Jonathan Sprinkle, Ph.D.

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Computer Science
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───────────────────────────── Education ─────────────────────────────

Ph.D. 2003	Doctor of Philosophy in Electrical Engineering Vanderbilt University

- · Dissertation: Metamodel Driven Model Migration
- · Committee:
  - – Gábor Karsai (Chair)
  - – Ákos Lédeczi
  - – Greg Nordstrom
  - – Doug Schmidt
  - – Janos Sztipanovits

M.Sc. 2000	Master of Science in Electrical Engineering Vanderbilt University

- · Thesis: Model-Integrated Program Synthesis of Agent Negotiation Protocols
- · Readers:
  - – Gábor Karsai
  - – Ted Bapty

B.S. 1999	Bachelor of Science in Electrical Engineering Tennessee Technological University *cum laude, in cursu honorum* Majors: Computer Engineering and Electrical Engineering Minor: Mathematics

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——————————————— Employment History ———————————————

7/2024—	Department Chair
	Vanderbilt University
	Department of Computer Science (https://engineering.vanderbilt.edu/bio/jonathan-sprinkle)
8/2021—	Professor
	Vanderbilt University
	Department of Computer Science (https://engineering.vanderbilt.edu/bio/jonathan-sprinkle)
8/2015— 8/2021	Litton Industries John M. Leonis Distinguished Associate Professor
	University of Arizona
	Department of Electrical and Computer Engineering (http://csl.arizona.edu/sprinkjm)
9/2020— 8/2021	Interim Director
	University of Arizona
	Transportation Research Institute
8/2019— 10/2021	Expert, Cyber-Physical Systems
	National Science Foundation
	Directorate for Computer & Information Science & Engineering Division of Computer and Network Systems
6/2017— 8/2019	Program Director, Cyber-Physical Systems
	National Science Foundation
	Directorate for Computer & Information Science & Engineering Division of Computer and Network Systems
8/2014—	Associate Professor with tenure
	University of Arizona
	Department of Electrical and Computer Engineering
8/2007— 8/2014	Assistant Professor
	University of Arizona
	Department of Electrical and Computer Engineering
9/2005— 6/2007	Executive Director
	Center for Hybrid and Embedded Software Systems—Chess

Department of Electrical Engineering and Computer Sciences

University of California, Berkeley

9/2003—8/2007	Visiting Postdoc
	Department of Electrical Engineering and Computer Sciences
	University of California, Berkeley
7/1999–8/2003	Research Assistant
	Institute for Software Integrated Systems
	Vanderbilt University

Selected Publications

For a full listing of papers, please visit my Google Scholar page.

Recent/Open Access

[1] J. Ji, D. Gloudemans, Y. Wang, G. Zachár, W. Barbour, J. Sprinkle, B. Piccoli, and D. B. Work, "Scalable analysis of stop-and-go waves: Representation, measurements and insights," *Transportation Research Part C: Emerging Technologies*, vol. 182, p. 105385, 2026.

[2] X. Wang, M. Nice, M. Bunting, F. Wu, M. L. D. Monache, J. W. Lee, B. Piccoli, B. Seibold, A. M. Bayen, D. B. Work *et al.*, "Human-in-the-loop classification of adaptive cruise control at a freeway scale," in *Proceedings of the ACM/IEEE 16th International Conference on Cyber-Physical Systems (with CPS-IoT Week 2025)*, 2025, pp. 1–12.

[3] X. Wang, Y. Yang, Y. Shangguan, W. Yan, Z. An, M. Bunting, M. Nice, T. Beckers, M. Ma, D. Work, and J. Sprinkle, "A safety-driven interpretable model for vehicle control with impact on traffic," *IEEE Transactions on Intelligent Transportation Systems*, vol. 26, no. 12, pp. 22 151–22 160, 2025.

[4] Z. An, X. Wang, H. Baier, Z. Chen, A. Dubey, T. T. Johnson, J. Sprinkle, A. Mukhopadhyay, and M. Ma, "Combining llms with a logic-based framework to explain mcts," in *Proceedings of the 24th International Conference on Autonomous Agents and Multiagent Systems*, ser. AAMAS '25. Richland, SC: International Foundation for Autonomous Agents and Multiagent Systems, 2025, p. 2405–2407.

[5] G. Gunter, M. Nice, M. Bunting, J. Sprinkle, and D. Work, "Can control barrier functions keep automated vehicles safe in live freeway traffic?" in *Proceedings of the ACM/IEEE 16th International Conference on Cyber-Physical Systems (with CPS-IoT Week 2025)*, 2025, pp. 1–10.

[6] J. W. Lee, H. Wang, K. Jang, N. Lichtlé, A. Hayat, M. Bunting, A. Alanqary, W. Barbour, Z. Fu, X. Gong *et al.*, "Traffic control via connected and automated vehicles (cavs): An open-road field experiment with 100 cavs," *IEEE Control Systems*, vol. 45, no. 1, pp. 28–60, 2025.

[7] H. Wang, Z. Fu, J. W. Lee, H. N. Z. Matin, A. Alanqary, D. Urieli, S. Hornstein, A. R. Kreidieh, R. Chekroun, W. Barbour *et al.*, "Hierarchical speed planner for automated vehicles: A framework for lagrangian variable speed limit in mixed-autonomy traffic," *IEEE Control Systems*, vol. 45, no. 1, pp. 111–138, 2025.

[8] M. L. D. Monache, S. T. McQuade, H. N. Z. Matin, D. A. Gloudemans, Y. Wang, G. L. Gunter, A. M. Bayen, J. W. Lee, B. Piccoli, B. Seibold *et al.*, "Modeling, monitoring, and controlling road traffic using vehicles to sense and act," *Annual Review of Control, Robotics, and Autonomous Systems*, vol. 8, 2025.

[9] A. Hayat, A. Alanqary, R. Bhadani, C. Denaro, R. J. Weightman, S. Xiang, J. W. Lee, M. Bunting, A. Gollakota, M. W. Nice *et al.*, "Traffic smoothing using explicit local controllers: Experimental evidence for dissipating stop-and-go waves with a single automated vehicle in dense traffic," *IEEE Control Systems*, vol. 45, no. 1, pp. 95–110, 2025.

[10] K. Jang, N. Lichtle, E. Vinitsky, A. Shah, M. Bunting, M. Nice, B. Piccoli, B. Seibold, D. B. Work, M. L. Delle Monache *et al.*, "Reinforcement learning-based oscillation dampening: Scaling up single-agent reinforcement learning algorithms to a 100-autonomous-vehicle highway field operational test," *IEEE Control Systems*, vol. 45, no. 1, pp. 61–94, 2025.

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Preprints

[13] Y. Yan, Y. Liao, G. Xu, R. Yao, H. Fan, J. Sun, X. Wang, J. Sprinkle, Z. An, M. Ma *et al.*, "Large language models for traffic and transportation research: Methodologies, state of the art, and future opportunities," *arXiv preprint arXiv:2503.21330*, 2025.

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Proceedings

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[61] X. Wang, Y. Yang, Y. Shangguan, W. Yan, Z. An, M. Bunting, M. Nice, T. Beckers, M. Ma, D. Work *et al.*, "Interpretable finite state machine controller: a case study on lane merge yield mode," in *2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*. IEEE, 2024, pp. 3823–3828.

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—————————— Meeting and Organization Activities (since 2013) ——————————

2025   Lead organizer, NSF USDOT Workshop on Digital Twins

2024   Chair, Organizing Committee, 2024 National Science Foundation Cyber- Physical Systems Principal Investigators Meeting.

2023   Lead Organizer, 2023 NSF-MOST Workshop on Cyber Physical Systems & Smart and Connected Communities, Taiwan, May 18-20, 2023.

     Publications Co-Chair, 2023 International Conference on Cyber-Physical Systems, ICCPS 2023

     Planning Committee, ISORC 2023

2022   Finance Chair, 4th IFAC Workshop on Cyber-Physical and Human Systems, CPHS 2022

2021   ICCPS 2021 Workshops Co-Chair

     ICRA 2021 (Associate Editor)

2020   Institute for Pure and Applied Mathematics (IPAM) Long Program Co-Chair on "Mathematical Challenges and Opportunities for Autonomous Vehicles"

     IPAM Workshop II Co-Chair, "Safe Operation of Connected and Autonomous Vehicle Fleets"

2019   No organizing activities from June 2017–August 2019, to avoid conflict of interest while at NSF

     ACM SPLASH Workshop on Domain-Specific Modeling (co-organizer)

     IEEE Conference on Decision and Control (CDC) Workshop on AI and Machine Learning for Traffic Control (co-organizer)

     IEEE CDC Tutorial Session: "Autonomous vehicles: From vehicular control to traffic control" (co-organizer)

2018   No organizing activities from June 2017–August 2019, to avoid conflict of interest while at NSF

2017   ACM/IEEE, 1st International Workshop on Safe Control of Connected and Autonomous Vehicles (SCAV 2017, co-organizer)

     The CAT Vehicle Challenge, held at University of Arizona (May 2017)

     No organizing activities from June 2017–August 2019, to avoid conflict of interest while at NSF

2016   ACM SPLASH Workshop on Domain-Specific Modeling (co-organizer)

     Cyber-Physical Systems Virtual Organization (CPS-VO) Challenge, held in Tucson, AZ (Oct 2016)

2015   International Conference on Cyber-Physical Systems (ICCPS), PC

     IEEE Conference on Decision and Control, Reviewer

2014	American Control Conference (ACC), Reviewer
	International Conference on Cyber-Physical Systems (ICCPS), PC, Co-Publicity Chair
	Gerontology, Reviewer
	Cyber-Physical Systems 20 (CPS20), PC
	International Workshop on Model Evolution (ME 2014), PC
	Pearson, Reviewer
2013	20th Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems (ECBS) (General Chair)
	International Conference on Cyber-Physical Systems (ICCPS), PC
	Design, Automation and Test in Europe (DATE), Cyber-Physical Systems Track (TPC)
	The 2nd Workshop on Graphical Modeling Language Development (GMLD) (PC)
	First Workshop on Cyber-Physical Systems Education (Organizing Committee)
	MODELS Workshops Committee (PC)
	International Workshop on Model Evolution (ME 2013) PC
	7th International Workshop on Multi-Paradigm Modeling (MPM'13) (PC)

Government/Professional Research Meetings (since 2013)

As Government	*Selected examples of organization and meeting management activities while in government. Includes activities where discussion and advice was given to grantees who were organizing the workshops and Principal Investigator (PI) meetings.*
	Over 25 NSF panels for which served as the principal Program Director
	NSF Cyber-Physical Systems PI Meeting (2017, 2018)
	NSF Smart and Connected Communities PI Meeting (2018, 2019)
	NSF/CISE Computer and Network Systems Division Retreat (2017, Lead organizer)
	NSF/CISE Computer and Network Systems Division Retreat (2018, co-organizer)
	NSF Workshop on Sustainable Rural/Urban Research Interface (2019)
	NSF Workshop on Transportation and Automation for Sustainable Urban Systems (2019)
As Faculty	NSF Workshop on Accessible Remote Testbeds (2015, speaker)
	NSF Workshop for Aspiring PIs in Cyber-Physical Systems (2014, Lead organizer)

———————————— RESEARCH EXPERIENCE ————————————

CURRENT/
RECENT
PROJECTS

I am listed as Co-PI or serve as a major project manager (along with the other listed personnel) for the following current and recent projects:

DOE CIRCLES

Period of Performance: 1/2020–12/2023; *With A. Bayen (Berkeley, PI), B. Piccoli (Rutgers), B. Seibold (Temple), J. Sprinkle (UA), D. Work (Vanderbilt)*
Brief project description: The project goal is to reduce fuel consumption of all vehicles in the traffic stream via intelligent control of a small number of connected and automated vehicles in the traffic stream. Compared to the baseline vehicular technologies related to cruise controllers and vehicular automation, the proposed work offers a significant departure by designing the control algorithm for the vehicle keeping in mind the impact that one vehicle can have on the overall smoothness of the traffic flow, and consequently the fuel consumption. The proposed work is also distinct from freeway control strategies that appear at fixed locations, such as ramp meters and variable speed limits, which are only able to actuate vehicles at fixed locations on the road network.
Supported by the Department of Engergy (contract pending), through the EERE program, Vehicle Technologies Office.

CPS: Synergy: Collaborative Research: Computationally-Aware Cyber-Physical Systems

Period of Performance: 9/2015–8/2018; *With J. Sprinkle, R. Sanfelice*
Brief project description: This project develops new theory for deciding between the best model to use when making a decision in real time. Our approach is to switch between different predictive models of the system, depending on the computational burden of the associated controller, and the accuracy that the predictive model provides. These tools will pave the way for more kinds of aircraft to navigate closely and safely with one another through the National Air Space (NAS), including Unmanned Air Systems (UAS).
Supported by the National Science Foundation under award #CNS-1544395, Program Officer: David Corman

CPS: The Cyber-Physical Systems Virtual Organization 2 — Active Resources

Period of Performance: 9/2015–8/2017; *With J. Sztipanovits, V. Kumar, P. Tabuada, J. Sprinkle*
Brief project description: This project explores the use of the Cyber-Physical Systems Virtual Organization as a resource that is executable. The goal is to permit tools developed by researchers to be made available through the website in a runnable manner, but also to enable researchers interested in model checking and other kinds of verification and validation tools to access models of other resarchers. Thus the active resources goes beyond a portal to the archived data, and extends to the datasets, tools, and resources that facilitate peer review of other kinds of artifacts.
Supported by the National Science Foundation under award #CNS-1521617, Program Officer: David Corman

CPS: Synergy: Collaborative Research: Control of Vehicular Traffic Flow. . .

Period of Performance: 1/2015–12/2017; *With J. Sprinkle, B. Piccoli, D. Work, B. Seibold*
Brief project description: Full title: CPS: Synergy: Collaborative Research: Control of Vehicular Traffic Flow Via Low Density Autonomous Vehicles. This project develops new models, computational methods, software tools, and engineering solutions to employ autonomous vehicles to detect and mitigate traffic events that adversely affect fuel consumption and congestion. The approach is to combine the data measured by autonomous vehicles in the traffic flow, as well as other traffic data, with appropriate macroscopic traffic models to detect and predict congestion trends and events. Based on this information, the loop is closed by carefully following prescribed velocity controllers that are demonstrated to reduce congestion. These controllers require detection and response times that are beyond the limit of a human's ability. The choice of the best control strategy is determined via optimization approaches applied to the multiscale traffic model and suitable fuel consumption estimation. The communication between the autonomous vehicles, combined with the computational and control tasks on each individual vehicle, require a cyber-physical approach to the problem. This research considers new types of traffic models (micro-macro models, network approaches for higher-order models), new control algorithms for traffic flow regulation, and new sensing and control paradigms that are enabled by a small number of controllable systems available in a flow.
Supported by the National Science Foundation under award #CNS-1446435, Program Officer: Gurdip Singh

CAREER: Domain-Specific Modeling Techniques for Cyber-Physical Systems

Period of Performance: 5/2013–5/2017; *With J. Sprinkle*

Brief project description: The objective of this research is an injection of new modeling techniques into the area of Cyber-Physical Systems (CPSs). The approach is to design new architectures for domain-specific modeling tools in order to permit feedback from analysis, validation, and verification engines to influence how CPSs are designed. This project outlines new research into the integration of existing, heterogeneous modeling languages in order to address problems in CPS design, rather than a single language used to design any CPS. Since many tools for analysis, validation, and verification focus on at most two of the three major components of CPS (communication, computation, and control), new paradigms in modeling are used to integrate tools early in the design process. The algorithms and software developed in this project run validation and verification tools on models, and then close the loop by using the tool outputs to automatically modify the system models.

Supported by the National Science Foundation under award #CNS-1253334, Program Officer: Mimi McClure

REU Site: Cognitive and Autonomous Test Vehicle (CAT Vehicle)

Period of Performance: 5/2013–4/2017; With J. Sprinkle, T. Bose
Brief project description: The motivation for this project is to engage students with the myriad of applications that are related to autonomous ground vehicles. The REU Site will fund 10 students for 10 weeks in the summer, and these participants will sit side-by-side with graduate students working in the fields of autonomous systems and cognitive radio. The project approach utilizes a spiral development process for participant projects, which enables participants to see how a research problem can be decomposed, and also enables each year of the project to build upon previous projects. The process focuses on requirements verification and testing, and thus enables a safe interaction with the CAT Vehicle.

Supported by the National Science Foundation under award #CNS-1262960, Program Officer: Harriet Taylor

PREVIOUS MAJOR PROJECTS

I have served as a responsible manager or main technical lead on these major research projects.

Data-Adaptable Modeling and Optimization for Runtime Adaptable Systems

Period of Performance: 5/2015–4/2016; With R. Lysecky, J. Sprinkle
Brief project description: This project uses a model-integrated approach for holistic optimization of complex, dynamic, heterogeneous systems. The optimization and configuration space are too large to statically optimize such systems, and the system composition itself is dynamic, with vehicles or sensors temporarily being made available, or performing tasks for which they may not have otherwise been intended. To address these concerns, we put forth several research areas in order to decompose the system execution space and reduce the complexity of system specification and the execution of the various optimization schemes. The application scenario used to ground the theoretical research is autonomous system design, specifically applications with sensor-based processing for decision control.

Supported by the Air Force Office of Scientific Research under award #FA9550-15-1-0143, Program Officer: Frederica Darema

NSF Workshop for Aspiring PIs in Cyber-Physical Systems

Period of Performance: 1/2014–12/2014; With J. Sprinkle
Brief project description: The workshop will help aspiring PIs understand what NSF (and importantly, the panels convened by NSF) are expecting to see in a successful CPS proposal. The workshop will include exciting talks by CPS program grantees as well as NSF CPS Program Officers, along with panel discussions with researchers as well as program officers. The agenda also plans significant time for discussions between aspiring PIs and panelists.

Supported by the National Science Foundation under award #CNS-1419419, Program Officer: David Corman

NSF I-Corps: CLD/HT: A Cost-Limited Home Thermostat

Period of Performance: 7/2012–12/2012; With S. Lysecky, X. Qin, M. Teran
Brief project description: This work will produce licensable technology or a manufactured product that can impact this very large percentage of the energy market in the US (and abroad), with little or no necessary construction changes required to the home. The results permit homeowners to correlate their spending directly to their level of (temperature) comfort in their home. This leverages results from cyber-physical systems where the concurrent consideration of system dynamics, software design, and control algorithms permits intuitive specification of system behaviors, without compromising design choices.

Supported by the National Science Foundation under award #IIP-1249175, Program Officer: Errol B. Arkilic

Commodity Sensors for Autonomous Consumer Cars

Period of Performance: 1/2009–; With Various Faculty
Brief project description: Robotic cars are still fragile, and more importantly their ability to navigate depends on sensors that cost more than the cost of the vehicle. This project is ongoing research into the use of commodity sensors that come standard on the car, or are always in the car (such as a cell phone, or rear camera) to localize, and automate, consumer automobiles.
Supported by various grants, and the generosity of college donors at the University of Arizona

Physical Modeling/Software Synthesis for Self-Reconfigurable Sensors in River Environments

Period of Performance: 8/2009–8/2013; With A. Bayen (UC Berkeley) and S. Martinez (UC San Diego)
Brief project description: The objective of this research is the transformation from static sensing into mobile, actuated sensing in dynamic environments, with a focus on sensing in tidally forced rivers. The approach is to develop inverse modeling techniques to sense the environment, coordination algorithms to distribute sensors spatially, and software that uses the sensed environmental data to enable these coordination algorithms to adapt to new sensed conditions.
Supported by the National Science Foundation, under award #CNS 0930919, titled " CPS:Medium:Collaborative Research: Physical Modeling and Software Synthesis for Self-Reconfigurable Sensors in River Environments ". Program Manager: Kishan Baheti.

Data-Adaptable Reconfigurable Embedded Systems (DARES)

Period of Performance: 8/2009–7/2013; With Prof. Roman Lysecky, Prof. Jerzy Rozenblit, Prof. Michael Marcellin
Brief project description: The Data-Adaptable Reconfigurable Embedded Systems (DARES) project focuses on developing hardware/software codesign and reconfigurable computing methodologies driven by data-adaptability. This data-adaptable approach allows designers to directly model data configurability of an application, thereby enabling a solution that can be dynamically reconfigured at runtime based on the profile of incoming data. The DARES project combines modeling techniques for capturing the data configuration space with new hardware/software codesign techniques to synthesize reconfigurable circuits and communication resources directly from the data/application model. The resulting hardware/software implementation provides the flexibility of software with the performance of hardware.
Supported by the National Science Foundation, under award #CNS 0915010, titled " CSR: Small: Data-Adaptable Reconfigurable Embedded Systems (DARES)". Program Manager: D. Helen Gill.

Modeling of Embedded Human Systems

Period of Performance: 8/2009–4/2012; With Diyang Chu (student)
Brief project description: The objective of this research is to develop abstractions of embedded human systems (i.e., where components are necessarily human and computational) that permit computational analysis and verification of their design. Our technical approach is the design and application of an embedded human modeling environment that synthesizes validating simulations, user-driven simulators, and configuration for analysis and verification tools. This modeling environment permits the specification of multi-modal behaviors, and synthesizes additional system constraints based on global design preferences. We will also develop analysis methods that reveal weaknesses in a design when latency, communications breakdown, or ambiguous decision paths are introduced.
Supported by the Air Force Office of Scientific Research, under award #FA9550-091-0519, titled "Modeling of Embedded Human Systems". Program Manager: David Luginbuhl.

STOMA II: Subspace Techniques for Obfuscating Matrix-based Algorithms

Period of Performance: 9/2008–9/2010; With Prof. Mark Neifeld
Brief project description: The objective of this research is the application of graph-based rewriting and code synthesis techniques to matrix-based algorithm obfuscation. A subset of matrix operations can be rewritten in a different subspace, thus increasing artificially the dimensionality of the system. Additional techniques can embed matrix constants that represent significant investments to achieve (e.g., system identification results) into a new subspace, perform operations on the data in that subspace, and then recover unobfuscated matrix results for use in external hardware or algorithms.
Army Research Office, under award #W31P4Q-08-C-0498, titled "Modeling Techniques to Support Matrix-Based Algorithm Obfuscation". Program Manager: Patrick Jungwirth.

C2 Wind Tunnel: High-Level Autonomy for Multi-Rotorcraft Experiments

Period of Performance: 1/2008–5/2009; *With Prof. Janos Sztipanovits, Prof. Claire Tomlin*
Brief project description: Multiple computational nodes performed simulations of quad-rotor vehicle control models, allowing evaluation of various human-UAV interaction protocols through the C2WT infrastructure. This included visualization in Google Earth, and simulation of network traffic in order to present realistic latencies or outages in communications. Contributions included automatic target search and tracking algorithms that take over when the network outage prevents human action, but on-board sensors can work in a degraded operational mode.

MultiCore Hardware Experiments in Software Producibility

Period of Performance: 1/2008–12/2008; *With Prof. Brandon Eames, Utah State University*
Brief project description: Developed as an open collaborative research and development environment to demonstrate, evaluate, and document the ability of novel tools, methods, techniques, and run-time technologies to yield affordable and more predictable production of software intensive systems.

Certification of Flight Critical Systems (CerTA FCS)

Period of Performance: 3/2006–7/2008; *With Jerry Ding, Prof. Shankar Sastry, Prof. Claire Tomlin*
Brief project description: Development of distributed decision protocols for autonomous vehicles.

RESEARCH INTERESTS

My research interest can be broadly called *composable systems*. This falls broadly into the disciplined use of modeling concepts to produce usable systems or software. Applications for this area include control (especially autonomous systems), and systems engineering.

MODELING	Domain-Specific Languages, Domain-Specific Modeling Environments (DSMEs)
	Model-Integrated Computing, model-based code generation
	Modeling and Metamodeling, Model Transformations, Model-Driven Development
	Integrative models for systems composition
	Model-based techniques for system verification
CONTROLS & SYSTEMS	Autonomous Systems
	Cyber-Physical and Embedded Systems
	Model-Predictive Control (MPC)
	Hybrid Systems (Theory and Implementation, Verification)
SYSTEMS ENGINEER-ING	Adding intelligence to platforms and testbeds
	Software Engineering through Systems Modeling
	Executable Model Generation from DSMEs
	Actor-Oriented Design/Implementation

================================ Courses Taught ================================

Autonomous Vehicles and Traffic (Vanderbilt University)

2023, 2024, 2025 — Note: co-taught with Civil and Environmental Engineering. Theory and architectures for software and simulation used in estimation of traffic. Interdisciplinary teams will design and implement autonomous vehicle speed controllers, and explore the impact of those controllers at scale though simulation, to compare theoretical predictions with results. Teams controllers are deployed on the open road with data feedback given for iteration. Starting in 2025, this course was a Projects class that satisfies the graduation and Vanderbilt Immersion requirements for CS students.

Foundations of Machine Learning (Vanderbilt University)

2022, 2023, 2024 — Theoretical and algorithmic foundations of machine learning and statistical pattern recognition. The set of topics and areas covered by this course include: regression; support vector machines; neural networks; clustering and dimensionality reduction; bias/variance tradeoffs; feature selection; data pre-processing.

Principles of Software Engineering (Vanderbilt University)

2021, 2022 — The nature of software. The object-oriented paradigm. Software life-cycle models. Requirements, specification, design, implementation, documentation, and testing of software. Object-oriented analysis and design. Software maintenance.

Automatic Control (University of Arizona)

2011, 2013, 2020 — Linear control system representation in time and frequency domains, feedback control system characteristics, performance analysis and stability, and design of control.

Computer Programming II (University of Arizona)

2014, 2015, 2019 — C and C++ programming. Core design and analysis of engineering algorithms and structures including lists, trees, graphs, traversal, and encoding. Fundamentals of C and C++ programming languages including pointers, structures, unions, and introduction to classes. Programming design topics including memory management, abstraction and design of advanced structures, and basics of software engineering.

Model-Integrated Computing (University of Arizona)

2008, 2010, 2012, 2014, 2016 — Modeling, metamodeling, advanced object-oriented system design, model-integrated computing, and integrated systems. Behavioral, structural, and process modeling are among the modeling approaches to be examined. Additional topics include semantic mapping, models of computation, graph rewriting, and domain-specific modeling. Features an individual project performed over the course of the semester.

Object-Oriented Software Design (University of Arizona)

2007–2010 — Concepts of object-oriented software design, with programming exercises as proofs of concept (i.e., not primarily a programming course). The set of topics and areas include OO computing concepts, OO designs and architectures, classic OO (classes, message passing, inheritance, polymorphism, dynamic binding), introduction to UML, and a project approved by the instructor, and performed by a team (not an individual).

Software Engineering Concepts (University of Arizona)

2008, 2010–2014, 2016, 2017	In-depth consideration of each of the phases of the software project life cycle. Object-oriented design and programming. Includes a large-scale software development project involving groups of students.

Honors

Awards	Institutional Lead Award, IEEE Intelligent Transportation Systems Society (2024), as part of the CIRCLES Project.
	Distinguished Lecturer, IEEE Intelligent Transportation Systems Society (2024-2026).
	Distinguished Scholar of the University of Arizona. This Provost-level award and honorary title was conferred upon 3 faculty across the University in 2020.
	Named the Litton Industries John M. Leonis Distinguished Associate Professor of Electrical and Computer Engineering at the University of Arizona. This endowed chair is a rotating honor for a tenured associate professor, or full professor who has held that rank for fewer than 5 years. (2015—2021)
	University of Arizona "Catapult Award" for Excellence in Technology Transfer for the College of Engineering (2014)
	College of Engineering Faculty Support Grant, made possible by the generosity of Ed and Joan Biggers to the University of Arizona College of Engineering
	IBM Fellow, graduate study at Vanderbilt University.
White House Fellow	I was selected as a regional finalist for the 2005–2006 White House Fellows Program—self described as "one of the Nation's most prestigious programs for leadership and public service." The webpage denotes that "[s]election as a White House Fellow is highly competitive and based on a record of remarkable professional achievement early in one's career, evidence of leadership skills, a strong commitment to public service, and the knowledge and skills necessary to contribute successfully at the highest levels of the Federal government." I participated in a regional interview of 12 regional finalists, two of whom were selected as fellows for the 2005–2006 year. For more information, see http://www.whitehouse.gov/fellows/news/20050228.html.
Nobel Meeting	I was selected as one of nine young researchers in the United States by the Oak Ridge Associated Universities to participate in the 52nd Meeting of Nobel Laureates in Lindau, Germany, July 2002. The meeting consists of small group discussions and informal talks between students and laureates, as well as meals with distinguished scientists such as Sir Harry Kroto and Rudolf Mössbauer. For more information, see http://www.orau.gov/orise/edu/lindau2002/.
Master Teaching Fellow	Master Teaching Fellow in the Center for Teaching at Vanderbilt University. This position was conferred on me for the 2002–2003 academic year. In my appointment, I (along with nine other graduate students selected from all graduate and professional schools at Vanderbilt University)

· served as counselor to teaching assistants (TAs) in all disciplines;

· played a formative role in the integration of new TAs into Vanderbilt by leading workshops at TA Orientation, a mandatory event for TAs during their tenure at Vanderbilt;

· gave consultations to TAs concerned with their performance, or as required by their supervisor;

· sponsored and organized graduate student workshops dealing with academia-related topics;

· served as liaison between TAs and their students when providing mid-term feedback regarding course dynamics;

For more information, see http://www.vanderbilt.edu/cft/.

UNDERGRADUATE	TTU Student Body President
	Campus Leader of the Year 1997–98
	Student Government Legislator of the Year, 1997–98
	Derryberry Award Finalist
	TTU nominee for Rhodes Scholar
VARIOUS	United States Skills Olympics (National), 4th place, Extemporaneous Speech (1994)
	Eagle Scout with six Eagle Palms (1993)

──────────────── ADDITIONAL SERVICE ────────────────

DEPARTMENTAL	VUBroadening Participation in Computing area lead for Computer Science Mentoring (2023–)
	VUExecutive Council, Institute for Software Integrated Systems (2022–)
	Co-organizer, 25th Anniversary of the Institute for Software Integrated Systems (2023)
	NSF CAREER Mentoring (2014–)
	UA College Advisory Committee, Vice Chair (2017)
	UA College Advisory Committee (2015–2017)
	UA ECE Undergraduate Studies Committee (2016–2017)
	UA ECE Executive Committee (2013–2016)
	Organizer, ECE Currents (2009-2012)
	Judge, UA ECE372 Final Projects (Fall 2007, Spring 2009, Spring 2010)
	Reader, UA ECE Graduating Seniors' Writing Portfolios (2007-2009)
	Organizer, UA ECE Computer Engineering Seminar (2008-2009)
UNIVERSITY	College of Connected Computing Dean Search Committee (2024-2025)
	College of Connected Faculty Advisory Committee (2025–)
	College of Connected Computing Task Force (2024-2025)
	Member, Chancellor's Advisory Group on Innovation and the Nashville Ecosystem, VU (2024–)
	Member, College of Connected Computing Task Force, VU (2024–)
	Co-Char, Senate Affairs Committee, Faculty Senate, VU (2022–2025)
	Mentoring lead, Broadening Participation in Computing, VU (2023–)

Elected Senator, School of Engineering, VU (2022–2025)

Member, UA University Administrator Review Committee (2015–2016)

Member, UA Faculty Intellectual Property Committee (2013–2017)

Member, UA Faculty Senate Research Policy Committee (2010-2012, 2013–2017)

Member, UA Faculty Senate Task Force on Student Retention and Advancement (2007-2008)

IEEE   Member, Board of Governers, Intelligent Transportation Society (2023–2025)

Distinguished Lecturer, Intelligent Transportation Society (2024–2026)

Government   NSF Cyber-Physical Systems (CPS), Program Director (2017-19)

NSF Smart and Connected Communities (S&CC), Program Director (2017-19)

NSF Research Experiences for Undergraduates (REU) Sites, Program Director (2017-18)

NSF Formal Methods in the Field (FMitF), Program Director (2019)

NSF CAREER, Program Director (2017-19)

NSF EPSCoR Co-funding Representative for CISE (2018-19)

NSF Independent Research/Development (IR/D) Council Representative for CISE (2018-19)

NSF Directorate for Environmental Research and Education (ERE) Representative for CISE (2018-19)

Memberships

Professional   Senior Member, Institute of Electrical and Electronics Engineers (IEEE)

Senior Member, American Institute of Aeronautics and Astronautics (AIAA)

Senior Member, Association for Computing Machinery (ACM)

IEEE Intelligent Transportation Systems Society, Computer Society, Controls Society, Education Society

ACM SIGBED (Special Interest Group on Embedded Systems)

Engineer in Training (EIT), tested May 1999

Elected Honors   Mortarboard National Honor Society

Omicron Delta Kappa (OΔK) Honor Society

Tau Beta Pi (TBΠ) Engineering Honor Society

Eta Kappa Nu (HKN) National Electrical and Computer Engineering Honor Society

The Honor Society of Phi Kappa Phi (ΦKΦ)

Kappa Mu Epsilon (KME) Mathematics Honor Society

Education   Future Faculty Preparation Program (F2P2) graduate (VU)

IEEE Education Society

Community   Boy Scouts of America

United States Golf Association

United States Tennis Association

─────────────────────── Hobbies and Interests ───────────────────────

Sports   Golf, Tennis, Backpacking

Board   Euchre, Rook
and card   Crosswords, Sudoku
games   Mind-stretching games, e.g., Set, Scrabble, and chess.

/etc   Acoustic and electric guitar
                My Erdős number is 4 (see http://www.oakland.edu/enp for more information).

─────────────────────── References and Colleagues ───────────────────────

Academic   Prof. Janos Sztipanovits
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                Vanderbilt University, Nashville, TN
                janos.sztipanovits@vanderbilt.edu

                Prof. Radha Poovendran
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                University of Washington
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                Prof. Shankar Sastry
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