactions on Power Systems (TPWRS)*, 2023
- [J3] M. Kazemi*, R. Majumdar, M. Salamati*, S. Soudjani, **B. Wooding***, "[Data-Driven Abstraction-Based Controller Synthesis](#)", *under revision in Nonlinear Analysis: Hybrid Systems (NAHS)*, 2022 (**contributed equally*)

Publications: Book Chapter

- [B1] **B. Wooding**, V. Vahidinisab, and S. Soudjani, "Cyber-Physical Smart Homes/Buildings", *accepted Elsevier chapter*, 2023
- [B2] **B. Wooding**, V. Vahidinisab, S. Soudjani, "[Operation and control of a population of active buildings at network level](#)", *Active Building Energy Systems: Operation and Control*, 2021
- [B3] **B. Wooding**, V. Vahidinisab, M. Kazemi, S. Soudjani, "[Control and management of active buildings](#)", *Active Building Energy Systems: Operation and Control*, 2021

Publications: Conference

- [C1] **B. Wooding**, A. Lavaei, V. Vahidinisab, and S. Soudjani, "Robust Simulation Functions with Disturbance Refinement", *accepted to European Control Conference (ECC)*, 2023
- [C2] S. Bogomolov, J. Fitzgerald, FF. Foldager, C. Gamble, PG. Larsen, K. Pierce, P. Stankaitis, **B. Wooding**, "[Tuning Robotti: the machine-assisted exploration of parameter spaces in multi-models of a cyber-physical system](#)", *18th International Overture Workshop*, 2021 (*authors in alphabetical order*)
- [C3] A. Abate, H. Blom, N. Cauchi, J. Delicaris, A. Hartmanns, M. Khaled, A. Lavaei, C. Pilch, A. Remke, S. Schupp, F. Shmarov, S. Soudjani, A. Vinod, **B. Wooding**, M. Zamani, and P. Zuliani, "[ARCH-COMP20 Category Report: Stochastic Models](#)", "*7th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH20)*", 2020 (*authors in alphabetical order*)
- [C4] **B. Wooding**, V. Vahidinisab, S. Soudjani, "[Formal Controller Synthesis for Frequency Regulation Utilising Electric Vehicles](#)", *Smart Energy Systems and Technologies (SEST)*, 2020

Teaching Experiences (Demonstrating and Marking)

Cloud Computing; Engineering for AI; Research Methods; Computer Architecture; Software Engineering; Software Verification; Algorithm Design and Analysis; Building Systems for People; Understanding Programming Languages; Group Project in Data Science; Development and Operation of Systems.

Supervision Experiences

- 7 BSc Projects, 5 MSc Projects, 1 PhD Project (see publication [J1])

Academic Services: Program Committees

- **Website Chair** for Verification of Autonomous & Robotic Systems Workshop at CPS-IoT Week 2022
- **Repeatability Program Committee** for Hybrid Systems: Computation and Control 2020, 2021
- **Repeatability Program Committee** for IFAC Conference on Analysis and Design of Hybrid Systems 2021
- **Artifact Evaluation Program Committee** for Formal Modeling and Analysis of Timed Systems 2023

Academic Services: Membership

- 2024 IEEE Member
- 2023 IEEE Student Membership

Academic Services: Reviewing Activities

- **Journals:** IEEE TCST, IEEE Access, Elsevier European Journal of Control
- **Book Chapters:** Active Building Energy Systems: Operation and Control
- **Conferences:** ACM HSCC, IEEE ECC, IEEE CCTA, IFAC ADHS, ATVA, ACM/IEEE ICCPS, CAV, CAADCPS, ISoLA

Conference Presentation

- [Jun. 23] 21st European Control Conference (ECC), Bucharest, Romania.
- [Sep. 20] 3rd International Conference on Smart Energy Systems and Technologies (SEST), Istanbul, Turkey. [**Virtual**]

Relevant Courses Taken

During PhD: *Smart Grids and Applications of Computational Intelligence; Applied Probability; Differential Equations; Systems and Control; Signals and Communication*

During MComp: *Machine Learning; Big Data Analytics; Distributed Algorithms; System Evaluation; System Validation; System Verification Technologies; System and Network Security; Cryptography; Reliability and Fault Tolerance; High Integrity Software Development; The Challenge of Dependable Systems.*

References

available on [LinkedIn](#) or upon request