Bryan Donyanavard

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Education

2013–2019 **Ph.D. in Computer Science**, *University of California, Irvine*.
Thesis: *Adaptive Resource Management for Mobile Multiprocessors through Computational Self-Awareness*
Awarded ICS Dean's Fellowship (4 Years of Full Financial Support)

2008–2010 **M.Sc. in Computer Engineering**, *University of California, Santa Barbara*.

2004–2008 **B.Sc. in Computer Engineering**, *University of California, Santa Barbara*.

Research & Work Experience

2021 – present **Assistant Professor**, Computer Science, San Diego State University.
- Research in energy-efficient cyber-physical systems.

2020 – 2021 **Experienced Researcher**, Device Technologies, Ericsson.
- Identifying and addressing runtime optimization challenges across the system stack for distributed applications executing on networks of cyber-physical systems.

2019 – 2020 **Postdoctoral Researcher**, Center for Embedded and Cyber-physical Systems, University of California, Irvine.

Postdoctoral Researcher, Chair of Integrated Systems, Technical University, Munich.
- Key contributor to the collaborative Information Processing Factory (IPF) project, investigating cross-layer runtime management solutions of cyber-physical systems using computational self-awareness.

2015 – 2019 **Graduate Student Researcher**, Dutt Research Group, University of California, Irvine.
- Adaptive On-chip Memory Management in Future Many-core Systems
  - *Developed novel software solutions to simultaneously exploit the features of new memory technologies and application semantics during on-chip memory management in many-core systems.*
- Adaptive and Autonomous Resource Management in Mobile Systems
  - *Provided policies in software for adaptive resource management of unpredictable workloads.*
  - *Developed autonomous hierarchical supervisors to manage system goals in response to abrupt runtime changes.*

2016 **Software Engineering Intern**, Chrome OS, Google.
- Performed research in viability of non-volatile memory (NVM) main memory replacement for mobile SoCs. Proposed and evaluated large last-level cache controller policies for NVM main memory systems by extending the gem5 simulator.

2015 **Software Engineering Intern**, Technical Infrastructure, Google.
- Performed platforms research in software management of multi-tiered main memory hierarchies. Evaluated the validity of incorporating non-uniform memory accesses in cloud applications by collecting and simulating memory traces from live workloads.

2011 – 2013 **Software Developer**, SPARC Systems Group, Oracle.
- Member of platform development teams for SPARC Systems providing bootstrapping source code to initialize chip and system state. Developed firmware to manage various platform I/O peripherals. Platforms include SPARC Blade, Volume, and Enterprise.

Research Interests

- Runtime Resource Management
- Autonomous Cyber-physical Systems
- Memory Management
- Computational Self-awareness

Teaching

2018 – present **Instructor**.
- Internet of Things, San Diego State University
  - Spring 2023
- Intro to Software Systems, San Diego State University
  - Fall/Spring 2024, Fall/Spring 2023, Fall/Spring 2022, Fall/Spring 2021
- Digital Logic Design, UC Irvine
  - Fall 2018

2017 **Certificate in Teaching Excellence Program**, Division of Teaching Excellence and Innovation, University of California, Irvine.
- Trained and certified in designing lessons using evidence-based pedagogical principles, analyzing and assessing teaching practices, and effectively facilitating learning

2017 **Associate Training**, Center for the Integration of Research, Teaching and Learning, University of California, Irvine.
- Trained and certified in effective teaching and learning, and scholarly teaching that uses the CIRTL ideas to demonstrably improve learning of students

2014 – 2016 **Volunteer Tutor Lead**, Rocket Science Tutors, Santa Ana Unified School District.
- Lead mentor in after school program to encourage local students' involvement in STEM subjects
- Nominated for Engage UCI award for Excellence in Service

Mentoring

2024 **STEM Pathways Summer Program**, *SDSU*, Jordan Kelley, Andres Cadena.

2022 **STEM Pathways Summer Program**, *SDSU*, Fernando Quintana.

2022 **Summer Undergraduate Research Program**, *SDSU*, Lili Balazs, Christopher Fisher.

2021 **Summer Undergraduate Research Program**, *SDSU*, Nicholas Lozben.

2020 **MS Thesis**, *KTH*, Sandra Hernandez Herrero.
Cross-layer optimization for visual-inertial localization in resource constrained devices

2017 – 2018 **Mentor**, International Summer Undergraduate Research Fellowship, University of California, Irvine.

2010 **Graduate Student Mentor**, Apprentice Researchers Program, University of California, Santa Barbara.

Research Funding

2024 – 2028 National Science Foundation, Division of Computing and Communication Foundations
Expanding AI Innovation through Capacity Building and Partnerships (ExpandAI)
PARTNER: Expanding AI Capacity in San Diego: A Strategic Collaboration between San Diego State University and TILOS AI Institute
Role: Co-Principle Investigator
Amount: $2,800,000

2024 – 2026 National Science Foundation, Division Of Computer and Network Systems
Computer and Information Science and Engineering Research Initiation Initiative (CRII)
CRII: CNS: Supporting Resilient Perception in Autonomous Cyber-physical Systems
Role: Principle Investigator
Amount: $175,000

2024 San Diego State University, Seed Grant program
Enabling Flexible Autonomous Systems

Role: Principle Investigator

Amount: $7,490

Conference Papers

*Primary author † Primary supervisor

2024 Danny Abraham, Biswadip Maity, Bryan Donyanavard, Nikil Dutt, *Back to the Future: Reversible Runtime Neural Network Pruning for Safe Autonomous Systems*, Design, Automation & Test in Europe Conference & Exhibition (**DATE**)

2022 Dongjoo Seo, Biswadip Maity, Ping-Xiang Chen, Dukyoung Yun, Bryan Donyanavard, Nikil Dutt, *ProSwap: Period-aware Proactive Swapping to Maximize Embedded Application Performance*, IEEE International Conference on Networking, Architecture and Storage (**NAS**)

2022 Sina Shahhosseini, Tianyi Hu, Dongjoo Seo, Anil Kanduri, Bryan Donyanavard, Amir Rahmani, Nikil Dutt, *Hybrid Learning for Orchestrating Deep Learning Inference in Multi-user Edge-cloud Networks*, International Symposium on Quality Electronic Design (**ISQED**)

†2021 Sandra Hernández, José Araujo, Patric Jensfelt, Ioannis Karagiannis, Ananya Muddukrishna, Bryan Donyanavard, *Cross-layer Configuration Optimization for Localization on Resource-constrained Devices*, International Conference on Intelligent Robots and Systems (**IROS**)

2020 Biswadip Maity, Bryan Donyanavard, Nikil Dutt, *Self-aware Memory Management for Emerging Energy-efficient Architectures*, 11th International Green and Sustainable Computing Workshops (**IGSC**)

2020 Florian Maurer, Bryan Donyanavard, Amir Rahmani, Nikil Dutt, Andreas Herkersdorf, *Emergent Control of MPSoC Operation by a Hierarchical Supervisor / Reinforcement Learning Approach*, Design, Automation & Test in Europe Conference & Exhibition (**DATE**)

*2019 Bryan Donyanavard, Armin Sadighi, Florian Maurer, Tiago Mück, Amir Rahmani, Andreas Herkersdorf, Nikil Dutt, *SOSA: Self-Optimizing Learning with Self-Adaptive Control for Hierarchical System-on-Chip Management*, 52nd IEEE/ACM International Symposium on Microarchitecture (**MICRO**)

2019 Biswadip Maity, Bryan Donyanavard, Nalini Venkatasubramanian, Nikil Dutt, *Workload Characterization for Memory Management in Emerging Embedded Platforms*, The 6th International Embedded Systems Symposium (**IESS**)

*2018 Bryan Donyanavard, Amir Mahdi Hosseini Mozannah, Tiago Mück, Nikil Dutt, *Exploring Hybrid Memory Caches in Chip Multiprocessors*, 13th International Symposium on Reconfigurable Communication-centric Systems-on-Chip (**ReCoSoC**)

*2018 Amir Rahmani, Bryan Donyanavard, Tiago Mück, Kasra Moazemmi, Axel Jantsch, Onur Mutlu, Nikil Dutt, *SPECTR: Formal Supervisory Control and Coordination for Many-core Systems Resource Management*, Proceedings of the Twenty-Third International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS**)

*2018 Bryan Donyanavard, Amir Rahmani, Tiago Mück, Kasra Moazemmi, Nikil Dutt, *Gain Scheduled Control for Nonlinear Power Management in CMPs*, Design, Automation & Test in Europe Conference & Exhibition (**DATE**)

2017 Tiago Mück, Bryan Donyanavard, Nikil Dutt, *PoliCym: Rapid Prototyping of Resource Management Policies for HMPs*, Proceedings of the 28th International Symposium on Rapid System Prototyping: Shortening the Path from Specification to Prototype (**RSP**)

*2016 Bryan Donyanavard, Tiago Mück, Santanu Sarma, Nikil Dutt, *SPARTA: Runtime Task Allocation for Energy Efficient Heterogeneous Many-cores*, International Conference on Hardware/Software Codesign and System Synthesis (**CODES+ISSS**)

2016 Hossein Tajik, Bryan Donyanavard, Nikil Dutt, *On Detecting and Using Memory Phases in Multimedia Systems*, Proceedings of the 14th ACM/IEEE Symposium on Embedded Systems for Real-Time Multimedia (**ESTIMedia**)

2010 Yi-Chu Wang, Bryan Donyanavard, Tim Cheng, *Energy-Aware Real-Time Face Recognition System on Mobile CPU-GPU Platform*, European Conference on Computer Vision (**ECCV Workshops**)

Journal Articles

2023 Florian Maurer, Moritz Thoma, Anmol Prakash Surhonne, Bryan Donyanavard, Andreas Herkersdorf, *Machine learning in run-time control of multicore processor systems*, **it - Information Technology**

2022 Sina Shahhosseini, DongJoo Seo, Anil Kanduri, Tianyi Hu, Sung-Soo Lim, Bryan Donyanavard, Amir Rahmani, Nikil Dutt, *Online Learning for Orchestration of Inference in Multi-User End-Edge-Cloud Networks*, ACM Transactions on Embedded Computing Systems (**TECS**)

2021 Biswadip Maity, Saehanseul Yi, Dongjoo Seo, Leming Cheng, Sung-Soo Lim, Jong-Chan Kim, Bryan Donyanavard, Nikil Dutt, *Chauffeur: Benchmark Suite for Design and End-to-End Analysis of Self-Driving Vehicles on Embedded Systems*, ACM Transactions on Embedded Computing Systems (**TECS**)

2021 Biswadip Maity, Bryan Donyanavard, et al., *SEAMS: Self-Optimizing Runtime Manager for Approximate Memory Hierarchies*, ACM Transactions on Embedded Computing Systems (**TECS**)

2020 Eberle Rambo, Bryan Donyanavard, Minjun Seo, Florian Maurer, et al., *The Self-Aware Information Processing Factory Paradigm for Mixed-Critical Multiprocessing*, **IEEE Transactions** on Emerging Topics in Computing

2020 Tianyi Zhang, Minjun Seo, Bryan Donyanavard, Nikil Dutt, Fadi Kurdahi, *Predicting Failures in Embedded Systems using Long Short-Term Inference*, IEEE Embedded Systems Letters (**ESL**)

2018 Tiago Mück, Bryan Donyanavard, Kasra Moazemmi, Amir Rahmani, Axel Jantsch, Nikil Dutt, *Design Methodology for Responsive and Robust MIMO Control of Heterogeneous Multicores*, IEEE Transactions on Multi-Scale Computing Systems (**TMSCS**)

2018 Majid Shoushtari, Bryan Donyanavard, Luis Angel D Bathen, Nikil Dutt, *ShaVe-ICE: Sharing Distributed Virtualized SPMs in Many-Core Embedded Systems*, ACM Transactions on Embedded Computing Systems (**TECS**)

2016 Aviral Shrivastava, Nikil Dutt, Jian Cai, Majid Shoushtari, Bryan Donyanavard, Hossein Tajik, *Automatic Management of Software Programmable Memories in Many-core Architectures*, **IET** Computers & Digital Techniques

2016 Hossein Tajik, Bryan Donyanavard, Janmartin Jahn, Joerg Henkel, Nikil Dutt, *SPMPool: Runtime SPM Management for Memory-Intensive Applications in Embedded Many-Cores*, ACM Transactions on Embedded Computing Systems (**TECS**)

Book Chapters

2021 Bryan Donyanavard, Amir M Rahmani, Axel Jantsch, Onur Mutlu, Nikil Dutt, **Intelligent Management of Mobile Systems Through Computational Self-Awareness**, *Handbook of Research on Methodologies and Applications of Supercomputing*

2020 Bryan Donyanavard et al., **Reflecting on Self-Aware Systems-on-Chip**, *A Journey of Embedded and Cyber-Physical Systems*

Selected Projects

benchmarking Contribute to Chauffeur benchmark suite for design and end-to-end analysis of self-driving vehicles on embedded systems – `https://github.com/duttresearchgroup/Chauffeur`

OS/middleware Contribute to MARS resource management policy framework and offline simulator – `https://github.com/duttresearchgroup/MARS`

gem5 Added support for software programmable memories (SPMs) in gem5 – `https://github.com/duttresearchgroup/gem5-spm`

Service

Committee	CODES+ISSS, DAC, GLSVLSI, ECRTS
Reviewer	ISCA, CASES, ESTIMedia, ACM SAC, ACM TODAES, CODES+ISSS, VLSI Design, SCOPES, DATE, IEEE TC, ACM TACO, GLSVLSI, IEEE TVLSI, IEEE ISVLSI, IEEE Design & Test, CCPE, ASP-DAC, ACM TECS