

TAYLOR T. JOHNSON

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BRIEF BIOGRAPHY

Dr. Taylor T. Johnson, PE, is an Associate Professor of Computer Science (CS), Computer Engineering (CmpE), and Electrical Engineering (EE) in the Departments of Computer Science and Electrical and Computer Engineering in the School of Engineering (VUSE) at Vanderbilt University, where he directs the Verification and Validation for Intelligent and Trustworthy Autonomy Laboratory (VeriVITAL) and is a Senior Research Scientist in the Institute for Software Integrated Systems (ISIS). Dr. Johnson was previously (September 2013 to August 2016) an Assistant Professor of Computer Science and Engineering (CSE) at the University of Texas at Arlington (UT-Arlington). Dr. Johnson earned a PhD in Electrical and Computer Engineering (ECE) from the University of Illinois at Urbana-Champaign in 2013, where he worked in the Coordinated Science Laboratory with Prof. Sayan Mitra, and earlier earned an MSc in ECE at Illinois in 2010 and a BSEE from Rice University in 2008. Dr. Johnson worked in industry for Schlumberger at various times between 2005 and 2010 developing novel embedded control systems for downhole tools.

Dr. Johnson's research focus is developing formal verification techniques and software tools for cyber-physical systems (CPS). Dr. Johnson has published over a hundred papers on these methods and their applications across CPS domains, such as power and energy systems, aerospace and avionics systems, automotive systems, transportation systems, biotechnology, and robotics, two of which were recognized with best paper awards from the IEEE and IFIP, and one of which was awarded an ACM Best Software Repeatability Award. Dr. Johnson is a 2018 and 2016 recipient of the AFOSR Young Investigator Program (YIP) award, a 2015 recipient of the National Science Foundation (NSF) Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII) award, and his research is / has been supported by AFRL, AFOSR, ARO, DARPA, NSA, NSF (CISE CCF/FMiF, CISE CCF/SHF, CISE CNS/CPS, ENG ECCS/EPCN), the MathWorks, NVIDIA, ONR, Toyota, and USDOT, totaling over \$27 million in sponsored research projects. Dr. Johnson is a member of AAAI, AAAS, ACM, AIAA, IEEE, and SAE, and is a registered Professional Engineer (PE) in Tennessee, license number 122259.

EDUCATION

- 2013 **PhD, Electrical and Computer Engineering**, *University of Illinois at Urbana-Champaign*, Urbana, IL.
 - Dissertation: *Uniform Verification of Safety for Parameterized Networks of Hybrid Automata*
 - Committee: Sayan Mitra (Adviser), Tarek Abdelzaher, William H. Sanders, Mahesh Viswanathan
- 2010 **MSc, Electrical and Computer Engineering**, *University of Illinois at Urbana-Champaign*, Urbana, IL.
 - Thesis: *Fault-Tolerant Distributed Cyber-Physical Systems: Two Case Studies*
 - Adviser: Sayan Mitra
- 2008 **BSEE, Electrical and Computer Engineering**, *Rice University*, Houston, TX.
 - Senior Project: *Sensorless Synchronous Motor Control in Downhole Tools* (with Frank Havlak and Elica Skorcheva at Rice, and Fadi Abousleiman, Farès Hantous, and Slim Besbes at Supélec, Gif-sur-Yvette, France)
 - Advisers: Albert Hoefel and Peter Swinburne (Schlumberger); J.D. Wise and Fathi H. Ghorbel (Rice)

ACADEMIC AND RESEARCH POSITIONS

- 8/2021 – Present **Associate Professor**, *Vanderbilt University*, Computer Science, Nashville, TN.
 - Appointments in Computer Science (CS), Computer Engineering (CmpE), and Electrical Engineering (EE)
 - Senior Research Scientist in the Institute for Software Integrated Systems (ISIS)
 - Director of Master of Engineering (MEng) Program in Cyber-Physical Systems
 - Director of VeriVITAL: The Verification and Validation for Intelligent and Trustworthy Autonomy Laboratory
 - Faculty Affiliate, Vanderbilt Data Science Institute (DSI)
 - Research Interests: autonomous cyber-physical systems (CPS), encompassing the Internet of Things (IoT); Safety, security, & reliability of CPS; Formal methods & formal verification; Robust machine learning & trustworthy artificial intelligence (AI); Software engineering; Hybrid systems; Distributed systems; Real-time systems; CPS domains such as transportation systems (aerospace & automotive), medical devices, power/energy systems, & robotics
- 8/2016 – 8/2021 **Assistant Professor**, *Vanderbilt University*, Electrical Eng. and Computer Science, Nashville, TN.
 - Appointments in Computer Science (CS), Computer Engineering (CmpE), and Electrical Engineering (EE)
- 9/2013 – 8/2016 **Assistant Professor**, *University of Texas at Arlington*, Computer Science and Eng., Arlington, TX.
 - Courtesy Appointment: Electrical Engineering

- 5/2015-5/2016 **Adjunct Faculty**, *University of Connecticut*, UTC Institute for Advanced Systems Engineering.
 - Supervised capstone projects for two teams, SE 5309: Capstone Projects for Embedded Systems.
 - Taught an all online summer 2015 graduate course for UTC engineers, SE 5302: Formal Methods.
- Summers 2014 and 2015 **Visiting Research Faculty**, *AFOSR Summer Faculty Fellowship Program (SFFP) and AFRL Visiting Faculty Research Program (VFRP)*, Information Directorate, Air Force Research Laboratory, Rome, NY.
 - Research with Steven Drager and Stanley Bak to develop formal verification methods for hybrid systems and apply them to Air Force CPS, resulting in papers [C9,C10,C11,C13,J4] and software tools [S3,S5].
- 8/2008 – 8/2013 **Research and Teaching Assistant**, *University of Illinois at Urbana-Champaign*, Electrical and Computer Engineering, Urbana, IL.
- Summer 2011 **Visiting Graduate Researcher**, *Air Force Summer Faculty Fellowship Program, Space Vehicles Directorate, Air Force Research Laboratory*, Albuquerque, NM.
 - Research with R. Scott Erwin and Prof. Sayan Mitra to develop and apply hybrid systems abstraction and verification techniques to Air Force space systems problems, particularly verification of conjunction (collision) avoidance for satellite rendezvous maneuvers, resulting in paper [C5].

INDUSTRY AND STARTUP POSITIONS

- December 2017 – Present **Founder and Chief Technology Officer (CTO)**, *Verivital, LLC*, Nashville, TN.
 - Research, development, commercialization, and consulting activities on verification and validation results arising from our research group, particularly formal verification for autonomous cyber-physical systems.
 - Founded as a Tennessee limited liability company (LLC).
- May 2017 – Present **Founder and President**, *CelerFama, Inc.*, Nashville, TN.
 - Technology and business development for automating data entry for electronic health records (EHRs) and electronic medical records (EMRs) using natural language processing (NLP), based on technology transfer of patent application [P2].
 - Founded as a Tennessee class-C corporation.
- Summer 2010 **Intern in Electrical Engineering**, *Schlumberger Technology Corporation*, Sugar Land, TX.
 - Designed, implemented, and analyzed a real-time state estimator for maximum available power produced by a turbo-alternator, used for stalling protection of a turbine in a power control loop outside already cascaded velocity and torque control loops for permanent magnet synchronous motor (PMSM) control of a pump. This work resulted in a conference publication [LC1]—that won a best paper award—and patent [P1].
- Summer 2008 **Intern in Electrical Engineering**, *Etudes et Productions Schlumberger*, Clamart, France.
 - Analyzed and modeled analog and mixed-signal electronics designs for correctness by hand and using computer tools like PSpice with Monte Carlo simulation.
- Summer 2007 **Intern in Computer Engineering**, *Schlumberger Technology Corporation*, Sugar Land, TX.
 - Implemented new features on FPGAs in VHDL used in Space Vector Pulse Width Modulation (SV-PWM) control of permanent magnet synchronous motors (PMSMs).
- Summer 2006 **Intern in Computer Engineering**, *Schlumberger Technology Corporation*, Sugar Land, TX.
 - Designed, implemented, tested, and documented a networked boot loader and application framework in 8051 assembly and C for a microcontroller, utilizing CAN for networking via an SPI interface to a CAN transceiver.
- Summer 2005 **Intern in Computer Science**, *Schlumberger Technology Corporation*, Sugar Land, TX.
 - Designed and implemented an intranet web application in PHP and Javascript (AJAX) with a SQL database backend system to gather, store, and report static analysis metrics on embedded systems source code.

TEACHING EXPERIENCE

Vanderbilt University

- Fall 2021 **Introduction to Engineering, Computer Science Module (ES140x)**, *Instructor*.
75 students total: 25 first-year students each in 3 one credit hour modules taught over the semester
- Fall 2021 **Computer Networks (CS5283)**, *Instructor*.
26 students, online-only course as part of online MSc
- Spring 2021 **Automated Verification (CS6315)**, *Instructor*.
10 students
- Fall 2020 **Introduction to Engineering, Computer Science Module (ES140x)**, *Instructor*.
80 students total: 25-30 first-year students each in 3 one credit hour modules taught over the semester

- Summer 2020 **Computer Networks (CS5283)**, *Instructor*, Developed asynchronous content for this graduate-level course on computer networks as a part of Vanderbilt's new online MSc in computer science.
7 students, online-only course
- Spring 2020 **Machine Learning Verification (CS8395)**, *Instructor*, Developed research seminar course on formal methods, verification, and software engineering for machine learning systems, building on our group's and others' recent results in this growing area.
10 students
- Fall 2019 **Digital Systems (EECE2123)**, *Instructor*, Developed curriculum, assignments, lab assignments, and taught the first iteration of this new core undergraduate EECS course that replaced existing Computer Organization (CS2231) and Digital Logic (EECE2116) courses and labs.
33 students in EECE2123-02 section, and 115 students in 9 laboratory sections of EECE2123L
- Fall 2019 **Introduction to Engineering, Computer Science Module (ES140x)**, *Instructor*.
80 students total: 25-30 first-year students each in 3 one credit hour modules taught over the semester
- Spring 2019 **Automated Verification (CS6315)**, *Instructor*.
30 students, 25 graduate, 5 undergraduate
- Fall 2018 **Introduction to Engineering, Computer Science Module (ES140x)**, *Instructor*, Redesigned curriculum to utilize Python programs to control mobile aerial robots (DJI Tello quadcopter drones), emphasizing cyber-physical and computational thinking.
80 students total: 25-30 first-year students each in 3 one credit hour modules taught over the semester
- Spring 2018 **Computer Networks (CS4283/CS5283)**, *Instructor*.
35 students (25 undergraduate, 10 graduate)
- Fall 2017 **Discrete Event Systems (CS6375)**, *Instructor*.
9 students
- Fall 2017 **Introduction to Engineering, Computer Science Module (ES140x)**, *Instructor*.
75 students total: 25 first-year students each in 3 one credit hour modules taught over the semester
- Spring 2017 **Automated Verification (CS6315)**, *Instructor*.
9 students
- Fall 2016 **Computer Organization (CS2231)**, *Instructor*, This course's student results were used in the 2017 Accreditation Board for Engineering and Technology (ABET) Accreditation for the Computer Science (CS) and Computer Engineering (CmpE) program evaluations.
35 students

Courses for Professional Organizations

- Fall 2020 **SAE C1876: Formal Methods for Functional Safety and Security in Cyber-Physical Systems**, *Instructor*, SAE International, 3-day course on formal methods, verification, and validation (V&V) in the automotive domain, arranged with feedback from DARPA (Raymond Richards), NSF (Jeremy Epstein), SAE, and the National Motor Freight Traffic Association (NMFTA) as a foundational background course for helping transition the seL4 microkernel into usage in automotive systems.
<https://www.sae.org/learn/content/c1876/>
- University of Connecticut***
- Spring 2016 **Capstone Projects for Embedded Systems (SE5309), United Technologies Corporation (UTC), Institute for Advanced Systems Engineering (IASE)**, *Adjunct Faculty; Capstone Project Mentor*, Supervised two student teams for capstone embedded system design projects using formal methods concepts and tools as a part of their Embedded Systems Graduate Certificates.
6 students, online-only course
- Summer 2015 **Formal Methods (SE5302), United Technologies Corporation (UTC), Institute for Advanced Systems Engineering (IASE)**, *Adjunct Faculty; Instructor of Record (Main Instructor)*, Developed and taught this all online course on formal methods to graduate-level engineers across three continents (North America, Europe, Asia) in industry from UTC through the UTC IASE. Formal methods tools used include nuXmv, NuSMV, Simulink Design Verifier, Simulink Verification and Validation, Frama-C, Daikon, and PVS. Guest lecturers provided by Prof. Sayan Mitra of Illinois, Dr. Eelco Scholte of UTC, and Jay Abraham of the MathWorks.
26 students, online-only course

University of Texas at Arlington

- Fall 2015 **Automated Software Engineering (CSE6323)**, *Instructor*.
9 students; developed course
- Summer 2015 **Introduction to Engineering and Engineering Mathematics (ENGR1.0x)**, *Guest Lecturer*, Created modules on computer science mathematics, particularly discrete math and graph theory. Massive Open Online Course (MOOC) through edX via UTArlingtonX for high school students.
- Spring 2015 **Mobile Systems Engineering (CSE4340 / CSE5349)**, *Instructor*.
32 students (18 undergraduates in 4340 and 14 graduates in 5349); redeveloped course
- Fall 2014 **Computer Organization and Assembly Language Programming (CSE2312)**, *Instructor*.
49 students; also provided all course materials for another fall 2014 section, which has been reused in five subsequent sections in spring 2015, summer 2015, and fall 2015.
- Spring 2014 **Special Topics in Advanced Systems and Architecture: Cyber-Physical Systems (CSE6359)**, *Instructor*.
9 students; developed course
- Fall 2013 **Computer Organization and Assembly Language Programming (CSE2312)**, *Instructor*, Redeveloped course and also provided course materials for spring 2014 and summer 2014 sections.
47 students

University of Illinois at Urbana-Champaign

- Spring 2010 **Introduction to Computing Systems (ECE190)**, *Graduate Teaching Assistant*.
- Spring 2009 **Introduction to Computing Systems (ECE190)**, *Graduate Teaching Assistant*.
- Fall 2008 **Introduction to Electrical and Computer Engineering (ECE110)**, *Graduate Teaching Assistant*.

Rice University

- Spring 2008 **Applied Algorithms and Data Structures (COMP314)**, *Undergraduate Teaching Assistant*.
- Spring 2008 **Intermediate Programming (COMP212)**, *Undergraduate Teaching Assistant*.
- Fall 2007 **Digital Logic Design (ELEC326)**, *Undergraduate Lab Assistant*.
- Spring 2007 **Intermediate Programming (COMP212)**, *Undergraduate Teaching Assistant*.
- Spring 2007 **Microcontroller and Embedded Systems Laboratory (ELEC226)**, *Undergraduate Lab Assistant*.
- Spring 2006 **Intermediate Programming (COMP212)**, *Undergraduate Teaching Assistant*.

PUBLICATIONS

Co-authors with a trailing [†] indicate thesis students formally advised or co-advised, with a trailing [°] are postdocs formally mentored, and co-authors with a trailing * indicate students informally mentored (all at the time of publication). Papers subject to double-blind reviews (both authors and reviewers are anonymous) are indicated by DBR. Papers that have corresponding software artifacts and have passed a repeatability/artifact evaluation are indicated by RAE.

Citation metrics are from Google Scholar, with a total of 2071 citations, *h*-index of 25, and *i*10-index of 54 as of October 12, 2021.

PAPERS SUBMITTED AND PENDING REVIEW DECISIONS

- [U2] Joel Rosenfeld[°], Ben Russo, Rushi Kamalapurkar, **Taylor T. Johnson**, "The Occupation Kernel Method for Nonlinear System Identification," under revision for *SIAM Journal on Control and Optimization (SICON)*, October 2021.
- [U1] Luan Viet Nguyen, Hoang-Dung Tran[†], **Taylor T. Johnson**, Vijay Gupta, "Decentralized Safe Control for Distributed Cyber-Physical Systems using Real-time Reachability Analysis," under review for *IEEE Transactions on Control of Network Systems (TCNS)*, September 2021.

REFEREED JOURNAL ARTICLES

- [J26] Joel A. Rosenfeld, Rushikesh Kamalapurkar, L. Forest Gruss, **Taylor T. Johnson**, "Dynamic Mode Decomposition for Continuous Time Systems with the Liouville Operator," *Journal of Nonlinear Science*, October 2021. [pdf]
Impact Factor: 3.621.
- [J25] Hoang-Dung Tran[†], Diego Manzanas Lopez[†], Patrick Musau[†], Xiaodong Yang[†], Luan Nguyen, Weiming Xiang, **Taylor T. Johnson**, "Verification of piecewise deep neural networks: a star set approach with

- zonotope pre-filter," *Formal Aspects of Computing*, Vol: 33, p 519-545, August 2021. [pdf]
DOI: 10.1007/s00165-021-00553-4
Impact Factor: 0.627. *Special Issue of Formal Aspects of Computing on Formal Methods: Foundations and Practical Applications*, October 2020. Extension of [C25] invited for special issue.
- [J24] Xiaodong Yang[†], Omar Beg, Matthew Kenigsberg, **Taylor T. Johnson**, "A Framework for Identification and Validation of Affine Hybrid Automata from Input-Output Traces," *ACM Transactions on Cyber-Physical Systems (TCPS)*, August 2021. [pdf].
- [J23] Omar Ali Beg, Luan Viet Nguyen, **Taylor T. Johnson**, Ali Davoudi, "Cyber-Physical Anomaly Detection in Microgrids Using Time-Frequency Logic Formalism," *IEEE Access*, Vol: 9, p 20012-20021, January 2021. [pdf]
DOI: 10.1109/ACCESS.2021.3055229
Impact Factor: 3.745.
- [J22] Hoang-Dung Tran[†], Weiming Xiang, **Taylor T. Johnson**, "Verification Approaches for Learning-Enabled Autonomous Cyber-Physical Systems," *IEEE Design and Test (D&T)*, August 2020. [pdf]
DOI: 10.1109/MDAT.2020.3015712
Impact Factor: 2.409.
- [J21] Weiming Xiang, Xiaodong Yang[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, "Reachable Set Estimation for Neural Network Control Systems: A Simulation-Guided Approach," *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*, May 2020. [pdf]
DOI: 10.1109/TNNLS.2020.2991090
Impact Factor: 8.793.
- [J20] Hoang-Dung Tran[†], Feiyang Cei, Diego Manzananas Lopez[†], **Taylor T. Johnson**, Xenofon Koutsoukos, "Safety Verification of Cyber-Physical Systems with Reinforcement Learning Control," *ACM Transactions on Embedded Computing Systems (TECS), Special Issue from EMSOFT'19*, Vol: 18, No: 5s, p 105:1-105:22, October 2019. [pdf]
DOI: 10.1145/3358230
Acceptance Rate: 25.0 percent (25 of 100)
Double-Blind Review (**DBR**)
Impact Factor: 2.609.
- [J19] Ziaur Rahman, Stephen P. Mattingly, Rahul Kawadgave, Dian Nostikasari, Nicole Roeglin, Colleen Casey, **Taylor T. Johnson**, "Using crowd sourcing to locate and characterize conflicts for vulnerable modes," *Accident Analysis and Prevention*, Vol: 128, p 23-39, July 2019. [pdf]
DOI: 10.1016/j.aap.2019.03.014
Impact Factor: 3.655.
- [J18] Andrew Sogokon^o, Paul B. Jackson, **Taylor T. Johnson**, "Verifying Safety and Persistence in Hybrid Systems Using Flowpipes and Continuous Invariants," *Journal of Automated Reasoning (JAR), Springer*, Vol: 63, No: 4, p 1005-1029, December 2019. [pdf]
DOI: 10.1007/s10817-018-9497-x
Impact Factor: 1.445. Extension of [C19].
- [J17] Stanley Bak, Omar Beg[†], Sergiy Bogomolov, **Taylor T. Johnson**, Luan Viet Nguyen[†], Christian Schilling, "Hybrid automata: from verification to implementation," *International Journal on Software Tools for Technology Transfer (STTT), Springer*, Vol: 21 (1), p 87-104, February 2019. [pdf]
DOI: 10.1007/s10009-017-0458-1
Impact Factor: 1.079. Software tool: <http://swt.informatik.uni-freiburg.de/tool/spaceex/ha2slsf>
- [J16] Omar Beg[†], Luan Viet Nguyen[†], **Taylor T. Johnson**, Ali Davoudi, "Signal Temporal Logic-based Attack Detection in DC Microgrids," *IEEE Transactions on Smart Grid (TSG)*, Vol: 10, No: 4, p 3585-3595, July 2018. [pdf]
DOI: 10.1109/TSG.2018.2832544
Impact Factor: 8.267.
- [J15] Weiming Xiang^o, Hoang-Dung Tran[†], **Taylor T. Johnson**, "Nonconservative Lifted Convex Conditions for Stability of Discrete-Time Switched Systems under Minimum Dwell-Time Constraint," *IEEE Transactions on Automatic Control (TAC)*, Vol: 64, No: 8, p 3407-3414, August 2018. [pdf]
DOI: 10.1109/TAC.2018.2879585
Impact Factor: 5.625.
- [J14] Weiming Xiang^o, Hoang-Dung Tran[†], **Taylor T. Johnson**, "Robust exponential stability and disturbance attenuation for discrete-time switched systems under arbitrary switching," *IEEE Transactions on Automatic Control (TAC)*, Vol: 63, No: 5, p 1450-1456, May 2018. [pdf]

- DOI: 10.1109/TAC.2017.2748918
Impact Factor: 5.625.
- [J13] Weiming Xiang[°], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Output reachable set estimation and verification for multilayer neural networks,” *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*, Vol: 29, No: 11, p 5777-5783, March 2018. [pdf]
DOI: 10.1109/TNNLS.2018.2808470
Impact Factor: 8.793.
- [J12] Luan Viet Nguyen[†], Khaza Anuaral Hoque[°], **Taylor T. Johnson**, Stanley Bak, Steven Drager, “Cyber-Physical Specification Mismatches,” *ACM Transactions on Cyber-Physical Systems (TCPS)*, Vol: 2, No: 4, p 23:1-23:26, July 2018. [pdf]
DOI: 10.1145/3170500
Impact Factor: 2.6.
- [J11] Andrew Sogokon[°], Khalil Ghorbal, **Taylor T. Johnson**, “Operational Models for Piecewise-Smooth Systems,” *ACM Transactions on Embedded Computing Systems (TECS), Special Issue from EMSOFT’17*, Vol: 16, No: 5s, p 185:1-185:19, October 2017. [pdf]
DOI: 10.1145/3126506
Acceptance Rate: 25.6 percent (74 of 289)
Impact Factor: 2.609.
- [J10] Omar Beg[†], Houssam Abbas, **Taylor T. Johnson**, Ali Davoudi, “Model Validation of PWM DC-DC Converters,” *IEEE Transactions on Industrial Electronics (TIE)*, Vol: 64, No: 9, p 7049-7059, September 2017. [pdf]
DOI: 10.1109/TIE.2017.2688961
Impact Factor: 7.515.
- [J9] Weiming Xiang[°], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Output Reachable Set Estimation for Switched Linear Systems and Its Application in Safety Verification,” *IEEE Transactions on Automatic Control (TAC)*, Vol: 62, No: 10, p 5380-5387, October 2017. [pdf]
DOI: 10.1109/TAC.2017.2692100
Impact Factor: 5.625.
- [J8] Weiming Xiang[°], **Taylor T. Johnson**, “Event-triggered control for continuous-time switched linear systems,” *IET Control Theory and Applications (CTA)*, Vol: 11, No: 11, p 1694-1703, July 2017. [pdf]
DOI: 10.1049/iet-cta.2016.0672
Impact Factor: 3.526.
- [J7] Hoang-Dung Tran[†], Luan Viet Nguyen[†], Weiming Xiang[°], **Taylor T. Johnson**, “Order-reduction abstractions for safety verification of high-dimensional linear systems,” *Discrete Event Dynamic Systems (DEDS), Springer*, Vol: 27, No: 2, p 443-461, April 2017. [pdf]
DOI: 10.1007/s10626-017-0244-y
Impact Factor: 1.088.
- [J6] Omar Beg[†], **Taylor T. Johnson**, Ali Davoudi, “Detection of false-data injection attacks in cyber-physical DC microgrids,” *IEEE Transactions on Industrial Informatics (TII)*, Vol: 13, No: 5, p 2693-2703, October 2017. [pdf]
DOI: 10.1109/TII.2017.2656905
Impact Factor: 9.112.
- [J5] Sergiy Bogomolov, Alexandre Donzé, Goran Frehse, Radu Grosu, **Taylor T. Johnson**, Hamed Ladan, Andreas Podelski, Martin Wehrle, “Guided Search for Hybrid Systems Based on Coarse-Grained Space Abstractions,” *International Journal on Software Tools for Technology Transfer (STTT), Springer*, Vol: 18, No: 4, p 449-467, August 2016. [pdf]
DOI: 10.1007/s10009-015-0393-y
Impact Factor: 1.079. Software tool: <http://www2.informatik.uni-freiburg.de/~bogom/sttt2015/>
- [J4] **Taylor T. Johnson**, Stanley Bak, Marco Caccamo, Lui Sha, “Real-time reachability for verified simplex design,” *ACM Transactions on Embedded Computing Systems (TECS)*, Vol: 15, No: 2, p 26:1-26:27, February 2016. [pdf]
DOI: 10.1145/2723871
Impact Factor: 2.609. Extension of [C9]. Software Tool [S4]: <https://github.com/verivital/rtreach>
- [J3] **Taylor T. Johnson**, Sayan Mitra, “Safe and stabilizing distributed multi-path cellular flows,” *Theoretical Computer Science (TCS), Elsevier*, Vol: 579, p 9-32, May 2015. [pdf]
DOI: 10.1016/j.tcs.2015.01.023

Impact Factor: 0.895. Extension of [C1]. Software Tool: https://github.com/verivital/cell_flows

- [J2] Luan Viet Nguyen[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, "Virtual Prototyping for Distributed Control of a Fault-Tolerant Modular Multilevel Inverter for Photovoltaics," *IEEE Transactions on Energy Conversion (TEC)*, Vol: 29, No: 4, p 841-850, December 2014. [pdf]
DOI: 10.1109/TEC.2014.2362716
Impact Factor: 4.501.
- [J1] **Taylor T. Johnson**, Sayan Mitra, "Safe Flocking in Spite of Actuator Faults using Directional Failure Detectors," *Journal of Nonlinear Systems and Applications, Watam Press*, Vol: 2, No: 1-2, p 73-95, 2011. [pdf]. Extension of [C2]

REFEREED HIGHLY-SELECTIVE CONFERENCE PROCEEDINGS PAPERS

Acceptance based on peer review of full papers.

- [C32] Tianshu Bao[†], Xiaowei Jia, Jacob Zwart, Jeffrey Sadler, Alison Appling, Samantha Oliver, **Taylor T. Johnson**, "Partial Differential Equation Driven Dynamic Graph Networks for Predicting Stream Water Temperature," *21st IEEE International Conference on Data Mining (ICDM'21)*, December 2021. [pdf]
Acceptance Rate: 20.0 percent (198 of 990).
- [C31] Hoang-Dung Tran[†], Neelanjana Pal[†], Patrick Musau[†], Xiaodong Yang[†], Nathaniel Hamilton[†], Diego Manzananas Lopez[†], Stanley Bak, **Taylor T. Johnson**, "Robustness Verification of Semantic Segmentation Neural Networks Using Relaxed Reachability," *33rd International Conference on Computer-Aided Verification (CAV'21)*, Vol: 12759, p 263-283, July 2021. [pdf]
DOI: 10.1007/978-3-030-81685-8_12
Acceptance Rate: 27.2 percent (79 of 290)
Double-Blind Review (**DBR**)
Repeatability/Artifact Evaluation Passed (**RAE**). Reproducible artifact (functional, available, reusable badges): <https://zenodo.org/record/4726346>
- [C30] Xiaodong Yang[†], Tomoya Yamaguchi, Hoang-Dung Tran, Bardh Hoxha, **Taylor T. Johnson**, Danil Prokhorov, "Reachability Analysis of Deep ReLU Neural Networks using Facet-Vertex Incidence," *24th ACM International Conference on Hybrid Systems (HSCC'21)*, p 18:1-7, May 2021. [pdf]
DOI: 10.1145/3447928.3456650
Acceptance Rate: 35.0 percent (27 of 77)
Double-Blind Review (**DBR**).
- [C29] Hoang-Dung Tran[†], Stanley Bak, Weiming Xiang, **Taylor T. Johnson**, "Verification of Deep Convolutional Neural Networks Using ImageStars," *32nd International Conference on Computer-Aided Verification (CAV'20)*, Vol: 12224, p 18-42, July 2020. [pdf]
DOI: 10.1007/978-3-030-53288-8_2
Acceptance Rate: 27.3 percent (66 of 241)
Double-Blind Review (**DBR**). Reproducible CodeOcean capsule: <https://doi.org/10.24433/CO.3351375.v1>
- [C28] Stanley Bak, Hoang-Dung Tran[†], Kerianne Hobbs, **Taylor T. Johnson**, "Improved Geometric Path Enumeration for Verifying ReLU Neural Networks," *32nd International Conference on Computer-Aided Verification (CAV'20)*, Vol: 12224, p 66-96, July 2020. [pdf]
DOI: 10.1007/978-3-030-53288-8_4
Acceptance Rate: 27.3 percent (66 of 241)
Double-Blind Review (**DBR**)
Repeatability/Artifact Evaluation Passed (**RAE**).
- [C27] Hoang-Dung Tran[†], Xiaodong Yang[†], Diego Manzananas Lopez[†], Patrick Musau[†], Luan Viet Nguyen, Weiming Xiang, Stanley Bak, **Taylor T. Johnson**, "NNV: The Neural Network Verification Tool for Deep Neural Networks and Learning-Enabled Cyber-Physical Systems," *32nd International Conference on Computer-Aided Verification (CAV'20)*, Vol: 12224, p 3-17, July 2020. [pdf]
DOI: 10.1007/978-3-030-53288-8_1
Acceptance Rate: 27.3 percent (66 of 241)
Repeatability/Artifact Evaluation Passed (**RAE**). Reproducible CodeOcean capsule: <https://doi.org/10.24433/CO.0221760.v1>
- [C26] Shafiu Azam Chowdhury, Sohil Lal Shrestha, **Taylor T. Johnson**, Christoph Csallner, "SLEMI: Equivalence Modulo Input (EMI) Based Mutation of CPS Models for Finding Compiler Bugs in Simulink," *42nd International Conference on Software Engineering (ICSE'20)*, p 335-346, June 2020.

- [pdf]
 DOI: 10.1145/3377811.3380381
 Acceptance Rate: 20.9 percent (129 of 617)
 Double-Blind Review (**DBR**)
 Repeatability/Artifact Evaluation Passed (**RAE**).
- [C25] Hoang-Dung Tran[†], Patrick Musau[†], Diego Manzananas Lopez[†], Xiaodong Yang[†], Luan Viet Nguyen, Weiming Xiang[°], **Taylor T. Johnson**, “Star-Based Reachability Analysis of Deep Neural Networks,” *23rd International Symposium on Formal Methods (FM’19)*, Vol: 11800, p 670-686, September 2019. [pdf]
 DOI: 10.1007/978-3-030-30942-8_39
 Acceptance Rate: 34.1 percent (44 of 129).
- [C24] Hoang-Dung Tran[†], Luan Viet Nguyen, Nathaniel Hamilton[†], Weiming Xiang[°], **Taylor T. Johnson**, “Reachability Analysis for High-Index Linear Differential Algebraic Equations,” *17th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS’19)*, Vol: 11750, p 160-177, August 2019. [pdf]
 DOI: 10.1007/978-3-030-29662-9_10
 Acceptance Rate: 40.4 percent (17 of 42).
- [C23] Hoang-Dung Tran[†], Luan Viet Nguyen, Patrick Musau[†], Weiming Xiang[°], **Taylor T. Johnson**, “Decentralized Real-Time Safety Verification for Distributed Cyber-Physical Systems,” *39th International Conference on Formal Techniques for Distributed Objects (FORTE’19)*, Vol: 11535, p 261-277, June 2019. [pdf]
 DOI: 10.1007/978-3-030-21759-4_15
 Acceptance Rate: 42.8 percent (18 of 42).
- [C22] Stanley Bak, Hoang-Dung Tran[†], **Taylor T. Johnson**, “Numerical verification of affine systems with up to a billion dimensions,” *22nd ACM International Conference on Hybrid Systems (HSCC’19)*, p 23-32, April 2019. [pdf]
 DOI: 10.1145/3302504.3311792
 Acceptance Rate: 23.5 percent (21 of 89)
 Double-Blind Review (**DBR**)
 Repeatability/Artifact Evaluation Passed (**RAE**).
- [C21] Shafiu Chowdhury[†], Soumik Mohian, Sidharth Mehra, Siddhant Gawsane, **Taylor T. Johnson**, Christoph Csallner, “Automatically Finding Bugs in a Commercial Cyber-Physical System Development Tool Chain With SLforge,” *40th International Conference on Software Engineering (ICSE’18)*, p 981-992, May 2018. [pdf]
 DOI: 10.1145/3180155.3180231
 Acceptance Rate: 20.9 percent (105 of 502)
 Double-Blind Review (**DBR**)
 Repeatability/Artifact Evaluation Passed (**RAE**). Related software tools SLForge and CyFuzz [S6]
- [C20] Luan Viet Nguyen[†], James Kapinski, Xiaoqing Jin, Jyotirmoy Deshmukh, **Taylor T. Johnson**, “Hyperproperties of real-valued signals,” *15th ACM-IEEE International Conference on Formal Methods (MEMOCODE’17)*, p 104-113, September 2017. [pdf]
 DOI: 10.1145/3127041.3127058
 Acceptance Rate: 31.2 percent (15 of 48).
- [C19] Andrew Sogokon[°], Paul Jackson, **Taylor T. Johnson**, “Verifying safety and persistence properties of hybrid systems using flowpipes and continuous invariants,” *9th NASA Formal Methods Symposium (NFM’17)*, Vol: 10227, p 194-211, May 2017. [pdf]
 DOI: 10.1007/978-3-319-57288-8_14
 Acceptance Rate: 38.3 percent (23 of 60).
- [C18] Luan Viet Nguyen[†], James Kapinski, Xiaoqing Jin, Jyotirmoy Deshmukh, Ken Butts, **Taylor T. Johnson**, “Abnormal data classification using time-frequency temporal logic,” *20th International Conference on Hybrid Systems: Computation and Control (HSCC’17)*, p 237-242, April 2017. [pdf]
 DOI: 10.1145/3049797.3049809
 Acceptance Rate: 38.1 percent (29 of 76)
 Double-Blind Review (**DBR**)
 Repeatability/Artifact Evaluation Passed (**RAE**).
- [C17] Umair Siddique, Khaza Anuaral Hoque[°], **Taylor T. Johnson**, “Formal Specification and Dependability Analysis of Optical Communication Networks,” *Design, Automation, and Test in Europe (DATE’17)*, p 1564-1569, March 2017. [pdf]

- DOI: 10.23919/DATE.2017.7927239
 Acceptance Rate: 24.3 percent (193 of 794).
- [C16] Andrew Sogokon^o, Khalil Ghorbal, **Taylor T. Johnson**, “Decoupling Abstractions of Non-linear Ordinary Differential Equations,” *International Symposium on Formal Methods (FM’16)*, Vol: 9995, p 628-644, November 2016. [pdf]
 DOI: 10.1007/978-3-319-48989-6_38
 Acceptance Rate: 28.4 percent (43 of 151).
- [C15] Muhammad Usama Sardar, Nida Afaq, Khaza Anuaral Hoque^o, **Taylor T. Johnson**, Osman Hasan, “Probabilistic formal verification of the SATS concept of operation,” *8th NASA Formal Methods Symposium (NFM’16)*, Vol: 9690, p 191-205, June 2016. [pdf]
 DOI: 10.1007/978-3-319-40648-0_15
 Acceptance Rate: 37.2 percent (19 of 51).
- [C14] Stanley Bak, Sergiy Bogomolov, Thomas A. Henzinger, **Taylor T. Johnson**, Pradyot Prakash, “Scalable Static Hybridization Methods for Analysis of Nonlinear Systems,” *19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC’16)*, p 155-164, April 2016. [pdf]
 DOI: 10.1145/2883817.2883837
 Acceptance Rate: 43.0 percent (28 of 65)
 Repeatability/Artifact Evaluation Passed (**RAE**). **Best Software Repeatability Evaluation Award**
- [C13] Stanley Bak, **Taylor T. Johnson**, “Periodically-Scheduled Controller Analysis using Hybrid Systems Reachability and Continuization,” *36th IEEE Real-Time Systems Symposium (RTSS’15)*, p 195-205, December 2015. [pdf]
 DOI: 10.1109/RTSS.2015.26
 Acceptance Rate: 22.5 percent (34 of 151).
- [C12] Luan Viet Nguyen[†], Christian Schilling, Sergiy Bogomolov, **Taylor T. Johnson**, “Runtime Verification for Hybrid Analysis Tools,” *15th International Conference on Runtime Verification (RV’15)*, Vol: 9333, p 281-286, November 2015. [pdf]
 DOI: 10.1007/978-3-319-23820-3_19
 Acceptance Rate: 46.6 percent (21 of 45).
- [C11] **Taylor T. Johnson**, Stanley Bak, Steven Drager, “Cyber-Physical Specification Mismatch Identification with Dynamic Analysis,” *ACM/IEEE 6th International Conference on Cyber-Physical Systems (ICCPs’15)*, p 208-217, April 2015. [pdf]
 DOI: 10.1145/2735960.2735979
 Acceptance Rate: 27.4 percent (25 of 91). Software Tool [S3]: <http://verivital.com/hynger/>
- [C10] Stanley Bak, Sergiy Bogomolov, **Taylor T. Johnson**, “HyST: A Source Transformation and Translation Tool for Hybrid Automaton Models,” *18th International Conference on Hybrid Systems: Computation and Control (HSCC’15)*, p 128-133, April 2015. [pdf]
 DOI: 10.1145/2728606.2728630
 Acceptance Rate: 39.4 percent (30 of 76)
 Repeatability/Artifact Evaluation Passed (**RAE**). Software Tool [S5]: <http://verivital.com/hyst/>
- [C9] Stanley Bak, **Taylor T. Johnson**, Marco Caccamo, Lui Sha, “Real-Time Reachability for Verified Simplex Design,” *35th IEEE Real-Time Systems Symposium (RTSS’14)*, p 138-148, December 2014. [pdf]
 DOI: 10.1109/RTSS.2014.21
 Acceptance Rate: 21.4 percent (33 of 154). Software Tool [S4]: <https://github.com/verivital/rtreach>
- [C8] **Taylor T. Johnson**, Sayan Mitra, “Anonymized Reachability of Hybrid Automata Networks,” *12th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS’14)*, Vol: 8711, p 130-145, September 2014. [pdf]
 DOI: 10.1007/978-3-319-10512-3_10
 Acceptance Rate: 47.2 percent (17 of 36).
- [C7] Sergiy Bogomolov, Alexandre Donzé, Goran Frehse, Radu Grosu, **Taylor T. Johnson**, Hamed Ladan, Andreas Podelski, Martin Wehrle, “Abstraction-based guided search for hybrid systems,” *20th International SPIN Symposium on Model Checking of Software (SPIN’13)*, p 117-134, 2013. [pdf]
 Acceptance Rate: 50.0 percent (20 of 40).
- [C6] Parasara Sridhar Duggirala, **Taylor T. Johnson**, Adam Zimmerman, Sayan Mitra, “Static and dynamic analysis of timed distributed traces,” *33rd IEEE Real-Time Systems Symposium (RTSS’12)*, p 173-182, December 2012. [pdf]

DOI: 10.1109/RTSS.2012.69

Acceptance Rate: 22.2 percent (35 of 157).

- [C5] **Taylor T. Johnson**, Jeremy Green, Sayan Mitra, Rachel Dudley, R. Scott Erwin, "Satellite rendezvous and conjunction avoidance: Case studies in verification of nonlinear hybrid systems," *International Symposium on Formal Methods (FM'12)*, Vol: 7436, p 252-266, August 2012. [pdf]

DOI: 10.1007/978-3-642-32759-9_22

Acceptance Rate: 21.2 percent (28 of 132).

- [C4] **Taylor T. Johnson**, Sayan Mitra, "A small model theorem for rectangular hybrid automata networks," *IFIP International Conference on Formal Techniques for Distributed Systems: Joint International Conference of 14th Formal Methods for Open Object-Based Distributed Systems and 32nd Formal Techniques for Networked and Distributed Systems (FORTE/FMOODS'12)*, Vol: 7273, p 18-34, June 2012. [pdf]

DOI: 10.1007/978-3-642-30793-5_2

Acceptance Rate: 38.0 percent (16 of 42). **Best Paper Award**. Top 1 of 155 Submissions Across Three Conferences

- [C3] **Taylor T. Johnson**, Sayan Mitra, "Parameterized verification of distributed cyber-physical systems: An aircraft landing protocol case study," *3rd ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS'12)*, p 161-170, April 2012. [pdf]

DOI: 10.1109/ICCPS.2012.24

Acceptance Rate: 34.1 percent (14 of 41).

- [C2] **Taylor T. Johnson**, Sayan Mitra, "Safe flocking in spite of actuator faults," *Stabilization, Safety, and Security of Distributed Systems (SSS'10)*, Vol: 6366, p 588-602, September 2010. [pdf]

DOI: 10.1007/978-3-642-16023-3_45

Acceptance Rate: 43.3 percent (39 of 90).

- [C1] **Taylor T. Johnson**, Sayan Mitra, Karthik Manamcheri, "Safe and stabilizing distributed cellular flows," *30th IEEE International Distributed Computing Systems (ICDCS'10)*, p 577-586, June 2010. [pdf]

DOI: 10.1109/ICDCS.2010.49

Acceptance Rate: 14.3 percent (84 of 585).

BOOK CHAPTERS

Acceptance based on peer review of full papers.

- [BC1] Weiming Xiang^o, Diego Manzananas Lopez[†], Patrick Musau[†], **Taylor T. Johnson**, "Reachable Set Estimation and Verification for Neural Network Models of Nonlinear Dynamic Systems," *Safe, Autonomous and Intelligent Vehicles, Series on Unmanned Systems Technologies, Springer*, p 123-144, 2019. [pdf]
DOI: 10.1007/978-3-319-97301-2_7. Editors: Huafeng Yu, Xin Li, Richard Murray, Claire J. Tomlin, Ramesh S

OTHER FULLY REFEREED CONFERENCE PROCEEDINGS PAPERS

Acceptance based on peer review of full papers.

- [OC14] Preston Robinette[†], Benjamin Heiner, Umberto Ravaioli, Nathaniel Hamilton[†], **Taylor T. Johnson**, Kerianne Hobbs, "Reinforcement Learning Heuristics for Aerospace Control Systems," *IEEE Aerospace Conference*, March 2022. [pdf].
- [OC13] Patrick Musau[†], Nathaniel Hamilton[†], Diego Manzananas Lopez[†], **Taylor T. Johnson**, "Zero-Shot Policy Transfer in Autonomous Racing: Reinforcement Learning versus Imitation Learning," *IEEE International Conference on Assured Autonomy (ICAA'22)*, March 2022. [pdf].
- [OC12] Patrick Musau[†], Nathaniel Hamilton[†], Diego Manzananas Lopez[†], Preston Robinette[†], **Taylor T. Johnson**, "On Using Real-Time Reachability for the Safety Assurance of Machine Learning Controllers," *IEEE International Conference on Assured Autonomy (ICAA'22)*, March 2022. [pdf].
- [OC11] Joel A. Rosenfeld, Rushikesh Kamalapurkar, L. Forest Gruss, **Taylor T. Johnson**, "On Occupation Kernels, Liouville Operators, and Dynamic Mode Decomposition," *2021 American Control Conference (ACC)*, May 2021. [pdf]
DOI: 10.23919/ACC50511.2021.9483121.
- [OC10] Omar Ali Beg, Ajay P. Yadav, **Taylor T. Johnson**, Ali Davoudi, "Formal Online Resiliency Monitoring in Microgrids," *IEEE 2020 Resilience Week (RWS)*, p 99-105, October 2020. [pdf]
DOI: 10.1109/RWS50334.2020.9241272.
- [OC9] Joel Rosenfeld^o, Rushi Kamalapurkar, Ben Russo, **Taylor T. Johnson**, "Occupation Kernels and Densely Defined Liouville Operators for System Identification," *IEEE 58th Conference on Decision and*

- Control (CDC'19)*, p 6455-6460, December 2019. [pdf]
DOI: 10.1109/CDC40024.2019.9029337
Acceptance Rate: 59.5 percent (1155 of 1938).
- [OC8] Weiming Xiang^o, Hoang-Dung Tran[†], Joel Rosenfeld^o, **Taylor T. Johnson**, "Reachable Set Estimation and Safety Verification for Piecewise Linear Systems with Neural Network Controllers," *American Control Conference (ACC'18)*, p 1574-1579, June 2018. [pdf]
DOI: 10.23919/ACC.2018.8431048
Acceptance Rate: 66.9 percent (1087 of 1623).
- [OC7] Luan Viet Nguyen[†], Bardh Hoxha, **Taylor T. Johnson**, Georgios Fainekos, "Mission Planning for Multiple Vehicles with Temporal Specifications using UxAS," *6th IFAC Analysis and Design of Hybrid Systems (ADHS'18)*, Vol: 51, No: 16, p 67-72, July 2018. [pdf]
DOI: 10.1016/j.ifacol.2018.08.012
Acceptance Rate: 69.4 percent (50 of 72).
- [OC6] Hoang-Dung Tran[†], Stanley Bak, **Taylor T. Johnson**, "Reachability Analysis for One Dimensional Linear Parabolic Equations," *6th IFAC Analysis and Design of Hybrid Systems (ADHS'18)*, Vol: 51, No: 16, p 133-138, July 2018. [pdf]
DOI: 10.1016/j.ifacol.2018.08.023
Acceptance Rate: 69.4 percent (50 of 72).
- [OC5] Omar Beg[†], Luan Viet Nguyen[†], Ali Davoudi, **Taylor T. Johnson**, "Computer-Aided Formal Verification of Power Electronics Circuits," *VDE Frontiers in Analog Computer Aided Design (FAC'17)*, p 21-26, July 2017. [pdf].
- [OC4] Weiming Xiang^o, **Taylor T. Johnson**, Hoang-Dung Tran[†], "On reachable set estimation for discrete-time switched linear systems under arbitrary switching," *American Control Conference (ACC'17)*, p 4534-4539, May 2017. [pdf]
DOI: 10.23919/ACC.2017.7963654
Acceptance Rate: 64.2 percent (944 of 1469).
- [OC3] Weiming Xiang^o, Hoang-Dung Tran[†], **Taylor T. Johnson**, "Reachable set estimation and control for switched linear systems with dwell-time restriction," *55th IEEE Conference on Decision and Control (CDC'16)*, p 7246-7251, December 2016. [pdf]
DOI: 10.1109/CDC.2016.7799387
Acceptance Rate: 59.5 percent (1242 of 2086).
- [OC2] Parasara Sridhar Duggirala, Chuchu Fan, Matthew Potok, Bolun Qi, Sayan Mitra, Mahesh Viswanathan, Stanley Bak, Sergiy Bogomolov, **Taylor T. Johnson**, Luan Viet Nguyen[†], Christian Schilling, Andrew Sogokon^o, Hoang-Dung Tran[†], Weiming Xiang^o, "Tutorial: software tools for hybrid systems verification, transformation, and synthesis: C2E2, HyST, and TuLiP," *IEEE Conference on Control Applications (CCA'16)*, p 1024-1029, September 2016. [pdf]
DOI: 10.1109/CCA.2016.7587948.
- [OC1] **Taylor T. Johnson**, Sayan Mitra, Cédric Langbort, "Stability of Digitally Interconnected Linear Systems," *50th IEEE Conference on Decision and Control (CDC'11)*, p 2687-2692, December 2011. [pdf]
DOI: 10.1109/CDC.2011.6161264.

LIGHTLY REFEREED CONFERENCE PROCEEDINGS PAPERS

Acceptance based on peer review of abstracts or short papers.

- [LC9] Krishna Muvva, Justin M. Bradley, Marilyn Wolf, **Taylor T. Johnson**, "Assuring Learning-Enabled Components in Small Unmanned Aircraft Systems," *AIAA Scitech 2021 Forum*, January 2021. [pdf]
DOI: 10.2514/6.2021-0994.
- [LC8] Diego Manzananas Lopez[†], **Taylor T. Johnson**, Hoang-Dung Tran, Stanley Bak, Xin Chen, Kerianne L. Hobbs, "Verification of Neural Network Compression of ACAS Xu Lookup Tables with Star Set Reachability," *AIAA Scitech 2021 Forum*, January 2021. [pdf]
DOI: 10.2514/6.2021-0995.
- [LC7] Nathaniel Hamilton[†], Lena Schlemmer, Christopher Menart, Chad Waddington, Todd Jenkins, **Taylor T. Johnson**, "Sonic to knuckles: evaluations on transfer reinforcement learning," *SPIE Defense + Commercial Sensing - Unmanned Systems Technology XXII*, Vol: 11425, April 2020. [pdf]
DOI: 10.1117/12.2559546.
- [LC6] **Taylor T. Johnson**, Raghunath Gannamaraju, and Sebastian Fischmeister, "A survey of electrical and electronic (e/e) notifications for motor vehicles," *24th International Technical Conference on the Enhanced Safety of Vehicles (ESV'15)*, p 1-15, 2015. [pdf].

- [LC5] Leonardo Bobadilla, **Taylor T. Johnson**, Amy LaViers, Umer Huzaifa, “Verified Planar Formation Control Algorithms by Composition of Primitives,” *AIAA Science and Technology Forum and Exposition (SciTech’15)*, January 2015. [pdf]
DOI: 10.2514/6.2015-1541.
- [LC4] **Taylor T. Johnson**, Sayan Mitra, “Invariant Synthesis for Verification of Parameterized Cyber-Physical Systems with Applications to Aerospace Systems,” *AIAA Infotech at Aerospace*, p 1-16, August 2013. [pdf]
DOI: 10.2514/6.2013-4811.
- [LC3] Shamina Shahrin Hossain*, Sairaj Dhople, **Taylor T. Johnson**, “Reachability Analysis of Closed Loop Switching Power Converters,” *IEEE Power and Energy Conference at Illinois (PECI’13)*, p 130-134, February 2013. [pdf]
DOI: 10.1109/PECI.2013.6506047.
- [LC2] **Taylor T. Johnson**, Zhihao Hong*, Akash Kapoor*, “Design Verification Methods for Switching Power Converters,” *IEEE Power and Energy Conference at Illinois (PECI’12)*, p 1-6, February 2012. [pdf]
DOI: 10.1109/PECI.2012.6184587.
- [LC1] **Taylor T. Johnson**, Albert E. Hoefel, “Turbo-alternator stalling protection using available-power estimate,” *IEEE Power and Energy Conference at Illinois (PECI’11)*, p 1-6, February 2011. [pdf]
DOI: 10.1109/PECI.2011.5740501. **Best Paper Award**

REFEREED WORKSHOP PROCEEDINGS PAPERS

Acceptance based on peer review of full papers.

- [W27] Diego Manzananas Lopez[†], Patrick Musau[†], Nathaniel Hamilton[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Case Study: Safety Verification of an Unmanned Underwater Vehicle,” *IEEE Workshop on Assured Autonomous Systems (WAAS’20)*, Co-located with the 41st IEEE Symposium on Security and Privacy (Oakland), 2020. [pdf].
- [W26] Charles Hartsell, Nagabhushan Mahadevan, Shreyas Ramakrishna, Abhishek Dubey, Theodore Bapty, **Taylor T. Johnson**, Xenofon Koutsoukos, Janos Sztipanovits, and Gabor Karsai, “CPS Design with Learning-Enabled Components: A Case Study,” *30th International Workshop on Rapid System Prototyping (RSP’19)*, p 57-63, October 2019. [pdf]
DOI: 10.1145/3339985.3358491.
- [W25] Hoang-Dung Tran[†], Luan V. Nguyen, Patrick Musau[†], Weiming Xiang[°], **Taylor T. Johnson**, “Decentralized real-time safety verification for distributed cyber-physical systems,” *3rd International Workshop on Methods and Tools for Distributed Hybrid Systems (DHS’19)*, 2019. [pdf].
- [W24] Hoang-Dung Tran[†], Feiyang Cai, Diego Manzananas Lopez[†], Patrick Musau[†], **Taylor T. Johnson**, Xenofon Koutsoukos, “Safety Verification in Reinforcement Learning Control,” *2nd Workshop on Formal Methods for ML-Enabled Autonomous Systems (FoMLAS’19)*, 2019. [pdf].
- [W23] Hoang-Dung Tran[†], Patrick Musau[†], Diego Manzananas Lopez[†], Xiaodong Yang[†], Luan Viet Nguyen, Weiming Xiang, **Taylor T. Johnson**, “Parallelizable reachability analysis algorithms for feed-forward neural networks,” *7th IEEE/ACM International Conference on Formal Methods in Software Engineering (FormalISE’19)*, p 31-40, May 2019. [pdf]
DOI: 10.1109/FormalISE.2019.00012
Acceptance Rate: 32.5 percent (13 of 40).
- [W22] Diego Manzananas Lopez[†], Patrick Musau[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Verification of closed-loop systems with neural network controllers,” *EPIc Series in Computing 61, 6th Applied Verification for Continuous and Hybrid Systems (ARCH’19)*, Vol: 61, p 201-210, May 2019. [pdf]
DOI: 10.29007/btv1.
- [W21] Tamas Kecskes, Patrik Meijer, **Taylor T. Johnson**, Marcus Lucas, “Demo: A Design Studio for Verification Tools,” *1st Workshop on Design Automation for CPS and IoT (DESTION’19)*, p 60-61, April 2019. [pdf]
DOI: 10.1145/3313151.3314057.
- [W20] Charles Hartsell, Nagabhushan Mahadevan, Shreyas Ramakrishna, Abhishek Dubey, Theodore Bapty, **Taylor T. Johnson**, Xenofon Koutsoukos, Janos Sztipanovits, Gabor Karsai, “Model-based design for CPS with learning-enabled components,” *1st Workshop on Design Automation for CPS and IoT (DESTION’19)*, p 1-9, April 2019. [pdf]
DOI: 10.1145/3313151.3313166.
- [W19] Weiming Xiang[°], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Specification-Guided Safety Verification for Feedforward Neural Networks,” *2nd Verification of Neural Networks (VNN’19)*, AAAI 2019 Spring Symposium, 2019. [pdf].

- [W18] Weiming Xiang^o, Xiaodong Yang[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Reachability Analysis and Safety Verification for Neural Network Control Systems,” *2nd Verification of Neural Networks (VNN’19)*, AAAI 2019 Spring Symposium, 2019. [pdf].
- [W17] Patrick Musau[†], Diego Manzananas Lopez[†], Hoang-Dung Tran[†], **Taylor T. Johnson**, “Differential Algebraic Equations (DAEs) with Varying Index (Benchmark Proposal),” *5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’18)*, Vol: 54, p 174-184, September 2018. [pdf]
DOI: 10.29007/4gj7.
- [W16] Patrick Musau[†], **Taylor T. Johnson**, “Continuous-Time Recurrent Neural Networks (CTRNNs) (Benchmark Proposal),” *5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’18)*, Vol: 54, p 196-207, September 2018. [pdf]
DOI: 10.29007/6czp.
- [W15] Hoang-Dung Tran[†], Tianshu Bao[†], **Taylor T. Johnson**, “Discrete-Space Analysis of Partial Differential Equations (PDEs) (Benchmark Proposal),” *5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’18)*, Vol: 54, p 185-195, September 2018. [pdf]
DOI: 10.29007/fvpp.
- [W14] Shafiul Chowdhury[†], Lina Sera Varghese, Soumik Mohian, **Taylor T. Johnson**, Christoph Csallner, “A Curated Corpus of Simulink Models for Model-based Empirical Studies,” *4th International Workshop on Software Engineering for Smart Cyber-Physical Systems (SEsCPS ’18)*, p 45-48, May 2018. [pdf]
DOI: 10.1145/3196478.3196484.
- [W13] **Taylor T. Johnson**, “Reusable and Understandable Formal Verification for Cyber-Physical Systems,” *1st International Workshop on Formal Approaches to Explainable VERification (FEVER’17)*, 2017. [pdf].
- [W12] Hoang-Dung Tran[†], Luan Viet Nguyen[†], Weiming Xiang^o, **Taylor T. Johnson**, “Distributed Autonomous Systems (Benchmark Proposal),” *4th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’17)*, Vol: 48, p 33-43, June 2017. [pdf]
DOI: 10.29007/slz2.
- [W11] Omar Beg[†], Ali Davoudi, **Taylor T. Johnson**, “Reachability Analysis of Transformer-Isolated DC-DC Converters (Benchmark Proposal),” *4th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’17)*, Vol: 48, p 52-64, June 2017. [pdf]
DOI: 10.29007/8xk7.
- [W10] Shafiul Chowdhury[†], **Taylor T. Johnson**, Christoph Csallner, “CyFuzz: A Differential Testing Framework for Cyber-Physical Systems Development Environments,” *6th Workshop on Design, Modeling and Evaluation of Cyber Physical Systems (CyPhy’16)*, Vol: 10107, p 46-60, October 2016. [pdf]
DOI: 10.1007/978-3-319-51738-4_4
Acceptance Rate: 60.0 percent (9 of 15).
- [W9] Hoang-Dung Tran[†], Luan Viet Nguyen[†], **Taylor T. Johnson**, “Large-Scale Linear Systems from Order-Reduction (Benchmark Proposal),” *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’16)*, Vol: 43, p 60-67, 2016. [pdf]
DOI: 10.29007/xk7x.
- [W8] Andrew Sogokon^o, Khalil Ghorbal, **Taylor T. Johnson**, “Non-linear Continuous Systems for Safety Verification (Benchmark Proposal),” *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’16)*, Vol: 43, p 42-51, 2016. [pdf]
DOI: 10.29007/w94n.
- [W7] Omar Beg[†], Ali Davoudi, **Taylor T. Johnson**, “Charge Pump Phase-Locked Loops and Full Wave Rectifiers for Reachability Analysis (Benchmark Proposal),” *3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’16)*, Vol: 43, p 27-35, 2016. [pdf]
DOI: 10.29007/x211.
- [W6] Luan Viet Nguyen[†], Djordje Maksimovic, **Taylor T. Johnson**, Andreas Veneris, “Quantified Bounded Model Checking for Rectangular Hybrid Automata,” *9th International Workshop on Constraints in Formal Verification (CFV’15)*, 2015. [pdf].
- [W5] Stanley Bak, Sergiy Bogomolov, **Taylor T. Johnson**, “HyST: A Source Transformation and Translation Tool for Hybrid Automaton Models,” *1st International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR’15)*, 2015. [pdf].
- [W4] Hoang-Dung Tran[†], Luan Viet Nguyen[†], **Taylor T. Johnson**, “Benchmark: A Nonlinear Reachability Analysis Test Set from Numerical Analysis,” *2nd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’15)*, Vol: 34, p 89-97, 2015. [pdf]
DOI: 10.29007/6dcf.

- [W3] Stanley Bak, Sergiy Bogomolov, Marius Greitschus, **Taylor T. Johnson**, “Benchmark: Stratified Controllers of Tank Networks,” *2nd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’15)*, Vol: 34, p 73-79, 2015. [pdf]
DOI: 10.29007/2ljt.
- [W2] Luan Viet Nguyen[†], Eric Nelson^{*}, Amol Vengurlekar[†], Ruoshi Zhang[†], Kristopher I. White, Victor Salinas, **Taylor T. Johnson**, “Model-based design and analysis of a reconfigurable continuous-culture bioreactor,” *4th ACM SIGBED International Workshop on Design, Modeling (CyPhy’14)*, p 48-51, April 2014. [pdf]
DOI: 10.1145/2593458.2593469
Acceptance Rate: 50.0 percent (14 of 28).
- [W1] Luan Viet Nguyen[†], **Taylor T. Johnson**, “Benchmark: DC-to-DC Switched-Mode Power Converters (Buck Converters, Boost Converters, and Buck-Boost Converters).,” *1st International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’14)*, p 19-24, 2014. [pdf]
DOI: 10.29007/23pm.

OTHER WORKSHOP PROCEEDINGS PAPERS

Other workshop proceedings papers, not fully refereed, such as competition reports.

- [OW8] **Taylor T. Johnson**, Diego Manzananas Lopez[†], Luis Benet, Marcelo Forets, Sebastián Guadalupe, Christian Schilling, Radoslav Ivanov, Taylor J. Carpenter, James Weimer, Insup Lee, “ARCH-COMP21 Category Report: Artificial Intelligence and Neural Network Control Systems (AINNCS) for Continuous and Hybrid Systems Plants,” *EPiC Series in Computing 80, 8th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH21)*, Vol: 80, p 90-119, December 2021. [pdf]
DOI: 10.29007/kfk9.
- [OW7] **Taylor T. Johnson**, “ARCH-COMP21 Repeatability Evaluation Report,” *EPiC Series in Computing 80, 8th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH21)*, Vol: 80, p 153-160, December 2021. [pdf]
DOI: 10.29007/zqdx.
- [OW6] **Taylor T. Johnson**, Diego Manzananas Lopez[†], Patrick Musau[†], Hoang-Dung Tran[†], Elena Botoeva, Francesco Leofante, Amir Maleki, Chelsea Sidrane, Jiameng Fan and Chao Huang, “ARCH-COMP20 Category Report: Artificial Intelligence and Neural Network Control Systems (AINNCS) for Continuous and Hybrid Systems Plants,” *EPiC Series in Computing 74, 7th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH’20)*, Vol: 74, p 107-139, September 2020. [pdf]
DOI: 10.29007/9xgv.
- [OW5] **Taylor T. Johnson**, “ARCH-COMP20 Repeatability Evaluation Report,” *EPiC Series in Computing 74, 7th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH’20)*, Vol: 74, p 175-183, September 2020. [pdf]
DOI: 10.29007/8dp4.
- [OW4] Diego Manzananas Lopez[†], Patrick Musau[†], Hoang-Dung Tran[†], Souradeep Dutta, Taylor J. Carpenter, Radoslav Ivanov, **Taylor T. Johnson**, “ARCH-COMP19 Category Report: Artificial Intelligence/Neural Network Control Systems (AINNCS) for Continuous and Hybrid Systems Plants,” *EPiC Series in Computing 61, 6th Applied Verification for Continuous and Hybrid Systems (ARCH’19)*, Vol: 61, p 103-119, May 2019. [pdf]
DOI: 10.29007/rgv8.
- [OW3] **Taylor T. Johnson**, “ARCH-COMP19 Repeatability Evaluation Report,” *EPiC Series in Computing 61, 6th Applied Verification for Continuous and Hybrid Systems (ARCH’19)*, Vol: 61, p 162-169, May 2019. [pdf]
DOI: 10.29007/wbl3.
- [OW2] **Taylor T. Johnson**, “ARCH-COMP18 Repeatability Evaluation Report,” *5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’18)*, Vol: 54, p 128-134, September 2018. [pdf]
DOI: 10.29007/n9t3.
- [OW1] **Taylor T. Johnson**, “ARCH-COMP17 Repeatability Evaluation Report,” *4th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH’17)*, Vol: 48, p 175-180, June 2017. [pdf]
DOI: 10.29007/7hvk.

POSITION/EDITORIAL/OPINION PAPERS

Acceptance based on peer review of abstracts or short papers.

- [E1] **Taylor T. Johnson**, Sayan Mitra, "Handling Failures in Cyber-Physical Systems: Potential Directions," *Real-Time Systems Symposium (RTSS'09)*, 2009. [pdf]. **Award for Most Interesting Cyber-Physical Systems Research Problem**

PATENTS AND PATENT APPLICATIONS

- [P2] "Systems and Methods for Providing Speech-to-Text Recognition and Autosummarization," **Taylor T. Johnson**. VU 17131, MCC Docket Number 10644-043PV1, Patent Application, February 1, 2018.
- [P1] "Control of a Component of a Downhole Tool", Albert Hoefel, Francois Bernard, Kent D. Harms, Sylvain Ramshaw, Shayan Darayan, and **Taylor T. Johnson**. Patent No. US 9222352, Patent Issued December 29, 2015. Based in part on paper [LC1]. [pdf]

PRESENTATIONS

KEYNOTE/PLENARY PRESENTATIONS

- [KT4] Invited plenary presentation, "Repeatability, CPS-VO Design Studios, ARCH Benchmarks, and ARCH-COMP Repository," at the 7th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2020), at IFAC World Congress, Berlin, Germany, July 12, 2020.
- [KT3] Invited keynote presentation, "Verification for Autonomous Cyber-Physical Systems with Machine Learning Components," at the 6th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH 2019), at Cyber-Physical Systems and Internet of Things (CPS-IoT) Week 2019, Montreal, Canada, April 15, 2019.
- [KT2] Plenary presentation, "Verification of Neural Networks," at the AAAI Spring Symposium, Stanford University, Stanford, CA, March 26, 2019.
- [KT1] Keynote presentation, based on paper [C9], "Real-Time Reachability for Verified Simplex Design," at the *8th International Workshop on Numerical Software Verification 2015 (NSV 2015)* at Cyber-Physical Systems Week (CPS Week 2015), Seattle, WA, April 13, 2015.

INVITED PRESENTATIONS

- [IT44] Presented (virtually) "Semantic Segmentation Neural Network Verification," Stony Brook University, CSE-643: Cyber-Physical Systems & Verification Seminar, September 23, 2021.
- [IT43] Presented (virtually) "Verification and assurance tools for Cyber-physical Systems with Learning-Enabled Components," IEEE Real Time Systems Symposium (RTSS), Application of DARPA Assured Autonomy Program Technologies to Autonomous Learning-Enabled Real-Time Systems Hot Topics Day Workshop, December 1, 2020.
- [IT42] Presented (virtually) "Verifying Deep Neural Networks in Autonomous Cyber-Physical Systems," University of Southern California, Center for Cyber-Physical Systems and the Internet of Things (CCI) and Ming Hsieh Institute for Electrical Engineering (MHI) Seminar, November 18, 2020.
- [IT41] Presented "Verifying Deep Neural Networks in Autonomous Cyber-Physical Systems," University of Memphis, Computer Science Colloquium, March 16, 2020.
- [IT40] Presented "Challenges for Perception Verification in Autonomy," at the CPS Verification & Validation: Industrial Challenges & Foundations: Safe Learning and Optimization, Carnegie Mellon University, Pittsburgh, PA, December 11, 2019.
- [IT39] Presented "Verifying Deep Neural Networks in Autonomous Cyber-Physical Systems," Georgetown University, Computer Science Colloquium, November 14, 2019.
- [IT38] Presented "Formal Verification: An Introduction," DARPA seL4 Summit, September 23, 2019.
- [IT37] Presented "Verifying Neural Networks in Autonomous Cyber-Physical Systems," Stony Brook University, Computer Science Seminar, July 12, 2019.
- [IT36] Presented "Verifying Neural Networks in Autonomous Cyber-Physical Systems," Waterloo University, Electrical and Computer Engineering Seminar, June 3, 2019.
- [IT35] Presented "Verifying Neural Networks in Autonomous Cyber-Physical Systems," McGill University, Computer Science Seminar, May 28, 2019.
- [IT34] Presented "Safety Assurance in Autonomous Cyber-Physical Systems," University of Nebraska Lincoln, Computer Science and Engineering Colloquium, April 2, 2019.
- [IT33] Presented "Safety and Security Assurance in Autonomous Cyber-Physical Systems," University of Illinois at Urbana-Champaign, Information Trust Institute (ITI) Seminar, March 11, 2019.

- [IT32] Presented “Safety Assurance in Cyber-Physical Systems built with Learning-Enabled Components,” at the CPS Verification & Validation: Industrial Challenges & Foundations: Safe Implementation of CPS, Carnegie Mellon University, Pittsburgh, PA, December 12, 2018.
- [IT31] Presented “Safety and Security Assurance in Autonomous Cyber-Physical Systems with Hyperproperties & Hybrid Automata,” SimCenter Center of Excellence in Applied Computational Science and Engineering, University of Tennessee at Chattanooga, SimCenter Research Seminar, October 19, 2018.
- [IT30] Presented three invited lectures on “Design-Time and Runtime Verification for Safe Autonomous Cyber-Physical Systems,” at the Summer School on Cyber-Physical Systems, Halmstad University, Halmstad, Sweden, June 11-15, 2018.
- [IT29] Presented “SEC Faculty Travel Program Award Presentation: Formal Specification, Verification, & Falsification for Autonomous Cyber-Physical Systems with Hyperproperties & Hybrid Automata,” at the Computer Science and Engineering Graduate Seminar (CSCE 681), Texas A&M University, College Station, TX, March 5, 2018.
- [IT28] Presented “Software Defects in Medical Devices,” in conjunction with Prof. Pampee Young’s presentation “Software Error in Blood Bank Systems,” Vanderbilt University Medical Center (VUMC), Department of Medicine, Division of Hematology and Oncology, Laboratory Medicine Rounds, November 10, 2017.
- [IT27] Presented “Real-Time Reachability for Safety Verification of Autonomous Cyber-Physical Systems,” at the CPS Verification & Validation: Industrial Challenges & Foundations: Safe Implementation of CPS, Carnegie Mellon University, Pittsburgh, PA, May 12, 2017.
- [IT26] Presented “Real-Time Reachability for Safety of Autonomous Systems,” at the Computer Science and Engineering Graduate Seminar (CSCE 681), Texas A&M University, College Station, TX, March 6, 2017.
- [IT25] Presented “Real-Time Reachability for Verification of Autonomous Cyber-Physical Systems,” at the Electrical and Computer Engineering Seminar Series (ECE698/699), Rice University, Houston, TX, March 3, 2017.
- [IT24] Presented “Real-Time Reachability for Verification of Autonomous Systems,” at the Computer Science Seminar, University of Houston, Houston, TX, February 20, 2017.
- [IT23] Invited Presentation, “Cyber-Physical Specification Mismatches,” at the Air Force Research Laboratory, Air Vehicles Directorate, Wright-Patterson Air Force Base, Dayton, OH, June 28, 2016.
- [IT22] Invited Presentation, “Hybrid automata: from verification to implementation,” at the MathWorks Faculty Research Summit, Natick, MA, June 4, 2016.
- [IT21] Invited Presentation, “Automated Formal Verification for Cyber-Physical Systems,” at the Federal Laboratory Day, Laboratory for Telecommunication Sciences, University of Maryland, College Park, MD, March 29, 2016.
- [IT20] Invited Presentation, “Automated Formal Verification for Cyber-Physical Systems,” at the Electrical Engineering and Computer Science Department, Vanderbilt University, Nashville, TN, March 14, 2016.
- [IT19] Invited Presentation, “Automated Formal Verification for Aerospace Cyber-Physical Systems,” at the Aerospace Engineering Department Seminar, University of Michigan, Ann Arbor, MI, March 8, 2016.
- [IT18] Presented “Temporal and Functional Correctness in Support of Systems Biology Research,” at the Green Center for Systems Biology, University of Texas Southwestern Medical Center at Dallas (UT Southwestern), Dallas, TX, January 13, 2016.
- [IT17] Presented “Automating Verification of Cyber-Physical Systems with HyST,” at the Formal Methods Seminar, Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, IL, December 11, 2015.
- [IT16] Presented “Real-Time Reachability of Hybrid Systems for Formally Verified Supervisory Control,” at the Electrical Engineering Colloquium, University of North Texas, Denton, TX, September 18, 2015.
- [IT15] Invited presentation, “Automated Formal Verification of Distributed Cyber-Physical Systems,” at Systems and Information Engineering Department Colloquium, University of Virginia, Charlottesville, VA, December 19, 2014.
- [IT14] Invited presentation, “Cyber-Physical Specification Mismatch Identification with Dynamic Analysis,” at the CPS Verification and Validation: Industrial Challenges and Foundations (CPS V&V I&F), Carnegie Mellon University, Pittsburgh, PA, December 12, 2014.
- [IT13] Invited presentation, “Software Verification and Validation Methods: Automated Formal Verification of Distributed Cyber-Physical Systems,” at the IEEE Metrocon, Arlington, TX, October 2, 2014.
- [IT12] Presented, “Automated Formal Verification of Distributed Cyber-Physical Systems,” at School of Computer Science Colloquium, McGill University, Montreal, Quebec, Canada, August 12, 2014.

- [IT11] Presented, "Automated Formal Verification of Distributed Cyber-Physical Systems," at Electrical and Computer Engineering Colloquium, University of Waterloo, Waterloo, Ontario, Canada, July 25, 2014.
- [IT10] Presented, "Automated Formal Verification of Distributed Cyber-Physical Systems," at the Air Force Research Laboratory's Safe & Secure Systems and Software Symposium (S5), Dayton, OH, June 10, 2014.
- [IT9] Invited presentation, "Automated Formal Verification of Distributed Cyber-Physical Systems," at the Trust and Security Seminar, Information Trust Institute, University of Illinois at Urbana-Champaign, Urbana, IL, May 16, 2014.
- [IT8] Presented "Automated Formal Verification for Reliable Cyber-Physical Systems," Computer Science and Engineering Colloquium, Southern Methodist University, Dallas, TX, April 2, 2014.
- [IT7] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," University of Pennsylvania, Philadelphia, TX, April 3, 2013.
- [IT6] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," Sandia National Laboratory, Livermore, CA, March 20, 2013.
- [IT5] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," University of Texas at San Antonio, San Antonio, TX, March 17, 2013.
- [IT4] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," Texas State University, San Marcos, TX, March 5, 2013.
- [IT3] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," University of Texas at Arlington, Arlington, TX, March 4, 2013.
- [IT2] Invited presentation, "Verification Techniques and Tools for Reliable Cyber-Physical Systems," Old Dominion University, Norfolk, VA, March 1, 2013.
- [IT1] Invited presentation, "Safety Verification for Parameterized Hybrid Automata Networks," at Formal Methods in Systems Engineering (FORSYTE), Austrian Society for Rigorous Systems Engineering (ARiSE), Technische Universität Wien and Institute of Science and Technology Austria, Vienna, Austria, January 24, 2013.

CONFERENCE/WORKSHOP PAPER PRESENTATIONS

- [CT26] Presented paper [C25], "Star-Based Reachability Analysis for Deep Neural Networks", 23rd International Symposium on Formal Methods (FM'19), Porto, Portugal, October 2019.
- [CT25] Presented paper [C24], "Reachability Analysis for High-Index Linear Differential Algebraic Equations (DAEs)", 17th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS'19), Amsterdam, the Netherlands, August 2019.
- [CT24] Presented paper [C23], "Decentralized Real-Time Safety Verification for Distributed Cyber-Physical Systems", Formal Techniques for Distributed Objects, Components, and Systems (FORTE'19), Copenhagen, Denmark, June 2019.
- [CT23] Presented paper [W25], Decentralized real-time safety verification for distributed cyber-physical systems, 3rd International Workshop on Methods and Tools for Distributed Hybrid Systems (DHS 2019), Associated with CONCUR 2019, Amsterdam, The Netherlands, 26 August 2019.
- [CT22] Presented paper [W23], "Parallelizable Reachability Analysis Algorithms for Feed-forward Neural Networks", In Proceedings of the 7th International Workshop on Formal Methods in Software Engineering (FormaliSE'19), 2019, May.
- [CT21] Presented paper [OW4], "ARCH-COMP19 Category Report: Artificial Intelligence and Neural Network Control Systems (AINNCS) for Continuous and Hybrid Systems Plants", In ARCH19. 6th International Workshop on Applied Verification of Continuous and Hybrid Systems, April 2019.
- [CT20] Presented paper [OW3], "ARCH-COMP19 Repeatability Evaluation Report", In ARCH19. 6th International Workshop on Applied Verification of Continuous and Hybrid Systems, 2019, April.
- [CT19] Presented paper [W18], Reachability Analysis and Safety Verification for Neural Network Control Systems, Verification of Neural Networks (VNN19), AAAI 2019 Spring Symposium, March 2019.
- [CT18] Presented paper [OC6], "Reachability Analysis for One Dimensional Linear Parabolic Equation," at the IFAC Conference on Analysis and Design of Hybrid Systems (ADHS 2018), Oxford, United Kingdom, July 12, 2018.
- [CT17] Presented paper [W16], "Benchmark: Continuous-Time Recurrent Neural Networks," at the 5th Applied Verification for Continuous and Hybrid Systems (ARCH 2018), Oxford, United Kingdom, July 13, 2018.
- [CT16] Presented paper [W17], "Benchmark: Differential Algebraic Equations (DAEs) with Varying Index," at the 5th Applied Verification for Continuous and Hybrid Systems (ARCH 2018), Oxford, United Kingdom, July 13, 2018.

- [CT15] Presented paper [W15], “Benchmark: Discrete-Space Analysis of Partial Differential Equations,” at the 5th Applied Verification for Continuous and Hybrid Systems (ARCH 2018), Oxford, United Kingdom, July 13, 2018.
- [CT14] Presented paper [C15], “Probabilistic Formal Verification of the SATS Concept of Operation,” at the 8th NASA International Symposium on Formal Methods (NFM 2016), Minneapolis, MN, June 8, 2016.
- [CT13] Presented paper [W7], “Charge Pump Phase-Locked Loops and Full Wave Rectifiers for Reachability Analysis (Benchmark Proposal),” at Applied Verification for Continuous and Hybrid Systems (ARCH), Workshop Co-located with CPSWeek 2016, Vienna, Austria, April 11, 2016.
- [CT12] Presented paper [W9], “Large-Scale Linear Systems from Order-Reduction (Benchmark Proposal),” at Applied Verification for Continuous and Hybrid Systems (ARCH), Workshop Co-located with CPSWeek 2016, Vienna, Austria, April 11, 2016.
- [CT11] Presented paper [W6], “Quantified Bounded Model Checking for Rectangular Hybrid Automata,” at the 9th International Workshop on Constraints in Formal Verification (CFV 2015), Austin, TX, November 5, 2015.
- [CT10] Presented paper [LC6], “A Survey of Electrical and Electronic (E/E) Notifications for Motor Vehicles,” 24th NHTSA International Technical Conference on the Enhanced Safety of Vehicles (ESV 2015), Paper Number 15-0063, Gothenburg, Sweden, June 9, 2015.
- [CT9] Presented paper [C11], “Cyber-Physical Specification Mismatch Identification with Dynamic Analysis,” at *International Conference on Cyber-Physical Systems* (ICCPS 2015) at Cyber-Physical Systems Week (CPS Week 2015), Seattle, WA, April 16, 2015.
- [CT8] Presented paper [LC5], “Verified Planar Formation Control Algorithms by Composition of Primitives,” at *AIAA SciTech*, Kissimmee, FL, January 8, 2015.
- [CT7] Presented paper [C8], “Anonymized Reachability of Hybrid Automata Networks,” at *12th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS)*, Florence, Italy, September 9, 2014.
- [CT6] Presented paper [W2], “Model-Based Design and Analysis of a Reconfigurable Continuous-Culture Bioreactor,” at 4th ACM SIGBED International Workshop on Design, Modeling, and Evaluation of Cyber-Physical Systems, Workshop Co-located with CPSWeek 2014, Berlin, Germany, April 14, 2014.
- [CT5] Presented paper [W1], “Benchmark: DC-to-DC Switched-Mode Power Converters (Buck Converters, Boost Converters, and Buck-Boost Converters),” at Applied Verification for Continuous and Hybrid Systems (ARCH), Workshop Co-located with CPSWeek 2014, Berlin, Germany, April 14, 2014.
- [CT4] Presented paper [C4], “A Small Model Theorem for Rectangular Hybrid Automata Networks,” at the *IFIP International Conference on Formal Techniques for Distributed Systems: Joint International Conference of 14th Formal Methods for Open Object-Based Distributed Systems and 32nd Formal Techniques for Networked and Distributed Systems (FORTE/FMOODS)*, KTH, Stockholm, Sweden, June 15, 2012. (**Best Paper Award**).
- [CT3] Presented paper [LC2], “Design Verification Methods for Switching Power Converters,” at the *3rd IEEE Power and Energy Conference at Illinois (PECI)*, University of Illinois at Urbana-Champaign, Champaign, IL, February 24, 2012.
- [CT2] Presented paper [LC1], “Turbo-Alternator Stalling Protection using Available Power Estimate,” at the *2nd IEEE Power and Energy Conference at Illinois (PECI)*, University of Illinois at Urbana-Champaign, Urbana, IL, February 25, 2011. (**Best Paper Award**).
- [CT1] Presented paper [C2], “Safe Flocking in Spite of Actuator Faults,” at *12th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS)*, New York, NY, September 22, 2010.

OTHER PRESENTATIONS

- [OT13] Panel presentation, “Panel discussion: Formal Methods and Machine Learning: Progress and Future directions,” with Clark Barrett, **Taylor T. Johnson**, Alessio Lomuscio, and Luca Pulina, 2nd Workshop on Formal Methods for ML-Enabled Autonomous Systems (FoMLAS’19), Affiliated with CAV 2019, July 2019.
- [OT12] Presented “Automated Formal Verification for Cyber-Physical Systems,” at the College of Engineering Advisory Board Meeting, University of Texas at Arlington, Arlington, TX, January 29, 2016.
- [OT11] Omar Beg[†] presented, “Formal Verification for Software-Controlled Power Electronics,” at the Air Force Research Laboratory’s Safe & Secure Systems and Software Symposium (S5), Dayton, OH, June 11, 2015.
- [OT10] Presented, “Automated Formal Verification of Distributed Cyber-Physical Systems,” at the Air Force Research Laboratory’s Information Directorate, Rome, NY, August 5, 2014.

- [OT9] Presented, "Safe Flocking in Spite of Actuator Faults and Planar Distributed Formation Control with One-Dimensional Primitives," at the Air Force Research Laboratory's Information Directorate, Rome, NY, July 23, 2014.
- [OT8] Presented "Automatic Safety Verification of Distributed Cyber-Physical Systems," Texas Systems Day, Texas A&M University, College Station, TX, March 28, 2014.
- [OT7] Presented "Verification and Validation for Reliable Cyber-Physical Systems," at the Computer Science Colloquium, University of Texas at Arlington, Arlington, TX, November 11, 2013.
- [OT6] Presented "Safety Verification of Distributed Cyber-Physical Systems," at the Formal Methods Seminar, Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, IL, September 27, 2012.
- [OT5] Presented paper [OC1], "Stability of Digitally Interconnected Linear Systems" at the 7th CSL Student Conference, January 27, 2012, Urbana, IL.
- [OT4] Presented "Fault-Tolerant Distributed Cyber-Physical Systems" to the Control Systems Group, University of New Mexico, Albuquerque, NM, June 16, 2011.
- [OT3] Presented "Automatic Parameterized Verification of Distributed Algorithms" at 6th CSL Student Conference, Urbana, IL, January 28, 2011.
- [OT2] Presented paper [C1], "Safe and Stabilizing Distributed Cellular Flows" to the Multi-Robot Systems Lab, Rice University, Houston, TX, July 15, 2010.
- [OT1] Presented paper [C1], "Safe and Stabilizing Distributed Cellular Flows" at the 5th CSL Student Conference, Urbana, IL, January 29, 2010.

DEMONSTRATION PRESENTATIONS

Acceptance based on peer review of abstracts or short papers.

- [D6] Shafiu Azam Chowdhury, Sohil Lal Shrestha, **Taylor T. Johnson**, Christoph Csallner, "Demo: SLEMI: Finding Simulink Compiler Bugs through Equivalence Modulo Input (EMI)," *42nd International Conference on Software Engineering (ICSE'20)*, p 1-4, June 2020. [pdf]
DOI: 10.1145/3377812.3382147
Acceptance Rate: 33.3 percent (25 of 75)
Double-Blind Review (**DBR**).
- [D5] Stephen A. Rees, Tamas Kecskes, Patrik Meijer, **Taylor T. Johnson**, Katie Dey, Paulo Tabuada, Marcus Lucas, "Cyber-physical Systems Virtual Organization: Active Resources: Enabling Reproducibility, Improving Accessibility, and Lowering the Barrier to Entry", In Proceedings of the 10th ACM/IEEE International Conference on Cyber-Physical Systems, ACM, New York, NY, USA, pp. 340–341, 2019, April.
- [D4] Shafiu Chowdhury[†], **Taylor T. Johnson**, and Christoph Csallner, "Fuzzing Cyber-Physical System Development Environments With CyFuzz," Demo Session, 20th International Conference on Hybrid Systems: Computation and Control (HSCC 2017), CPSWeek 2017, Pittsburgh, PA, April 2017.
- [D3] Presented demo, "Hybrid Systems Model Transformations with HyST," at the 8th NASA International Symposium on Formal Methods (NFM 2016), Minneapolis, MN, June 7, 2016.
- [D2] Stanley Bak, Sergiy Bogomolov, and **Taylor T. Johnson**, "HyST: A Source Transformation and Translation Tool for Hybrid Automaton Models," Demonstration Session, 18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015), CPSWeek 2015, Seattle, Washington, April 2015.
- [D1] **Taylor T. Johnson** and Sayan Mitra, "The Passel Verification Tool for Hybrid Automata Networks," Demonstration Session, 16th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), CPSWeek 2013, Philadelphia, PA, April 9, 2013.

POSTER PRESENTATIONS

Acceptance based on peer review of abstracts, short papers, or posters.

- [Po12] Nathaniel Hamilton[†] and **Taylor T. Johnson**, "Architecture for an Indoor Distributed Cyber-Physical System Composed of Mobile Robots and Fog Computing Nodes," Poster Session, Safe and Secure Systems and Software Symposium (S5 2017), Dayton, Ohio, August 2017.
- [Po11] Christina Wang[†] and **Taylor T. Johnson**, "Moving Target Tracking with Formation Control by Groups of UAVs," Poster Session, Safe and Secure Systems and Software Symposium (S5 2017), Dayton, Ohio, August 2017.

- [Po10] Luan Viet Nguyen[†], James Kapinski, Xiaoqing Jin, Jyotirmoy V. Deshmukh, and **Taylor T. Johnson**, “Hyperproperties of Real-Valued Signals,” Poster Session, 20th International Conference on Hybrid Systems: Computation and Control (HSCC 2017), CPSWeek 2017, Pittsburgh, PA, April 2017.
- [Po9] Luan Viet Nguyen[†] and **Taylor T. Johnson**, “Towards Bounded Model Checking for Timed and Hybrid Automata with a Quantified Encoding,” PhD Student Forum, Oral and Poster Sessions, 15th International Conference on Formal Methods in Computer-Aided Design (FMCAD), Austin, TX, September 27-30, 2015.
- [Po8] Omar Beg[†] and **Taylor T. Johnson**, “Computer-Aided Formal Verification for Power Electronics Cyber-Physical systems,” PhD Student Forum, Poster Session, 15th International Conference on Formal Methods in Computer-Aided Design (FMCAD), Austin, TX, September 27-30, 2015.
- [Po7] Luan Viet Nguyen[†], Christian Schilling, Sergiy Bogomolov, and **Taylor T. Johnson**, “HyRG: A Random Generation Tool for Affine Hybrid Automata,” Poster Session, 18th International Conference on Hybrid Systems: Computation and Control (HSCC 2015), CPSWeek 2015, Seattle, Washington, April 2015. Software Tool: <http://verivital.com/hyrg/>
- [Po6] Hoang-Dung Tran[†], Luan Viet Nguyen[†], and **Taylor T. Johnson**, “Transforming Differential Algebraic Equations (DAEs) to Hybrid Automaton Models for Formal Verification,” Poster Session, Texas Systems Day 2015, University of Texas at Dallas, Plano, Texas, March 28, 2015.
- [Po5] Leonardo Bobadilla, **Taylor T. Johnson**, and Amy LaViers, “Towards Verified Planar Formation Control Algorithms by Composition of Primitives,” 5th Workshop on Formal Methods for Robotics and Automation Poster Session, Workshop Co-located with Robotics: Science and Systems Conference (RSS), Berkeley, CA, July 12, 2014. [poster pdf] [abstract pdf]
- [Po4] Luan Viet Nguyen[†] and **Taylor T. Johnson**, “Model-Based Design and Analysis of a Continuous-Culture Bioreactor for Systems Biology Experiments,” Texas Systems Day Poster Session, Texas A&M University, College Station, TX, March 28, 2014. [poster pdf]
- [Po3] **Taylor T. Johnson** and Sayan Mitra, “Verification of Distributed Cyber-Physical Systems: Stability of Digitally Interconnected Linear Systems,” Poster Session, Coordinated Science Laboratory 60th Anniversary Symposium, University of Illinois at Urbana-Champaign, Urbana, IL, October 28, 2011. [poster pdf]
- [Po2] **Taylor T. Johnson** and Sayan Mitra, “Verification of Distributed Cyber-Physical Systems: Stability of Digitally Interconnected Linear Systems,” Poster Session, Coordinated Science Laboratory Symposium on Emerging Topics in Control and Modeling: Cyber-Physical Systems, Urbana, IL, October 20, 2011. [poster pdf]
- [Po1] **Taylor T. Johnson** and Sayan Mitra, “Power Usage of Time and Event-Triggered Paradigms: A Case Study,” Poster Session, 15th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), CPSWeek 2009, San Francisco, CA, April 13, 2009. [poster pdf]

SOFTWARE TOOLS AND ARTIFACTS

We develop a large amount of research software, particularly verification software tool prototypes, some of which is peer-reviewed through activities such as software repeatability evaluations. Source code for each major artifact is indicated below, and is maintained on the following accounts (Git/Mercurial): <https://github.com/verivital>, <https://bitbucket.org/verivital/>, <https://bitbucket.org/ttj/>, <https://github.com/ttj>.

- [S10] nnv and nnmt: Neural network verification and neural network model transformation tools. These software tools implement methods for formally verifying properties of systems incorporating neural networks, as well as for interchange with other neural network verification tools and related software, such as ONNX, PyTorch, Keras, Tensorflow, etc. Development timeframe: 2018-present. Related papers include [C27,C29,J21,W27,C25,J20,W23,W22,OW4,J13]. Available online: <https://github.com/verivital/nnv/> and <https://github.com/verivital/nnmt>. Reproducible CodeOcean capsules are also available (CAV’20 Tool [C27]: <https://doi.org/10.24433/CO.0221760.v1>, CAV’20 ImageStar Paper [C29]: <https://doi.org/10.24433/CO.3351375.v1>).
- [S9] Hybrid Automata Learning Toolkit (HAutLearn): This software tool implements methods to infer hybrid automaton models from time-series data. Development timeframe: 2018-present. <https://github.com/verivital/hautlearn>
- [S8] daev: Differential algebraic equation (DAE) verification tool. This software tool implements methods to formally verify safety properties of systems incorporating DAEs, specifically targeted for DAEs with index greater than one, for which it is impossible to represent as classical hybrid automata

- without model transformations. Development timeframe: 2017-present. Related papers include [C24]. <https://github.com/verivital/daev>
- [S7] pdev: Partial differential equation (PDE) verification tool. This software tool implements numerical reachability analysis methods for systems incorporating PDEs. Development timeframe: 2017-present. Related papers include [OC6]. <https://github.com/verivital/pdev>
- [S6] SLForge and CyFuzz: Random differential testing for CPS Development Toolchains. This software tool randomly generates CPS model artifacts, currently targeting the MathWorks' Simulink/Stateflow (SLSF). Development timeframe: 2015-present. Related papers include [C26,D6,C21,D4,W10]. https://github.com/verivital/slsf_randgen
- [S5] HyST: Hybrid Source Transformer. This software tool takes hybrid automaton models in the SpaceX XML or Compositional Interchange Format (CIF) formats and translates them to other popular hybrid systems verification and reachability analysis tools, including Flow*, dReach, HyComp, HyCreate, and development tools including MathWorks' Simulink/Stateflow (SLSF). Development timeframe: 2014-present. Related papers include [C27,J17,C14,C13,C12,C10,D2]. *Best repeatability evaluation award [C14]*. Available online: <http://www.verivital.com/hyst/>
- [S4] rtreach: Real-time reachability algorithms for hybrid systems with linear and nonlinear dynamics: This software implements reachability analysis algorithms based on face-lifting that have worst-case execution time (WCET) guarantees. Related papers include [C23,J4,C9]. Development timeframe: 2014-present. Available online: <https://github.com/verivital/rtreach/>
- [S3] Hynger: Hybrid iNvariant GEnerator: This software tool takes MathWorks' Simulink/Stateflow (SLSF) models, instruments them, and produces traces for dynamic analysis in tools like Daikon. Related papers include [J16,J6,J12,C11]. Development timeframe: 2014-present. Available online: <http://www.verivital.com/hynger/>
- [S2] HyRG: Hybrid Random Generator. This software tool randomly generates hybrid automaton models, and is integrated within HyST [S5] to generate models in output formats compatible with several different formal verification tools for hybrid systems. Development timeframe: 2014-2016. Related papers include [C12,Po7]. Available online: <http://www.verivital.com/hyrg/>
- [S1] Passel: This software tool is used for parameterized verification (sometimes known as uniform verification) of parameterized networks of hybrid automata, and has been used to verify safety specifications in several distributed cyber-physical systems such as proving safe separation in air traffic control protocols. Development timeframe: 2011-2014. Related papers include [C8,LC4,C4,C3]. Available online: <https://publish.illinois.edu/passel-tool/>

AWARDS AND HONORS

- 8/2018 **Junior Faculty Teaching Fellow for 2018-2019.**
Vanderbilt University Center for Teaching (CFT)
- 10/2017 **2018 Young Investigator Research Program (YIP) Award**, Air Force Office of Scientific Research (AFOSR).
Received grant award [CG16].
- 8/2017 **Southeastern Conference (SEC) Faculty Travel Program Award for 2017-2018.**
Travel support to visit Dr. Dylan Shell at Texas A&M University to collaborate on distributed and swarm robotics.
- 4/2016 **Best Software Repeatability Evaluation Award for [C14]**, 19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Cyber-Physical Systems Week (CPSWeek) 2016, Austria, Vienna.
- 2/2016 **2016 Young Investigator Research Program (YIP) Award**, Air Force Office of Scientific Research (AFOSR).
Received grant award [CG9].
- 6/2015 **Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII) Award**, National Science Foundation (NSF), Computer and Information Science and Engineering (CISE).
Received grant award [CG11].
- Summer 2015 **Fellow**, *Air Force Research Laboratory, Information Directorate*, Air Force Office of Scientific Research (AFOSR), Summer Faculty Fellowship Program (SFFP), Rome, NY.
Received grant award [CG3].
- 3/2013 **Yi-Min Wang and Pi-Yu Chung Endowed Research Award**, *Electrical and Computer Engineering, University of Illinois at Urbana-Champaign*, Urbana, IL.

- 3/2013 **ECE Rambus Fellowship in Electrical and Computer Engineering**, *Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL.*
- 6/2012 **Best Overall Paper Award of Three Collocated Conferences for [C4]**, *IFIP International Conference on Formal Techniques for Distributed Systems: Joint International Conference of 14th Formal Methods for Open Object-Based Distributed Systems and 32nd Formal Techniques for Networked and Distributed Systems (FORTE/FMOODS 2012), of the 7th International Federated Conference on Distributed Computing Techniques (DisCoTec 2012), KTH, Stockholm, Sweden.*
- 2012 – 2013 **Computer Engineering Fellowship Sponsored by Intel Corporation**, *Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, IL.*
- 2/2011 **Best Paper Award for [LC1]**, *2nd IEEE Power and Energy Conference at Illinois (PECI), Urbana, IL.*
- 12/2009 **Most Interesting Cyber-Physical Systems Research Problem Award for [E1]**, *30th IEEE Real-Time Systems Symposium (RTSS), Washington, DC.*
- 2006 **First Place Team, AMD Digital Logic Design Competition**, *Rice University, Houston, TX.*
Teammates: Brent Stephens and Barron Stone
- 2004 – 2008 **Coca-Cola Scholars Scholarship.**
- 2004 – 2008 **Robert C. Byrd Honors Scholarship.**
- 2004 – 2008 **Bluebonnet Electric Cooperative Scholarship of Excellence.**
- 2004 – 2008 **Glaser Family Charitable Foundation Scholarship.**
- 2004 – 2008 **USA Funds Access to Education Scholarship.**
- 2004 **Texas Society of Professional Engineers Scholarship**, *Brazos County Chapter, TX.*
- 2004 **Second Place in Computer Science**, *Texas State Science and Engineering Fair, Arlington, TX.*
- 2003 **Finalist in Computer Science**, *Intel International Science and Engineering Fair, Cleveland, OH.*

STUDENT AWARDS AND HONORS

- 5/2021 **IEEE Outstanding Ph.D. Dissertation Award for “Verification of Learning-Enabled Cyber-Physical Systems,”** *IEEE Technical Committee on Cyber-Physical Systems (TCCPS), Hoang-Dung Tran (DA4), May 2021.*
- 4/2021 **NDSEG Fellowship Award for “Safe and Robust Reinforcement Learning to Quantify Risk in Intelligent Systems,”** *National Defense Science and Engineering Graduate (NDSEG) Fellowship Program, Preston Robinette (DS9), April 2021.*
- 4/2019 **NDSEG Fellowship Award for “Safe and Robust Reinforcement Learning for Autonomous Distributed Cyber-Physical Systems,”** *National Defense Science and Engineering Graduate (NDSEG) Fellowship Program, Nathaniel Hamilton (DS2), April 2019.*
- 4/2019 **NSF Travel Awards for the Cyber-Physical Systems and Internet of Things (CPS-IoT) Week 2019,** *Ayana Wild (DS1) and Patrick Musau (DS3), Montreal, Canada, April 13-17, 2019.*
- 9/2015 **NSF Travel Awards for the PhD Student Forum at Formal Methods in Computer-Aided Design (FMCAD 2015),** *Luan Viet Nguyen (DA2) and Omar Beg (DA1), Austin, TX, September 27-30, 2015.*
- 5/2015 **NSF and ACM SIGBED Travel Awards for Cyber-Physical Systems Week (CPSWeek 2015),** *Luan Viet Nguyen (DA2) and Hoang-Dung Tran (DA4), Seattle, WA, April 12-16, 2015.*
- 12/2014 **NSF Travel Award for CPS Verification and Validation: Industrial Challenges and Foundations (CPS V&V I&F),** *Luan Viet Nguyen (DA2), Carnegie Mellon University, Pittsburgh, PA, December 12, 2014.*
- 12/2014 **3rd Place in US/India Chamber of Commerce Spirit of Innovation Competition,** *Amol Vengurlekar (MA1), Ruoshi Zhang (MA2), Luan Viet Nguyen (DA2), and Eric Nelson for project related to paper [W2], which came with a \$1000 award.*
- 4/2014 **NSF Graduate Research Fellowship Program (GRFP) Honorable Mention,** *Shamina Shahrin Hossain (MP1), April 2014.*

RESEARCH MENTORING (CURRENT)

DOCTORAL DISSERTATION ADVISER

- [DS9] Fall 2020 – Present: Preston Robinette, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Runtime verification for safe autonomy. Major awards: 2021 NDSEG Fellowship.
- [DS8] Summer 2019 – Present: Neelanjana Pal, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Adversarial machine learning.
- [DS7] Summer 2019 – Present: Bernard Serbinowski, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Hyperproperties in adversarial machine learning and cyber-physical systems.
- [DS6] Fall 2017 – Present: Tianshu Bao, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Reachability analysis of physical dynamics beyond ordinary differential equations (ODEs): partial differential equations (PDEs), delay differential equations (DDEs), differential algebraic equations (DAEs), fractional order differential equations (FDEs), and more.
- [DS5] Fall 2017 – Present: Diego Manzananas Lopez, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Safe control synthesis for autonomous cyber-physical systems. Research results: [BC1].
- [DS4] Fall 2017 – Present: Xiaodong Yang, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Symbolic and statistical learning for autonomous cyber-physical systems.
- [DS3] Fall 2017 – Present: Patrick Musau, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Formal verification of neural networks for autonomous cyber-physical systems. Research results: [BC1].
- [DS2] Summer 2017 – Present: Nathaniel (Nate) Hamilton, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Distributed robotics control synthesis. Major awards: 2019 NDSEG Fellowship.
- [DS1] Summer 2017 – Present: Ayana Wild, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Foundations of cyber-physical systems verification.

MASTER'S THESIS ADVISER

- [MS1] None currently.

UNDERGRADUATE RESEARCHERS

- Summer 2020 **Yi Li**, *Vanderbilt BSc CS, Project: "Neural Network and Machine Learning Verification," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2020 **Siqi (Christine) Zhao**, *Vanderbilt BSc CS, Project: "Neural Network and Machine Learning Verification," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*

RESEARCH MENTORING (PAST / GRADUATED ALUMNI)

POSTDOCTORAL RESEARCH SCHOLAR ALUMNI

- [PDA4] 8/2017 – 8/2019: Joel Rosenfeld, Electrical Eng. and Computer Science, Research Topic: Optimization-Based Verification for Cyber-Physical Systems. Next/current position: Assistant Professor, Mathematics and Statistics, University of South Florida. Website: <http://joel.rosenfeldresearch.com/>
- [PDA3] 11/2015 – 8/2019: Weiming Xiang, Electrical Eng. and Computer Science, Research Topic: Unbounded-Time Reachability Analysis for Switched Systems. Research results: [J21,OC6,J15,OC8,J13,BC1,J14,J9,J7,OC4,W12,OC3,OC2]. Next/current position: Assistant Professor, School of Computer and Cyber Sciences, Augusta University. Website: <https://xiangweiming.github.io/>
- [PDA2] 1/2016 – 5/2017: Andrew Sogokon, Electrical Eng. and Computer Science, Vanderbilt University, Research Topic: Liveness Verification for Hybrid Automata. Research results: [J11,C19,C16,OC2,W8]. Next position: Postdoc at Carnegie Mellon University. Current position: Lecturer at the University of Southampton, UK. Website: <https://sites.google.com/site/andrewsogokon/>
- [PDA1] 3/2016 – 8/2016: Khaza Anuarul Hoque, Department of Computer Science and Eng., University of Texas at Arlington, Research Topic: Formal Verification for Aerospace CPS. Research results: [J12,C17,C15]. Next position: Research Fellow at Oxford University. Current position: Assistant Professor, Electrical Engineering and Computer Science (EECS) at University of Missouri Columbia. Website: <https://www.kahoque.com/>

DOCTORAL DISSERTATION ALUMNI

- [DA4] Spring 2015 – Summer 2020: Hoang-Dung Tran, Electrical Eng. and Computer Science, Vanderbilt University, Dissertation Topic: Formal Verification of Distributed Cyber-Physical Systems. Research results: [C25,C23,C24,W23,OC6,J14,J15,J9,J7,W12,OC3,OC2,W9,W4,J2]. Next position: Assistant Professor, Computer Science and Engineering, University of Nebraska Lincoln. Website: <https://sites.google.com/site/trhoangdung/>
- [DA3] Fall 2015 – Fall 2019: Shafiul Chowdhury, Department of Computer Science and Eng., University of Texas at Arlington, Dissertation Topic: Randomized Differential Testing for CPS Development Environments. Co-advised with Prof. Christoph Csallner. Research results: [C21,W10]. Next position: Research Scientist, Facebook. Website: <https://shafiul.github.io/>
- [DA2] Spring 2014 – Summer 2018: Luan Viet Nguyen, Department of Computer Science and Eng., University of Texas at Arlington, Dissertation Topic: Specifications for Cyber-Physical Systems. Research results: [J12,C20,J17,C18,W11,W12,J7,OC2,W9,W6,C12,W4,W1,W2,J2]. Next position: Postdoc at University of Pennsylvania, then Postdoc at University of Notre Dame; Current position: Assistant Professor at University of Dayton. Website: <https://luanvietnguyen.github.io/>
- [DA1] Summer 2014 – Summer 2017: Omar Beg, Department of Electrical Engineering, University of Texas at Arlington, Dissertation Topic: Reachability Analysis of Power Electronics and Systems. Co-advised with Prof. Ali Davoudi. Research results: [J16,J17,J10,J6,OC5,W11,W7]. Next position: Assistant Professor at University of Texas at Permian Basin. Website: <https://sites.google.com/site/omaralibeg/>

OTHER FORMER GRADUATE STUDENTS

- [FS2] Fall 2017 – Fall 2018: Yuanqi Xie, Electrical Eng. and Computer Science, Vanderbilt University, Research Topic: Auto-scribing electronic health records with natural language processing and autosummarization.
- [FS1] Fall 2017 – Spring 2018: Ran Hao, Electrical Eng. and Computer Science, Vanderbilt University, Research Topic: Safe reinforcement learning for distributed autonomous robots.

MASTER'S THESIS ALUMNI

- [MA7] Fall 2019 – Summer 2020: Ulysses Yu, Electrical Eng. and Computer Science, Vanderbilt University, Thesis Topic: Combining Reachable Set Computation with Neuron Coverage.
- [MA6] Fall 2015 – Summer 2016: Randy Long, Electrical Engineering, University of Texas at Arlington, Thesis Topic: Time-Triggered Controller Area Network Design for Formula SAE Racecars and Technique for Measuring CPU Usage on Systems with Nested and Non-Nested Interrupts. Next position: Engineer at Faraday Future.
- [MA5] Fall 2015 – Summer 2016: Rahul Kawadgave, Electrical Engineering, University of Texas at Arlington, Thesis Topic: Automatic Conflict Classification for Vulnerable Road Users. Next position: Engineer at Qualcomm.
- [MA4] Fall 2014 – Spring 2016: Nathan Hervey, Computer Science and Eng., University of Texas at Arlington, Thesis Topic: Distributed Robotics Localization and Control. Next position: Software Engineer at Lockheed Martin.
- [MA3] Fall 2014 – Spring 2015: Shweta Hardas, Electrical Engineering, University of Texas at Arlington, Thesis: “Virtual and Hardware Prototyping of a Modular Multilevel Inverter for Photovoltaics”. Next position: Engineer at Cummins.
- [MA2] Fall 2013 – Spring 2015: Ruoshi Zhang, Electrical Engineering, University of Texas at Arlington, Thesis: “Model-Based Design and Analysis of Automotive Systems using Time-Triggered Controller Area Networks (TTCAN)”. Next position: PhD student in Electrical Engineering at University of Texas at Arlington.
- [MA1] Fall 2013 – May 2015: Amol Vengurlekar, Electrical Engineering, University of Texas at Arlington, Thesis: “Design of a Real-Time Reconfigurable Bioreactor”. Next position: Engineer at EchoStar.

MASTER'S PROJECT ALUMNI

- [MP4] Fall 2018 – Summer 2019: Ronald Picard, Vanderbilt University, Master of Engineering: Cyber-Physical Systems, Project: “Action Schema Neural Networks: Generalized Policies for Stochastic Planning Problems in the Wargaming Domain”. Next position: Computer Engineer at Air Force Research Laboratory, Aerospace Systems Directorate, Autonomous Controls Branch.
- [MP3] Summer 2018 – Fall 2018: Ruohan Wang, Vanderbilt University, Computer Science, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization”. Next position: Software Engineer at Google.

- [MP2] Spring 2014 – Spring 2015: Zankar Bapat, University of Texas at Arlington, Electrical Engineering, Project: “Robot Localization with Circle Detection”. Next position: Engineer at Ferro Technologies.
- [MP1] Fall 2012–Spring 2013, University of Illinois at Urbana-Champaign, Electrical and Computer Engineering: Shamina Shahrin Hossain (first-year graduate student), Project: Verification of Closed-Loop Switching Power Converters (resulted in paper [LC3]).

UNDERGRADUATE RESEARCH PROJECT ALUMNI

- Summer 2019–Spring 2020 **Diandry A Rutayisire**, *Vanderbilt BSc CS, Project: “Autonomous F1/10 Race Car,” Vanderbilt University School of Engineering (VUSE) Summer Research Program and Independent Research.*
- Summer 2019 **Luke Bhan**, *Vanderbilt BSc CS, Project: “Autonomous F1/10 Race Car,” Vanderbilt University School of Engineering (VUSE) Research Volunteer.*
- Summer 2019 **Jiuke Huang**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2019 **Rong Wang**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2019 **Julie Truong**, *Vanderbilt BSc CS, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2019 **Angela R Maliakal**, *Tufts University BSc CS, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Spring 2019, Fall 2018 **Arda Turkmen**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE), Individual Study.*
- Spring 2019, Fall 2018 **Harsha Vankayalapati**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE), Individual Study.*
- Spring 2019 **Matthew Kenigsberg**, *Vanderbilt BSc CS, Project: “Learning Hybrid Automata from Data,” Vanderbilt University School of Engineering (VUSE), Individual Study.*
- Fall 2018 **Teo Lee**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Individual Study.*
- Fall 2018 **Joshua Wilson**, *Vanderbilt BSc CS, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Individual Study.*
- Summer 2018 **Daniel Hong**, *Johns Hopkins BSc ME, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Joshua Wilson**, *Vanderbilt BSc CS, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Jackson Brewer**, *Vanderbilt BSc ME, Project: “Controlling Groups of Swarm Robots,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Yufei Yan**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Arda Turkmen**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Xueqing Zhao**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Teo Lee**, *Vanderbilt BSc CS, Project: “Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization,” Vanderbilt University School of Engineering (VUSE) Summer Research Program.*

- Summer 2018 **Sally Kwok**, *Vanderbilt BSc CS, Project: "Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2018 **Xue Zou**, *Vanderbilt BSc CS, Project: "Auto-Scribing Electronic Health Records (EHRs) with Natural Language Processing (NLP) and Autosummarization," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Daniel Hong**, *Johns Hopkins BSc ME, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Christina Wang**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Timothy Liang**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Anissa Alexander**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Austin Wilms**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Stirling Carter**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2017 **Yinghui Yang**, *Vanderbilt BSc CS, Project: "Controlling Groups of Swarm Robots with Android Studio and Microsoft Kinect," Vanderbilt University School of Engineering (VUSE) Summer Research Program.*
- Summer 2015 **Ewin Tang**, *Major: Mathematics, University of Texas at Austin, Topic: Using the Isabelle Theorem Prover to Prove Some of the Top 100 Formalized Theorems.*
- Fall 2013–Spring 2014 **Eric Nelson**, *Computer Science, University of Texas at Arlington, Project: Xenomai Real-Time Operating System (RTOS) Design for Continuous-Culture Bioreactor.*
- Fall 2011 **Zhongdong Zhu**, *University of Illinois at Urbana-Champaign, Project: Simulating Safe and Stabilizing Distributed Cellular Flows.*

NSF RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU) PROJECT ALUMNI

- [REU2] Summer 2012: Lucas Buccafusca, University of Colorado at Boulder, Project: Safe Distributed Flocking Implemented on the StarL Distributed Robotics Framework. Information Trust Institute, NSF Research Experiences for Undergraduates (REU) Summer Program, University of Illinois at Urbana-Champaign.
- [REU1] Summer 2009: Shashank Gupta, Indian Institute of Technology, Kharagpur, Project: Distributed Algorithms for Sensor Networks Implemented on Net-X. Information Trust Institute, NSF Research Experiences for Undergraduates (REU) Summer Program, University of Illinois at Urbana-Champaign.

PROMOTING UNDERGRADUATE RESEARCH IN ENGINEERING (PURE) ALUMNI, University of Illinois at Urbana-Champaign

- [PURE10] Spring 2012 (co-advised with Adam Zimmerman): Jordan Kravitz, Project: Distributed Robotics in StarL.
- [PURE9] Fall 2011: Akash Kapoor, Project: Reachability Analysis of Power Converters (resulted in paper [LC2]).
- [PURE8] Spring 2011: Hersheda Tilak, Project: Implementation of a Boundary Detection Algorithm.
- [PURE7] Spring 2011: Jeffrey Lale, Project: A Randomized Algorithm for Deadlock-Free Robot Routing.
- [PURE6] Spring 2011: Zhihao (Ted) Hong: Modeling Parameterized Power Converters using Timed Automata (resulted in paper [LC2]).
- [PURE5] Fall 2010: Hersheda Tilak, Project: Simulating Coupled Inverted Pendulums in Matlab.
- [PURE4] Fall 2009: Jerry Sun and Donggeek Shin, Joint Project: Simulating a Planar Conveyor System in Matlab.
- [PURE3] Spring 2009: Rohan Bali, Project: Simulating Coupled Inverted Pendulums in Matlab.
- [PURE2] Spring 2009: Patrick Gu, Project: Extending Giotto to xGiotto on nxtOSEK for Lego Mindstorms.

[PURE1] Fall 2008: Haeran Lee, Soonwoo (Daniel) Chang, Youngho (Ryan) Park, and Yosub Shin, Joint Project: Reachability Analysis of Switched-Mode Power Converters.

SPONSORED RESEARCH SUPPORT

2013 – present **Funded Research Grants, Contracts, and Fellowships.**

Total Research Funding (PI + Co-PI, active and completed projects): ~ \$27M

Research Funding as PI: ~ \$3.5M (Sole PI Share: ~ \$2.4M). Research Funding as Co-PI: ~ \$23.5M.

Our research is currently supported by AFOSR, DARPA, NSA/DoD, and NSF, and past research has been supported by AFOSR, AFRL, ARO, NSF, ONR, USDOT, the MathWorks, NVIDIA, and Toyota.

ACTIVE RESEARCH SUPPORT

- [AG6] Taylor T. Johnson (PI (Sole)), "Verification of Autonomous Systems: Hyperproperties in Machine Learning," Trusted AI Challenge (TAI), Air Force Office of Scientific Research (AFOSR), Award Amount: \$100,000, 2021-12-15 to 2022-12-14, Duration: 1.0 years.
- [AG5] Taylor T. Johnson (PI), with Joel Rosenfeld (PI), Rushikesh Kamalapurkar (PI), "Collaborative Research: Operator Theoretic Methods for Identification and Verification of Dynamical Systems," Energy, Power, Control, and Networks Program, Division of Electrical, Communications and Cyber Systems, Directorate for Engineering (ENG:ECCS:EPCN), National Science Foundation (NSF), Award Amount: \$229,935, 2020-10-01 to 2023-09-30, Duration: 3.0 years.
- [AG4] Taylor T. Johnson (PI), with Joel Rosenfeld (Co-PI), "FMitF: Track II: Hybrid and Dynamical Systems Verification on the CPS-VO," Formal Methods in the Field (FMitF), Directorate for Computer and Information Science and Engineering (CISE:FMitF), National Science Foundation (NSF), Award Amount: \$98,311, 2019-10-01 to 2021-03-30, Duration: 1.5 years.
- [AG3] Taylor T. Johnson (PI), with Christoph Csallner (PI), "SHF: Small: Collaborative Research: Fuzzing Cyber-Physical System Development Tool Chains with Deep Learning (DeepFuzz-CPS)," Software and Hardware Foundations, Division of Computing and Communication Foundations, Directorate for Computer and Information Science and Engineering (CISE:CCF:SHF), National Science Foundation (NSF), Award Amount: \$248,473, 2019-10-01 to 2022-09-30, Duration: 3.0 years.
- [AG2] Taylor T. Johnson (Co-PI), with Gabor Karsai, Xenofon Koutsoukos (Co-PI), Ted Bapty (Co-PI), Janos Sztipanovits (Oversight), "Assurance-Based Learning-Enabled Cyber-Physical Systems (ALC)," Assured Autonomy (AA), Defense Advanced Research Projects Agency (DARPA), Award Amount: \$7,200,000, 4/2/2018 to 3/31/2022, Duration: 4.0 years.
- [AG1] Taylor T. Johnson (Co-PI), with Xenofon Koutsoukos (PI), Janos Sztipanovits (Vanderbilt/EECS), Gabor Karsai (Vanderbilt/EECS), Aniruddha Gokhale (Vanderbilt/EECS), Yevgeniy Vorobeychik (Vanderbilt/EECS), Abhishek Dubey (Vanderbilt/EECS), Maithilee Kunda (Vanderbilt/EECS), Peter Volgyesi (Vanderbilt/EECS), Jennifer Trueblood (Vanderbilt/Psychology), S. Shankar Sastry (Berkeley/EECS), Claire Tomlin (Berkeley/EECS), Anthony Joseph (Berkeley/EECS), Saurabh Amin (MIT/CEE), Nazli Choucri (MIT/Political Science), Alvaro Cardenas (UT Dallas/CS), Bhavani Thuraisingham (UT Dallas/CS), "Science of Security for Cyber-Physical Systems Lablet," Science of Security Lablet (SoSL), Department of Defense (DoD), Award Amount: \$14,750,000, 9/1/2017 to 8/31/2022, Duration: 5.0 years.

COMPLETED RESEARCH SUPPORT

- [CG18] Taylor T. Johnson (PI (Sole)), "Hyperproperties for Generative AI Models," Artificial Intelligence Hardware (AIHW), Semiconductor Research Corporation (SRC), Award Amount: \$240,000, 2021-01-01 to 2023-12-31, Duration: 3.0 years. Recommended for award, but declined by Vanderbilt due to intellectual property (IP) contractual concerns.
- [CG17] Taylor T. Johnson (Co-PI), with Ali Davoudi (PI, UT-Arlington), "Scalable Formal Verification of Resilient Converter-dominated MVDC Networks," Sea and Warfare Weapons (Code 33), Office of Naval Research (ONR), Award Amount: \$640,000, 2018-03-01 to 2021-02-28, Award Number: N00014-18-1-2184, Duration: 3.0 years.
- [CG16] Taylor T. Johnson (PI (Sole)), "Understandable and Reusable Formal Verification for Cyber-Physical Systems," Young Investigator Research Program (YIP), Air Force Office of Scientific Research (AFOSR), Award Amount: \$437,469, 2018-02-01 to 2021-01-31, Award Number: FA9550-18-1-0122, Duration: 3.0 years. Due to contractual issues, I had to re-apply and compete for the AFOSR YIP again, which previously was awarded at UT-Arlington [CG9].
- [CG15] Taylor T. Johnson (PI), with Christoph Csallner (Co-PI), "SHF: Small: Automating Improvement of Development Environments for Cyber-Physical Systems (AIDE-CPS)," Software and Hardware

- Foundations, Division of Computing and Communication Foundations, Directorate for Computer and Information Science and Engineering (CISE:CCF:SHF), National Science Foundation (NSF), Award Amount: \$498,437, 2015-09-01 to 2019-08-31, Award Number: 1736323, 1527398, Duration: 4.0 years.
- [CG14] Taylor T. Johnson (Co-PI), with Ali Davoudi (PI), David Levine (Senior Personnel), “Real-time Ab Initio Modeling of Electric Machines,” Energy, Power, Control, and Networks Program, Division of Electrical, Communications and Cyber Systems, Directorate for Engineering (ENG:ECCS:EPCN), National Science Foundation (NSF), Award Amount: \$285,000, 2015-08-01 to 2018-07-31, Award Number: 1509804, Duration: 3.0 years.
- [CG13] Taylor T. Johnson (Co-PI), with Christoph Csallner (PI), “Equivalence Modulo Input (EMI)-Based Validation of CPS Tool Chains,” Development Collaboration Research Grant (DCRG), The MathWorks (MathWorks), Award Amount: \$32,000, 2018-09-01 to 2019-08-31, Duration: 1.0 years.
- [CG12] Taylor T. Johnson (PI (Sole)), “Cyber-Physical Systems Specification Mismatch and Safe Upgrades,” Systems and Software Program (SS), Air Force Office of Scientific Research (AFOSR), Award Amount: \$397,806, 2015-08-15 to 2018-08-14, Award Number: FA9550-15-1-0258, Duration: 3.0 years.
- [CG11] Taylor T. Johnson (PI (Sole)), “CRII: CPS: Safe Cyber-Physical Systems Upgrades,” CISE Research Initiation Initiative, Cyber-Physical Systems Program, Division of Computer and Network Systems, Directorate for Computer and Information Science and Engineering (CISE:CNS:CRII:CPS), National Science Foundation (NSF), Award Amount: \$174,634, 2015-06-15 to 2017-06-14, Award Number: 1713253, 1464311, Duration: 2.0 years.
- [CG10] Taylor T. Johnson (PI), with Gautam Biswas (Co-PI), Clare McCabe (Co-PI), Julie Johnson (Co-PI), “Improving Participation of Female Computer Science Majors and Professionals through Digital Learning with Groups of Mobile Robots Controlled by Android Apps,” MacroGrant, Vanderbilt Institute for Digital Learning (VIDL), Award Amount: \$10,000, 2017-07-01 to 2018-06-30, Duration: 1.0 years.
- [CG9] Taylor T. Johnson (PI (Sole)), “Reusable Formal Verification for Cyber-Physical Systems,” Young Investigator Research Program (YIP), Air Force Office of Scientific Research (AFOSR), Award Amount: \$357,564, 2016-08-01 to 2019-07-31, Award Number: FA9550-16-1-0246, Duration: 3.0 years.
- [CG8] Taylor T. Johnson (Co-PI), with Ali Davoudi (PI, UT-Arlington), Frank Lewis (Co-PI, UT-Arlington), Hamidreza Modares (Co-PI, UT-Arlington), “Testbed Acquisition for Resilient Self-Organizing Microgrids,” Defense University Research Instrumentation Program (DURIP), Office of Naval Research (ONR), Award Amount: \$220,000, 2016-09-15 to 2017-09-14, Award Number: N0014-16-1-3180, Duration: 1.0 years.
- [CG7] Taylor T. Johnson (Co-PI), with Ali Davoudi (PI, UT-Arlington), Frank Lewis (Co-PI, UT-Arlington), Hamidreza Modares (Co-PI, UT-Arlington), “Realizing Resilient Self-Organizing Microgrids,” Department of Defense (DoD) Research and Education Program for Historically Black Colleges and Universities and Minority-Serving Institutions (HBCU/MI) (REP:HBCU/MSI), Army Research Office (ARO), Award Amount: \$300,000, 2016-09-15 to 2017-09-14, Award Number: W911NF-16-1-0534, Duration: 1.0 years.
- [CG6] Taylor T. Johnson (PI (Sole)), “Safely and Securely Controlling Large Swarms of Unmanned Aerial Vehicles (UAVs) with the STabilizing Robot Language (StarL),” Summer of Innovation (Sol), Air Force Research Laboratory (AFRL), Award Amount: \$90,000, 2017-05-01 to 2017-08-31, Award Number: FA8650-12-3-7255, Duration: 0.3 years.
- [CG5] Taylor T. Johnson (PI (Sole)), “Formal Modeling of Emergence in Distributed Cyber-Physical Systems,” Trusted Autonomy and Verification and Validation (VV), Integrated Command and Control (TAVV), Air Force Research Laboratory (AFRL), Award Amount: \$499,546, 2015-04-16 to 2017-04-15, Award Number: FA8750-15-1-0105, Duration: 2.0 years.
- [CG4] Taylor T. Johnson (Co-PI), with Stephen Mattingly (PI), Colleen Casey (Co-PI), “App-Based Crowd Sourcing of Bicycle and Pedestrian Conflict Data,” University Transportation Center for Livable Communities (TRCLC), United States Department of Transportation (USDOT), Award Amount: \$120,001, 2015-08-01 to 2016-07-31, Award Number: DTRT13-G-UTC60, Duration: 1.0 years.
- [CG3] Taylor T. Johnson (PI (Sole)), “Detecting and Mitigating Cyber-Physical Attacks with Invariant Inference and Runtime Assurance,” Summer Faculty Fellowship Program (SFFP), Air Force Office of Scientific Research (AFOSR), Award Amount: \$43,575, 2015-05-18 to 2015-07-31, Duration: 0.2 years.
- [CG2] Taylor T. Johnson (PI), with Ali Davoudi (Co-PI), David Levine (Senior Personnel), “Real-time Ab Initio Modeling of Electric Machines,” Hardware Donation Program (HDP), NVIDIA (NVIDIA), Award Amount: \$4,000, 2014-11-12 to 2014-11-12.

- [CG1] Taylor T. Johnson (PI (Sole)), "Inferring Physical System Specifications from Embedded Software Tests," Visiting Faculty Research Program (VFRP), Air Force Research Laboratory (AFRL), Award Amount: \$27,980, 2014-05-19 to 2014-08-08, Award Number: FA8750-13-2-0115, Duration: 0.2 years.

CONFERENCE AND OTHER TRAVEL GRANTS

- August 2017 **Southeastern Conference (SEC) Faculty Travel Program Award.**
- May 2017 **CPS Verification and Validation: Industrial Challenges and Foundations Workshop (CPS V&V I&F Workshop 2017), Carnegie Mellon University (NSF).**
- March 2015 **NSF CISE CAREER Workshop 2015 (NSF).**
- December 2014 **CPS Verification and Validation: Industrial Challenges and Foundations Workshop (CPS V&V I&F Workshop 2014), Carnegie Mellon University (NSF).**
- December 2012 **IEEE Real-Time Systems Symposium (RTSS), (University of Illinois at Urbana-Champaign Graduate College and NSF).**
- December 2011 **IEEE Conference on Decision and Control (CDC) (University of Illinois at Urbana-Champaign Graduate College and Rockwell Collins).**
- September 2010 **International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS) (NSF).**
- December 2009 **IEEE Real-Time Systems Symposium (RTSS) (NSF).**
- April 2009 **IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS) (NSF).**

OUTREACH

- 2014 – Present **Rice Alumni Volunteers for Admission (RAVA).**
- Interviewed prospective Rice University undergraduate students in-person and via teleconference (around 5 annually), and presented during high school college fairs.
- 2012 – Present **StackExchange and StackOverflow Contributor.**
- Answered over fifty questions related to computer science and programming.
 - Contributed extensively to Microsoft Research's Z3 satisfiability modulo theories (SMT) solver questions, and ranked as the top user not employed by Microsoft.
- 2017 – 2018 **MNPS K-12 Computer Science Curriculum Development.**
- Developed a mobile phone for computer science curriculum and demonstrations using the Raspberry Pi in conjunction with Chaz Carothers, M.Ed., Encore K-4 Teacher in Metro Nashville Public Schools (MNPS), Advanced Academics Resource Teacher (AART), Henry C. Maxwell Elementary School.
- 2014 – 2016 **Judge.**
- January 2016: Congressional STEM Competition Mobile App Contest Judge, El Centro College, Dallas County Community College District, Dallas, TX, sponsored by US Congressman Marc Veasey (http://www.house.gov/content/educate/app_challenge/).
 - May 2014: Congressional STEM Competition Mobile App Contest Judge, El Centro College West Campus, Dallas County Community College District, Dallas, TX, sponsored by US Congressman Marc Veasey (http://www.house.gov/content/educate/app_challenge/).
 - 2014-2015: Computer Science Area Judge, Fort Worth Regional Science and Engineering Fair, University of Texas at Arlington, Arlington, TX.
- 2012 **Demonstrator, Engineering Open House, University of Illinois at Urbana-Champaign, Urbana, IL.**
- Spring 2012: Adam Zimmerman, Matt Johnson, **Taylor T. Johnson**, and Sayan Mitra. Demonstration: Drawing Pictures with Mobile Robots. [video]
- 2007 – 2008 **Mentor for High School Students, DREAM Program, Rice University, Houston, TX.**
- Mentored several underrepresented high school students on science and engineering fair projects.

PROFESSIONAL ACTIVITIES AND SERVICE

PROFESSIONAL LICENSURE

- 2019 – Present **Professional Engineer (PE), License Number 122259, Tennessee Board of Architectural and Engineer Examiners, Passed the NCEES PE exam (Software Engineering) in April 2019, fully licensed since June 2019.**
- 2018 – 2019 **Engineer-in-Training (EiT) / Engineer Intern, License Number 33711, Tennessee Board of Architectural and Engineer Examiners.**

PROFESSIONAL ORGANIZATIONS

- 2019 – Present **Member**, *Association for the Advancement of Artificial Intelligence (AAAI)*.
- 2018 – Present **Member**, *National Society of Professional Engineers (NSPE)*.
- 2016 – Present **Member**, *American Association for the Advancement of Science (AAAS)*.
- 2015 – Present **Member**, *Society of Automotive Engineers (SAE International)*.
- 2014 – Present **Member**, *American Institute of Aeronautics and Astronautics (AIAA)*.
- 2005 – Present **Member**, *Institute of Electrical and Electronics Engineers (IEEE)*.
- 2003 – Present **Member**, *Association for Computing Machinery (ACM)*.

UNIVERSITY SERVICE

- 2021 – Present **Vanderbilt University, Graduate Faculty Council, Executive Committee**.
Invited member of executive committee advising the Graduate School from the School of Engineering
- 2021 – Present **Vanderbilt University, Graduate Faculty Council**.
Elected member advising the Graduate School from the School of Engineering. Participated as a panelist in Graduate Student Orientation
- 2021 – 2022 **Vanderbilt University, Graduate School Search Committee**.
Search committee member for Associate Dean for Academic Affairs of the Graduate School
- 2017 – Present **Vanderbilt University, Ingram Commons, Vanderbilt Visions / VUcept, Faculty VUceptor for a cohort of 18 first-year undergraduates.**, *Fall 2021, Fall 2020, Fall 2019, Fall 2018, Fall 2017*.
- 2020 **Vanderbilt University, Online Course Design Institute (OCDI), Center for Teaching**.
Participated in an online course design institute to better prepare for online and blended online-and-in-person teaching
- 2019 **Vanderbilt University, Ingram Commons, Vanderbilt Visions / VUcept, Student VUceptor Interviewer**.
Interviewed six prospective student VUceptor candidates for the 2019-2020 academic year
- 2018 – 2019 **Vanderbilt University, Ingram Commons, Vanderbilt Visions / VUcept, Commons Reading Selection Committee**.
Evaluated five potential Commons reading book prospects and made recommendations for the 2019 Commons reading
- 2017 – 2019 **Vanderbilt University, VU Women in Science and Engineering and VU Center for Integration of Research, Teaching, and Learning (VU-WiSE and VU-CIRTL) Tiered Mentorship Program (TMP)**, *Participated as a faculty mentor, 2018-2019, 2017-2018*.

COLLEGE/SCHOOL AND DEPARTMENTAL SERVICE

- 2021 – Present **Vanderbilt University, Electrical Eng. and Computer Science, Destination CS / Destination Vanderbilt Faculty Search Committee Member**.
- 2021 – Present **Vanderbilt University, School of Engineering, Director for Master of Engineering (MEng) in Cyber-Physical Systems (CPS)**.
Responsible for all aspects of this professional graduate degree, covering recruitment, advising, program progression (serving as the Director of Graduate Studies [DGS] for the program), marketing, etc
- 2019 – Present **Vanderbilt University, Electrical Eng. and Computer Science, Adviser for Student Team in two F1/10 Autonomous Racecar Competitions held at events such as the Cyber-Physical Systems and Internet-of-Things Week (CPS-IoT Week) 2019 and Embedded Systems Week (ESWeek) 2019 and IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021**.
- 2018 – 2021 **Vanderbilt University, Electrical Eng. and Computer Science, Director of Graduate Recruiting (DGR), Computer Science**.
Helped ACM-W/Women-in-Computing raise funds totaling around \$12.5k for Vanderbilt to serve as a platinum sponsor and for Vanderbilt CS students to attend the Grace Hopper Celebration of Women in Computing in 2019, and again for around a dozen and a half Vanderbilt CS students to attend the 2020 virtual edition. In total, around three dozen Vanderbilt CS students attended through our sponsorship efforts, and myself as CS DGR to help with CS graduate recruiting.
- 2018 – 2020 **Vanderbilt University, Electrical Eng. and Computer Science, Adviser for Student Team in 2018, 2019, and 2020 NSF Cyber-Physical Systems (CPS) Challenges**.

- 2019 **Vanderbilt University, School of Engineering, Profs in the House, Spoke with about 40 first year students about their transition to Vanderbilt.**
- 2019 **Vanderbilt University, Data Science Institute (DSI), Electrical Eng. and Computer Science, Postdoctoral Fellow Selection Committee.**
- 2018 **Vanderbilt University, VandyHacks, Electrical Eng. and Computer Science, Judge for Award Selection.**
- 2017 – Present **Vanderbilt University, Electrical Eng. and Computer Science, Academic Advisor for a cohort of 35 undergraduates in Computer Science (CS) and Computer Engineering (CmpE) for the class of 2021.**
- 2017 – Present **Vanderbilt University, Electrical Eng. and Computer Science, WithIT Computer Science Seminar Organizer.**
- 2016 – Present **Vanderbilt University, Accreditation Board for Engineering and Technology (ABET) Accreditation, Computer Science (CS) and Computer Engineering (CmpE) evaluation development.**
- 2018 – 2019 **Vanderbilt University, Electrical Eng. and Computer Science, Digital Systems (EECE2123) Curriculum Creation Committee.**
 Primary contributor to make a core undergraduate curriculum change for our Computer Science (CS), Computer Engineering (CmpE), and Electrical Engineering (EE) degrees, eliminating two required undergraduate courses (Computer Organization (CS2231) and Digital Logic (EECE2216)) and creating one new required undergraduate course (Digital Systems (EECE2123), then teaching the first iteration of EECE2123 in fall 2019.
- 2016 – 2018 **Vanderbilt University, Graduate Faculty Delegate Assembly (GFDA), Computer Science Representative.**
- 2015 – 2016 **College of Engineering, University of Texas at Arlington, Service and Committees.**
 ○ 2015-2016: Engineering Freshman Interest Group (FIG) Mentor.
- 2013 – 2016 **Department of Computer Science and Eng., University of Texas at Arlington, Committees.**
 ○ 2015 – 2016: Computer Science and Eng. Faculty Search for Three Tenure-Track Positions, Search Committee.
 ○ 2015 – 2016: Computer Science and Eng. CSE2100: Practical Computer Hardware/Software Systems, Curriculum Committee.
 ○ 2013 – 2016: Computer Science and Eng., Computer Engineering Curriculum Committee.
 ○ 2013 – 2016: Computer Science and Eng. PhD Admissions Committee.
 ○ 2013 – 2016: Computer Science and Eng. Graduate Studies Committee (GSC).
 ○ 2013 – 2016: Computer Science and Eng. Colloquium: invited speakers for over eight invited talks.
- 2010–2013 **Electrical and Computer Engineering, University of Illinois at Urbana-Champaign.**
 ○ 2010–2013: Incoming Graduate Student Orientation Program Volunteer and Panelist.
- 2013 – Present **Doctoral Dissertation Committee Membership.**
 ○ 2020 – 2021: Niveditha Manjunath, Informatics, Technical University of Vienna (TU Wien). Adviser: Ezio Bartocci. Reviewer and External Committee Member.
 ○ 2017 – 2020: Ritwika Ghosh, Computer Science, University of Illinois at Urbana-Champaign . Adviser: Sayan Mitra. External Committee Member.
 ○ 2016 – 2019: Fardin Abdi, Electrical and Computer Engineering, University of Illinois at Urbana-Champaign . Adviser: Marco Caccamo. External Committee Member.
 ○ 2015 – 2016: John Podolanko, Computer Science and Eng., University of Texas at Arlington. Adviser: Matthew Wright.
 ○ 2014 – 2016: Brian Cook, Computer Science and Eng., University of Texas at Arlington. Adviser: Manfred Huber.
 ○ 2014 – 2016: Nicholas Brent Burns, Computer Science and Eng., University of Texas at Arlington. Adviser: Gergely Zaruba.
 ○ 2014 – 2015: Seyedali Moayedi, Electrical Engineering, University of Texas at Arlington. Adviser: Ali Davoudi.
 ○ 2014 – 2015: Vahidreza Nasirian, Electrical Engineering, University of Texas at Arlington. Adviser: Ali Davoudi. First position: High-Power Electrical Engineer at TeraDiode, Inc.
 ○ 2013 – 2016: Minh Nguyen, Computer Science and Eng., University of Texas at Arlington. Adviser: Hao Che.
- 2013 – Present **Doctoral Preliminary Exam Committee Membership.**
 Served on around a dozen preliminary exam committees

REVIEWING AND SCHOLARLY COMMUNITY SERVICE

RESEARCH PROPOSAL REVIEWING

- NDSEG Department of Defense National Defense Science and Engineering Graduate Fellowship Program (NDSEG), 2021.
- SMART Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program, Department of Defense (DoD), Reviewer, 2016, 2018, 2019, 2020.
- NSF National Science Foundation (NSF), CISE Review Panels, 2015, 2016, 2017, 2018, 2019, 2020.
- NSF-EPSCoR National Science Foundation (NSF), Ad Hoc Reviewer, 2020.
- NSF-GRFP National Science Foundation (NSF), Graduate Research Fellowship Program (GRFP) Panel, 2020.
- Mitacs Mitacs Canada Accelerate Program, External Reviewer, 2017, 2019.
- Nebraska University of Nebraska, Faculty Grants System Science Request for Applications, 2018.
- NSERC Natural Sciences and Engineering Research Council of Canada (NSERC), External Reviewer, 2017, 2018.
- AFOSR Air Force Office of Scientific Research (AFOSR), External Reviewer, 2015, 2016.
- ORAU Oak Ridge Associated Universities (ORAU), NASA Postdoctoral Program (NPP), 2014.

RESEARCH REVIEWING AND ORGANIZATIONAL SERVICE

- 2009 – Present **Reviewing Service Overview and Verified Publons Record.**
My reviewing service for journals and conferences is verified through Publons, and a summary may be seen below with details at: <https://publons.com/author/522170/taylor-johnson>.

JOURNAL EDITORSHIP

- IET-CTA IET Control Theory & Applications, Guest Editor for Special Issue on Recent Advances in Control and Verification for Hybrid Systems, 2018-2019.

CONFERENCE/WORKSHOP STEERING COMMITTEE MEMBERSHIP

- DHS Methods and Tools for Distributed Hybrid Systems (DHS), Steering Committee Member, 2019-present.
- SNR International Workshop on Symbolic-Numeric Methods for Reasoning about CPS and IoT (SNR, Steering Committee Member), 2018-present.

TECHNICAL PROGRAM COMMITTEE MEMBERSHIP

- FORMATS'22 20th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS 2022), Technical Program Committee, September 2022.
- CAV'22 34th International Conference on Computer Aided Verification (CAV 2022), Technical Program Committee, August 2022.
- CVPR'22 IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2022), Technical Program Committee, June 2022.
- AAAI'22 36th AAAI Conference on Artificial Intelligence (AAAI 2022), Technical Program Committee, February 2022.
- HSCC'22 25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2022), Technical Program Committee, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), May 2022.
- ICCPS'22 13th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2022), Technical Program Committee, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), May 2022.
- ICCV'21 IEEE International Conference on Computer Vision (ICCV 2021), Technical Program Committee, October 2021.
- CVPR'21 IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2021), Technical Program Committee, June 2021.
- AAAI'21 35th AAAI Conference on Artificial Intelligence (AAAI 2021), Technical Program Committee, February 2021.

- SNR'21 **7th International Workshop on Symbolic-Numeric Methods for Reasoning about CPS and IoT (SNR 2021)**, Technical Program Committee, August 2021.
- FMAS'21 **Formal Methods for Autonomous Systems Workshop (FMAS'21)**, Technical Program Committee, Virtual, October 2021.
- ADHS'21 **7th IFAC Conference Analysis and Design of Hybrid Systems (ADHS 2021)**, Technical Program Committee, July 2021.
- SNR'20 **6th International Workshop on Symbolic-Numeric Methods for Reasoning about CPS and IoT (SNR 2020)**, Technical Program Committee, August 2020.
- FMAS'20 **Formal Methods for Autonomous Systems Workshop (FMAS'20)**, Technical Program Committee, Virtual, October 2020.
- NFM'20 **12th NASA Formal Methods Symposium (NFM 2020)**, Technical Program Committee, May 2020.
- HSCC'20 **23rd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2020)**, Technical Program Committee, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), April 2020.
- ICCPS'20 **11th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2020)**, Technical Program Committee, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), April 2020.
- FMAS'19 **Formal Methods for Autonomous Systems Workshop (FMAS'19)**, Technical Program Committee, Porto, Portugal, October 2019.
- F4TDAS'19 **1st International Workshop on Formal Techniques for Dependable Autonomous Systems (F4TDAS'19)**, Technical Program Committee, Turku, Finland, September 2019.
- FoMLAS'19 **2nd Workshop on Formal Methods for ML-Enabled Autonomous Systems (FoMLAS'19)**, Technical Program Committee, New York, NY, July 2019.
- GHC'19 **Anita Borg Institute Grace Hopper Celebration (GHC'19)**, Technical Program Committee, Orlando, FL, October 2019.
- ISORC'19 **22nd IEEE International Symposium on Real-Time Distributed Computing (ISORC'19)**, Technical Program Committee, Valencia, Spain, May 2019.
- ICCPS'19 **10th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2019)**, Technical Program Committee, Cyber-Physical Systems and Internet-of-Things Week (CPS-IoTWeek), April 2019.
- ICCPS-WiP'19 **10th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2019)**, Poster/Demo/Work-in-Progress Sessions, Technical Program Committee, Cyber-Physical Systems and Internet-of-Things Week (CPS-IoTWeek), April 2019.
- HSCC'19 **22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019)**, Technical Program Committee, Cyber-Physical Systems and Internet-of-Things Week (CPS-IoTWeek), April 2019.
- RTSS-AE'18 **39th IEEE Real-Time Systems Symposium (RTSS)**, Artifact Evaluation Committee, Nashville, TN, December 2018.
- TREC4CPS'18 **1st International Workshop on Trustworthy and Real-time Edge Computing for Cyber-Physical Systems (TREC4CPS)**, Technical Program Committee, Real-Time Systems Symposium (RTSS), Nashville, TN, December 2018.
- SNR'19 **5th International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2019)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), Montreal, Canada 2019.
- CPS-SR'19 **2nd Workshop on Cyber-Physical Systems Security and Resilience (CPS-SR 2019)**, collocated with CPSWeek 2019, Technical Program Committee, Montreal, Canada, April 2019.
- EMSOFT'18 **18th ACM International Conference on Embedded Software (EMSOFT 2018)**, Technical Program Committee, Torino, Italy, September-October 2018.
- FAC'18 **9th International Workshop on Frontiers in Analog CAD (FAC 2018)**, Technical Program Committee, Vienna, Austria, May 2018.

- ICCPS'18 **9th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2018)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), April 2018.
- HSCC'18 **21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2018)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), April 2018.
- CPS-SR'18 **1st Workshop on Cyber-Physical Systems Security and Resilience (CPS-SR 2018)**, collocated with CPSWeek 2018, Technical Program Committee, Porto, Portugal, April 2018.
- RTSS-AE'17 **38th IEEE Real-Time Systems Symposium (RTSS)**, Artifact Evaluation Committee, Paris, France, December 2017.
- EMSOFT'17 **17th ACM International Conference on Embedded Software (EMSOFT 2017)**, Technical Program Committee, South Korea, 2017.
- V2CPS'17 **2nd International Workshop on Verification and Validation of Cyber-Physical Systems (V2CPS)**, co-located with the Integrated Formal Methods Conference (iFM 2017), 2017.
- HSCC'17 **20th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2017)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), Pittsburgh, Pennsylvania, April 11-14, 2017.
- RTSS'16 **37th IEEE Real-Time Systems Symposium (RTSS)**, Technical Program Committee, Cyber-Physical Systems Track, Porto, Portugal, December 2016.
- EMSOFT'16 **16th ACM International Conference on Embedded Software (EMSOFT 2016)**, Technical Program Committee, Pittsburgh, PA, October 2-7, 2016.
- ICPP'16 **45th International Conference on Parallel Processing (ICPP 2016)**, Cyber-Physical Systems Track, Technical Program Committee, Philadelphia, PA, August 16-19, 2016.
- HSCC'16 **19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2016)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), Vienna, Austria, April 11-14, 2016.
- SNR'16 **2nd International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR 2016)**, Technical Program Committee, Cyber-Physical Systems Week (CPSWeek), Vienna, Austria, April 11, 2016.
- RTSS'15 **36th IEEE Real-Time Systems Symposium (RTSS)**, Technical Program Committee, Cyber-Physical Systems Track, San Antonio, TX, December 1-4, 2015.
- RSWeek'15 **Distributed Control Paradigms to Enable Resilient Microgrids**, Special Session at IEEE Resilience Week 2015, Co-Organizer, Philadelphia, PA, August 18-20, 2015.
- Compel'15 **16th IEEE Workshop on Control and Modeling for Power Electronics (Compel)**, Technical Program Committee, Vancouver, BC, Canada, July 12-15, 2015.
- RV'14 **14th International Conference on Runtime Verification (RV)**, Toronto, Canada, September 22-25, 2014.

CONFERENCE ORGANIZATIONAL SERVICE

- VNN'21 **2nd International Verification of Neural Networks Competition (VNN-COMP'21)**, Workshop Co-Chair with Changliu Liu and Stanley Bak, Affiliated with CAV 2021.
- ARCH'21 **8th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH) and 5th Hybrid Systems Verification Competition (ARCH-COMP) Repeatability Evaluation Chair, Experimental Evaluation Chair, and Artificial Intelligence and Neural Network Control Systems (AINNCS) Competition Category Chair**, IFAC ADHS, Brussels, Belgium, July 7, 2021.
- VNN'20 **3rd International Workshop on Verification of Neural Networks (VNN20) and 1st International Verification of Neural Networks Competition (VNN-COMP'20)**, Workshop Co-Chair with Changliu Liu, Affiliated with CAV 2020.
- ARCH'20 **7th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH) and 4rd Hybrid Systems Verification Competition (ARCH-COMP) Repeatability Evaluation Chair, Experimental Evaluation Chair, and Artificial Intelligence and Neural Network Control Systems (AINNCS) Competition Category Chair**, IFAC World Congress, Berlin, Germany, July 12, 2020.

- HSCC'20 **23rd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2020)**, Poster and Demo Session Chair, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), April 2020.
- GHC'19 **Anita Borg Institute Grace Hopper Celebration (GHC'19)**, Session Chair, Orlando, FL, October 2019.
- HSCC'19 **22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2019)**, Publicity Chair, Cyber-Physical Systems and Internet of Things Week (CPS-IoTWeek), April 2019.
- ARCH'19 **6th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH) and 3rd Hybrid Systems Verification Competition (ARCH-COMP) Repeatability Evaluation Chair, Experimental Evaluation Chair, and Artificial Intelligence and Neural Network Control Systems (AINNCS) Competition Category Chair, Cyber-Physical Systems Week (CPSWeek)**, Montreal, Canada, April 15, 2019.
- RTSS'18 **39th IEEE Real-Time Systems Symposium (RTSS)**, Local Organizing Committee, Nashville, TN, December 2018.
- SNR'18 **4th International Workshop on Symbolic and Numerical Methods for Reachability Analysis (SNR)**, Co-Chair with Prof. Dr. Martin Fränzle, European Joint Conferences on Theory and Practice of Software (ETAPS), Thessaloniki, Greece, April 14-21, 2018.
- ARCH'18 **5th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH) and 2nd Hybrid Systems Verification Competition (ARCH-COMP) Repeatability Evaluation Chair and Experimental Evaluation Chair**, Oxford, United Kingdom, July 15, 2018.
- ARCH'17 **4th International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH) and 1st Hybrid Systems Verification Competition (ARCH-COMP) Repeatability Evaluation Chair and Experimental Evaluation Chair**, Cyber-Physical Systems Week (CPSWeek), Pittsburgh, PA, April 17, 2017.
- HSCC-RE'17 **19th International Conference on Hybrid Systems: Computation and Control (HSCC 2016)**, Repeatability Evaluation Program Committee, Cyber-Physical Systems Week (CPSWeek), Vienna, Austria, April 11-14, 2016.
- ICCPs-WiP'16 **7th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs)**, Work-in-Progress, Demo, and Poster Chair, Cyber-Physical Systems Week (CPSWeek), Vienna, Austria, April 12, 2016.
- ARCH'16 **3rd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH)**, Experimental Evaluation Chair, Cyber-Physical Systems Week (CPSWeek), Vienna, Austria, April 11, 2016.
- ARCH'15 **2nd International Workshop on Applied Verification for Continuous and Hybrid Systems (ARCH)**, Experimental Evaluation Co-Chair, Cyber-Physical Systems Week (CPSWeek), Seattle, WA, April 13, 2015.
- CSL'12 **4th Annual Symposium on Emerging Topics in Control and Modeling: Networked Systems, Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL**, October 15-16, 2012. Organizing committee chair.
- CPSWeek'11 **Cyber Physical Systems Week (CPSWeek) 2011**, Chicago, IL. Designed program booklet, which was reused for CPSWeek 2012, Beijing, China.
- JOURNAL REVIEWING**
- ACM CSUR **ACM Computing Surveys (CSUR)**, 2020-present.
- IEEE TCAD **IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems**, 2019-present.
- IEEE TPS **IEEE Transactions on Power Systems**, 2019-present.
- IEEE ACCESS **IEEE Access**, 2018-present.
- ACM TOSEM **ACM Transactions on Software Engineering and Methodology**, 2018-present.
- ACTA INF **Acta Informatica**, 2018-present.
- TCS **Elsevier Theoretical Computer Science (TCS)**, 2017-present.
- AUTOMATICA **Elsevier International Federation of Automatic Control (IFAC) Automatica**, 2017-present.

- PIEEE **Proceedings of the IEEE, 2017-present.**
- ACM TCPS **ACM Transactions on Cyber-Physical Systems (TCPS), 2016-present.**
- IJRNC **International Journal of Robust and Nonlinear Control (IJRNC), 2017.**
- IEEE TAC **IEEE Transactions on Automatic Control, 2013-present.**
- IEEE CSM **IEEE Control Systems Magazine (CSM), 2016.**
- IEEE TPEL **IEEE Transactions on Power Electronics (TPEL), 2016.**
- ACM TECS **ACM Transactions on Embedded Computing Systems (TECS), 2015-present.**
- IEEE SJ **IEEE Systems Journal, 2014-present.**
- IET CTA **IET Control Theory and Applications (CTA), 2015.**
- JSSSE **Journal of Systems Science and Systems Engineering (JSSSE), Springer, 2015.**
- JPEDS **International Journal of Parallel, Emergent and Distributed Systems (JPEDS) (previously Parallel Algorithms and Applications), Taylor & Francis, 2015.**
- ACM TAAS **ACM Transactions on Autonomous and Adaptive Systems (TAAS), 2012, 2014.**
- IEEE JSAC **IEEE Journal on Selected Areas in Communications (JSAC), 2012.**
- IEEE TC **IEEE Transactions on Computers, 2009.**

BOOK REVIEWER

- Princeton **Princeton University Press, Book Reviewer for Princeton Series in Applied Mathematics, 2017-2018.**

EXTERNAL REVIEWER FOR CONFERENCES

- CDC'19 **IEEE Conference on Decision and Control (CDC), 2019.**
- ICCAD'18 **IEEE/ACM International Conference On Computer Aided Design (ICCAD), 2018.**
- CDC'18 **IEEE Conference on Decision and Control (CDC), 2018.**
- PECI'18 **IEEE Power and Energy Conference at Illinois (PECI), 2018.**
- ACC'16 **American Control Conference (ACC), 2016.**
- ICST'15 **IEEE International Conference on Software Testing, Verification and Validation (ICST), 2015 Tools Track.**
- MSC'14 **IEEE Multi-Conference on Systems and Control, 2014.**
- PECI'14 **IEEE Power and Energy Conference at Illinois (PECI), 2014.**
- ICCPs'13 **ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs), 2013.**
- HSCC'13 **ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2013.**
- PECI'13 **IEEE Power and Energy Conference at Illinois (PECI), 2013, 2014.**
- HSCC'12 **ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2012.**
- SSS'12 **International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS), 2012.**
- RSS'12 **Robotics: Science and Systems Conference (RSS), 2012.**
- HSCC'11 **ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2011.**
- NFM'11 **NASA Formal Methods Symposium (NFM), 2011.**
- HSCC'10 **ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2010.**

OTHER REVIEWING SERVICE

- 2018 – 2019 **Curriculum Reviewer.**
 - o National Council of Examiners for Engineering and Surveying (NCEES), Fundamental of Engineering (FE) Exam, Professional Activities and Knowledge Study (PAKS), Survey Creation Committee for Electrical/Computer Engineering (2018-2019).

MISCELLANEOUS

- Citizenship **US Citizen.**