

Dr. Theodore (Ted) P. Pavlic

CONTACT INFORMATION	Arizona State University School of Computing, Informatics, and Decision Systems Engineering PO Box 878809, Room 553 Tempe, AZ 85287-8809 USA	<i>Work:</i> +1-480-965-2899 <i>Fax:</i> +1-480-965-2751 <i>E-mail:</i> tpavlic@asu.edu <i>WWW:</i> www.tedpavlic.com
RESEARCH INTERESTS	Complex adaptive systems in control systems engineering and behavioral science: distributed algorithms, computational agent-based modeling, hybrid dynamic systems, decentralized decision making, emergence and self organization, amorphous computing, autonomous systems, control, communications, verification, cooperation, optimization, game theory, resource allocation, parallel computation, robotics, energy systems, sustainability in the built environment, behavioral ecology, engineering education, bio-mimicry and bio-inspiration	
CURRENT ACADEMIC APPOINTMENTS	Assistant Professor , Arizona State University School of Computing, Informatics, and Decision Systems Engineering (50%) School of Sustainability (25%) School of Complex Adaptive Systems (25%) <ul style="list-style-type: none">Affiliations:<ul style="list-style-type: none">School of Life Sciences (Adjunct Professor)The Biomimicry Center (Associate Director of Research)ASU–Santa Fe Institute Center for Biosocial Complex Systems (ASU–SFI Fellow)Barrett, the Honors College (Honors Faculty)BEYOND Center for Fundamental Concepts in ScienceCenter for Social Dynamics and ComplexityCenter for Biodiversity OutcomesGlobal Security InitiativeCenter for Biocomputation, Security, and Society	August 2015 to present
	External Faculty , Human Computation Institute	June 2015 to present
PREVIOUS ACADEMIC APPOINTMENTS	Associate Research Scientist , Arizona State University School of Life Sciences <ul style="list-style-type: none">Affiliations:<ul style="list-style-type: none">School of Computing, Informatics, and Decision Systems EngineeringBEYOND Center for Fundamental Concepts in ScienceCenter for Social Dynamics and ComplexityLaboratories:<ul style="list-style-type: none">Stephen C. Pratt’s Collective Behavior LaboratoryAutonomous Collective Systems Laboratory (PI: Spring Berman)Emergence@ASU (PI: Paul C. W. Davies, co-PI: Sara I. Walker)	August 2014 to July 2015
	Postdoctoral Scholar , Arizona State University School of Life Sciences <ul style="list-style-type: none">Supervisor: Professor Stephen C. PrattDecentralized decision making and behavioral bio-mimicry of social insects	July 2012 to August 2014
	Postdoctoral Researcher , The Ohio State University Department of Computer Science and Engineering <ul style="list-style-type: none">NSF ECCS-0931669: “Autonomous Driving in Mixed-Traffic Urban Environments”<ul style="list-style-type: none">Supervisor (co-PI): Professor Paolo A. G. SivilottiPI: Professor Ümit Özgüner	September 2010 to June 2012

EDUCATION

The Ohio State University, Columbus, OH

Ph.D., Electrical and Computer Engineering, August 2010

- Thesis Topic: *Design and Analysis of Optimal Task-Processing Agents*
- Candidacy: *Research Problems in Distributed Control for Energy Systems*
- Adviser: Professor Kevin M. Passino
- Area of Study: Control Engineering

M.S., Electrical and Computer Engineering, August 2007

- Thesis Topic: *Optimal Foraging Theory Revisited*
- Adviser: Professor Kevin M. Passino
- Area of Study: Control Engineering

B.S., Electrical and Computer Engineering, June 2004

- *Magna cum Laude*, With Honors in Engineering
- Electrical specialization (emphasis on electromagnetics and digital computers)
- Minor in Computer and Information Systems (programming and algorithms)

REFEREED
JOURNAL
PUBLICATIONS

- [1] Caetano-Anollés, K., B. Ewers, S. Iyer, J.R. Lucas, T.P. Pavlic, A.P. Seale, and Y. Zeng. A minimal framework for describing living systems: a multi-dimensional view of life across scales. *Journal of Integrative and Comparative Biology*. 2021. Accepted.
- [2] Pavlic, T.P., J. Hanson, G. Valentini, S.I. Walker, and S.C. Pratt. Quorum sensing without deliberation: Biological inspiration for externalizing computation to physical spaces in multi-robot systems. *Swarm Intelligence*. 2021. In press.
- [3] Baudier, K., and T.P. Pavlic. Incidental interactions among Neotropical army-ant colonies are met with self-organized walls of ants (Hymenoptera: Formicidae). *Myrmecological News*, 30:251–258. 2020. doi:10.25849/myrmecol.news_030:251
- [4] Wheatley, R., T.P. Pavlic, O. Levy, and R.S. Wilson. Habitat features and performance interact to determine the outcomes of terrestrial predator–prey pursuits. *Journal of Animal Ecology*, 89(12):2951–2971. 2020. doi:10.1111/1365-2656.13353
- [5] Valentini, G., N. Mizumoto, S.C. Pratt, T.P. Pavlic, S.I. Walker. Revealing the structure of information flows discriminates similar animal social behaviors. *eLife*, 9:e55395. 2020. doi:10.7554/eLife.55395
- [6] Valentini, G., N. Masuda, Z. Shaffer, J.R. Hanson, T. Sasaki, S.I. Walker, T.P. Pavlic, and S.C. Pratt. Division of labour promotes the spread of information in colony emigrations by the ant *Temnothorax rugatulus*. *Proceedings of the Royal Society B: Biological Sciences*, 287:20192950. doi:10.1098/rspb.2019.2950
- [7] Baudier, K., M.M. Bennett, M.M. Ostwald, S. Hart, T.P. Pavlic, and J.H. Fewell. Age-based changes in kairomone response mediate task partitioning in stingless bee soldiers (*Tetragonisca angustula*). *Behavioral Ecology*, 74(10):1–9. 2020. doi:10.1007/s00265-020-02902-4
- [8] Wilson, R.S., T.P. Pavlic, R. Wheatley, A.C. Niehaus, and O. Levy. Modeling escape success in terrestrial predator–prey interactions. *Integrative & Comparative Biology*, 60(2):497–508. 2020. doi:10.1093/icb/icaa070
- [9] Baudier, K., M.M. Ostwald, C. Grueter, F. Segers, D. Roubik, T.P. Pavlic, S.C. Pratt, and J.H. Fewell. Changing of the guard: flexible specialization and age polyethism in nest defense of the stingless bee *Tetragonisca angustula*. *Behavioral Ecology*, 30(4):1041–1049. 2020. doi:10.1093/beheco/arz047

- [10] Burchill, A., and T.P. Pavlic. Dude, Where's my Mark? Creating Robust Animal Identification Schemes Informed by Communication Theory. *Animal Behaviour*, 154:203–208. 2019. doi:10.1016/j.anbehav.2019.05.013
- [11] Hunter, A., M.J. Angilletta Jr., T.P. Pavlic, G. Lichtwark, and R.S. Wilson. Modeling the two-dimensional accuracy of soccer kicks. *Journal of Biomechanics*, 72:159–166, April 27, 2018. doi:10.1016/j.jbiomech.2018.03.003
- [12] Pavlic, T.P., S. Wilson, G.P. Kumar, and S. Berman. Control of stochastic boundary coverage by multi-robot systems. *Journal of Dynamic Systems, Measurement, and Control [Special Issue on Stochastic Models, Control and Algorithms in Robotics]*, 137(3):034504, March 1, 2015. doi:10.1115/1.4028353
- [13] Wilson, S., T.P. Pavlic, G.P. Kumar, A. Buffin, S. Pratt, and S. Berman. Design of ant-inspired stochastic control policies for collective transport by robotic swarms. *Swarm Intelligence*, 8(4):303–327, December 2014. doi:10.1007/s11721-014-0100-8
- [14] Pavlic, T.P., and K.M. Passino. Distributed and Cooperative Task Processing: Cournot Oligopolies on a Graph. *IEEE Transactions on Cybernetics*, 44(6):774–784, June 2014. doi:10.1109/TCYB.2013.2271776
- [15] Pavlic, T.P., and K.M. Passino. Generalizing foraging theory for analysis and design. *The International Journal of Robotics Research [Special Issue on Stochasticity in Robotics and Bio-Systems Part 1]*, 30(5):505–523, 2011. doi:10.1177/0278364910396551
- [16] Pavlic, T.P., and K.M. Passino. The sunk-cost effect as an optimal rate-maximizing behavior. *Acta Biotheoretica*, 59(1):53–66, 2011. doi:10.1007/s10441-010-9107-8
- [17] Pavlic, T.P., and K.M. Passino. When rate maximization is impulsive. *Behavioral Ecology and Sociobiology*, 64(8):1255–1265, August 2010. doi:10.1007/s00265-010-0940-1
- [18] Pavlic, T.P., and K.M. Passino. Foraging theory for autonomous vehicle speed choice. *Engineering Applications of Artificial Intelligence*, 22(3):482–489, April 2009. doi:10.1016/j.engappai.2008.10.017
- REFEREED
CONFERENCE
PUBLICATIONS
- [19] Baudier, K., and T.P. Pavlic. Multi-Level Instrumentation of Bivouac Thermoregulation: Current Methods and Future Directions. In: *Proceedings of the 4th International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM-2021)*, June 1–4, 2021. Kyoto, Japan.
- [20] Choi, T., B.P. Pyenson, J. Liebig, and T.P. Pavlic. Beyond Tracking: Using Deep Learning to Discover Novel Interactions in Biological Swarms. In: *Proceedings of the 4th International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM-2021)*, June 1–4, 2021. Kyoto, Japan.
- [21] Choi, T., B.P. Pyenson, J. Liebig, and T.P. Pavlic. Identification of Abnormal States in Videos of Ants Undergoing Social Phase Change. In: *Proceedings of the Thirty-Third Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-21)*, February 4–6, 2021. Virtual conference.
- [22] Choi, T., and T.P. Pavlic. Automatic Discovery of Motion Patterns that Improve Learning Rate in Communication-Limited Multi-Robot Systems. In: *Proceedings of the 2020 IEEE Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI 2020)*, September 14–16, 2020. Karlsruhe, Germany. doi:10.1109/MFI49285.2020.9235218
- [23] Kang, S., T. Choi, and T.P. Pavlic. How far should I watch? Quantifying the effect of various observational capabilities on long-range situational awareness in multi-robot teams. In: *Proceedings of the 2020 IEEE International Conference on Autonomic Computing*

and *Self-Organizing Systems (ACSOS 2020)*, August 17–21, 2020. Washington, DC, USA. doi:10.1109/ACSOS49614.2020.00036

- [24] Choi, T., S. Kang, and T.P. Pavlic. Learning local behavioral sequences to better infer non-local properties in real multi-robot systems. In: *Proceedings of the 2020 IEEE International Conference on Robotics and Automation (ICRA 2020)*, May 31 – August 31, 2020. Paris, France. doi:10.1109/ICRA40945.2020.9196728
- [25] Bowers, K.P., L.G. Strickland, G. Cooke, C. Pippin, and T.P. Pavlic. Trust-based Information Propagation on Multi-robot Teams in Noisy Low-communication Environments. In: *Proceedings of the 14th International Symposium on Distributed Autonomous Robotic Systems (DARS 2018)*, October 15–17, 2018. Boulder, CO, USA.
- [26] Strickland, L.G., K. Baudier, K.P. Bowers, T.P. Pavlic, and C. Pippin. Bio-Inspired Role Allocation of Heterogeneous Teams in a Site Defense Task. In: *Proceedings of the 14th International Symposium on Distributed Autonomous Robotic Systems (DARS 2018)*, October 15–17, 2018. Boulder, CO, USA.
- [27] Valentini, G., D.G. Moore, J.R. Hanson, T.P. Pavlic, S.C. Pratt, and S.I. Walker. Transfer of Information in Collective Decisions by Artificial Agents. In: *Proceedings of the 2018 Conference on Artificial Life (ALIFE 2018)*, July 23–27, 2018. Tokyo, Japan.
- [28] Choi, T., T.P. Pavlic, and A. Richa. Automated Synthesis of Scalable Algorithms for Inferring Non-Local Properties to Assist in Multi-Robot Teaming. In: *Proceedings of the 2017 IEEE International Conference on Automation Science and Engineering (CASE 2017)*, August 20–23, 2017. doi:10.1109/COASE.2017.8256320
- [29] Tuncali, C.E., S. Yaghoubi, T.P. Pavlic, and G. Fainekos. Functional Gradient Descent Optimization for Automatic Test Case Generation for Vehicle Controllers. In: *Proceedings of the 2017 IEEE International Conference on Automation Science and Engineering (CASE 2017)*, August 20–23, 2017. doi:10.1109/COASE.2017.8256245
- [30] Tuncali, C.E., T.P. Pavlic, and G. Fainekos. Utilizing S-TaLiRo as an Automatic Test Generation Framework for Autonomous Vehicles. In: *Proceedings of the 19th International Conference on Intelligent Transportation Systems (ITSC 2016)*, November 1–4, 2016. doi:10.1109/ITSC.2016.7795751
- [31] Campbell, J., C.E. Tuncali, P. Liu, T.P. Pavlic, U. Ozguner, and G. Fainekos. Modeling concurrency and reconfiguration in vehicular systems: A π -calculus approach. In: *Proceedings of the 2016 IEEE International Conference on Automation Science and Engineering (CASE 2016)*, August 21–24, 2016. doi:10.1109/COASE.2016.7743450
- [32] Pavlic, T.P., A. Adams, P.C.W. Davies, and S.I. Walker. Self-referencing cellular automata: A model of the evolution of information control in biological systems. In: *Proceedings of the 14th International Conference on the Synthesis and Simulation of Living Systems (ALIFE 14)*, July 30 – August 2, 2014. doi:10.7551/978-0-262-32621-6-ch083
- [33] Pavlic, T.P. Using Physical Stigmergy in Decentralized Optimization Under Multiple Non-separable Constraints: Formal Methods and an Intelligent Lighting Example. In: *Proceedings of the 2014 Workshop on Nature Inspired Distributed Computing (NI-DISC 2014)*, pp. 402–411, May 19, 2014. doi:10.1109/IPDPSW.2014.52
- [34] Pavlic, T.P., S. Wilson, G.P. Kumar, and S. Berman. An enzyme-inspired approach to stochastic allocation of robotic swarms around boundaries. In: *Proceedings of the 16th International Symposium on Robotics Research (ISRR 2013)*, pp. 631–647, December 16–19, 2013. doi:10.1007/978-3-319-28872-7_36

- [35] Kumar, G.P., A. Buffin, T.P. Pavlic, S.C. Pratt, and S.M. Berman. A Stochastic Hybrid System Model of Collective Transport in the Desert Ant *Aphaenogaster cockerelli*. In: *Proceedings of the 16th International Conference on Hybrid Systems: Communication and Control (HSCC 2013)*, pp. 119–124, April 8–11, 2013. doi:10.1145/2461328.2461349
- [36] Pavlic, T.P., and K.M. Passino. Cooperative task-processing networks. In: *Proceedings of the Second International Workshop on Networks of Cooperating Objects (CONET 2011)*, April 11, 2011.
- [37] Freuler, R.J., M.J. Hoffmann, T.P. Pavlic, J.M. Beams, J.P. Radigan, P.K. Dutta, J.T. Demel, and E.D. Justen. Experiences with a Comprehensive Freshman Hands-On Course – Designing, Building, and Testing Small Autonomous Robots. In: *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, 2003.

PATENTS

- [38] Tuncali, C.E., T.P. Pavlic, and G. Fainekos. Model predictive adaptive cruise control for reducing rear-end collision risk with follower vehicles. US Patent 10766489B2, 2020.

CONFERENCE
TALKS

Talks associated with conference publications listed above are not included here.

- [39] Lynch, C., I. Bespalova, T.P. Pavlic and J.H. Fewell. How to Effectively Sample to Estimate Distributions of Behavioral States and Transitions in Social Insects. In: *4th International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM-2021)*, June 1–4, 2021. Kyoto, Japan.
- [40] Navas Zuloaga, M.G., K.M. Baudier, T.P. Pavlic, J.H. Fewell, N. Ben-Asher, and Y. Kang. A mathematical model of flexible collective defense: crisis response in stingless bees. In: *International Symposium on Biomechanics & Ecology Education & Research (BEER 2020)*, November 13–15, 2020. Illinois State University.
- [41] Burchill, A.T., K.S. O’Meara, T.P. Pavlic, S.C. Pratt, and C.R. Reid. “Cooperatively transporting massive prey up vertical surfaces in the weaver ant *Oecophylla smaragdina*.” *Entomology 2019*, November 17–20, St. Louis, MO.
- [42] Baudier, K.M., M.M. Bennett, J.H. Fewell, T.P. Pavlic. Neural and physiological underpinnings of defense specialization in soldiers of the stingless bee *Tetragonisca angustula*. *Entomology 2019*, November 17–20, St. Louis, MO.
- [43] Valentini, G., N. Mizumoto, T.P. Pavlic, S.C. Pratt, and S.I. Walker. Complex Communication: Receiver-Sourced Signals that Regulate Information Flow During Social Recruitment. *Behaviour 2019*, July 23–27, 2019, Chicago, IL.
- [44] X. Guo, M. Lin, L. Saldyt, T.P. Pavlic, Y. Kang, J.H. Fewell. A study of alarm propagation in ants with machine learning and network building. *Behaviour 2019*, July 23–27, 2019, Chicago, IL.
- [45] Burchill, A.T., C. Reid, K. O’Meara, T.P. Pavlic, S. Pratt. Collective transport up vertical surfaces in the weaver ant *Oecophylla smaragdina*. *Behaviour 2019*, July 23–27, 2019, Chicago, IL.
- [46] Baudier, K., M. Bennett, J.H. Fewell, S.C. Pratt, T.P. Pavlic. Ageing modulates defensive tasks performed by soldiers of the stingless bee *Tetragonisca angustula*. *Behaviour 2019*, July 23–27, 2019, Chicago, IL.
- [47] Pavlic, T.P., J.R. Hanson, G. Valentini, S.I. Walker, and S.C. Pratt. Cognition in physical spaces: A quorum-sensing mechanism for ants without sequential sampling. *Behaviour 2019*, July 23–27, 2019, Chicago, IL.
- [48] Pavlic, T.P. Distributed Non-linear Optimization under Non-separable Constraints: A Low-communication Approach with a Power Systems Example. In: *2018 INFORMS Annual Meeting*, November 4–7, 2018. Phoenix, AZ, USA.

- [49] Xin Su, and T.P. Pavlic. Improving Exploration in Population-based Metaheuristics using Fading Consensus: Application to PSO. In: *2018 INFORMS Annual Meeting*, November 4–7, 2018. Phoenix, AZ, USA.
- [50] Pavlic, T.P. Intake Targets or Rate Maximization? A Foraging Currency that Aligns OFT and the GF. In: *International Society for Behavioral Ecology 2018 Conference (ISBE 2018)*, August 11–16, 2018. Minneapolis.
- [51] Valentini, G., S. Zhou, J.R. Hanson, T.P. Pavlic, S.C. Pratt, and S.I. Walker. Information transfer during tandem-running behavior of the ant *Temnothorax rugatulus*: Time scales of leadership? In: *International Union for the Study of Social Insects 2018 Meeting (IUSSI 2018)*, August 5–10, 2018. Guarujá, Brazil.
- [52] Baudier, K.M., J. Fewell, T.P. Pavlic, and S.C. Pratt. Changing of the Guard: Task dynamics of stingless bee nest defense in cleptoparasitic environments. In: *International Union for the Study of Social Insects 2018 Meeting (IUSSI 2018)*, August 5–10, 2018. Guarujá, Brazil.
- [53] Pavlic, T.P., J.R. Hanson, G. Valentini, S.I. Walker, and S.C. Pratt. Quorum sensing without counting, a discounting approach, or: Nobody goes there anymore, it's too crowded. In: *6th Workshop on Biological Distributed Algorithms (BDA 2018)*, July 23, 2018. London, UK.
- [54] Burchill, A., T.P. Pavlic, and S.C. Pratt. Macronutrient regulation and foraging strategies in the Neotropical ant *Ectatomma ruidum*. In: *2017 Annual Meeting of the Entomological Society of America*, November 5–8, 2017. Denver, CO, USA.
- [55] Xin Su, and T.P. Pavlic. Characterization and Prediction of Hyper-jump Diffusion in Consensus Dynamics on Networks. In: *2017 INFORMS Annual Meeting*, October 22–25, 2017. Houston, TX, USA.
- [56] Wheatley, R., O. Levy, T.P. Pavlic, and R.S. Wilson. What factors determine predation success? Considering speed, agility, and strategy for predators and prey. In: *2017 Annual Meeting of the Society for Integrative and Comparative Biology*, January 4–8, 2017. New Orleans, LA, USA.
- [57] Wheatley, R., O. Levy, T.P. Pavlic, and R.S. Wilson. Predicting predator evasion success based on speed, agility, and escape path. In: *2016 Ecological Society of Australia*, November 28 – December 2, 2016. Fremantle, Australia.
- [58] Pavlic, T.P. From social insects to smart, flexible, adaptive teams of robots: The biomechanics of group decision-making. In: *2016 XXV International Congress of Entomology*, September 25–30, 2016. Orlando, FL, USA.
- [59] Pavlic, T.P., and S.C. Pratt. Testing Unified Foraging Theories with Social Insects: Integrating Macronutrient Regulation with More Traditional Costs and Benefits. In: *2015 Conference on Complex Systems*, September 28 – October 2, 2015. Tempe, AZ, USA.
- [60] Pavlic, T.P., and S.C. Pratt. Numerical Methods within the Ant Colony: The Illuminating Case of Multi-Objective Macronutrient Regulation in Eusocial Insects. In: *2nd Workshop on Biological Distributed Algorithms (BDA 2014)*, Austin, TX, October 11–12, 2014.
- [61] Pavlic, T.P., and S.C. Pratt. Understanding foraging patterns that achieve colony-level macronutrient regulation. In: *2014 International Union for the Study of Social Insects International Congress (IUSSI 2014)*, Queensland, Australia, July 13–18, 2014.

- [62] Pavlic, T.P. Kinetic modeling of social insect behavior and beyond: Lessons from stochastic robotics. In: *2013 International Symposium on Biomathematics and Ecology Education and Research (BEER 2013)*, Arlington, VA, October 11–13, 2013.
- [63] Pavlic, T.P., and S.C. Pratt. Sequential-sampling models of quorum sensing in house-hunting *Temnothorax* ants. In: *50th Annual Conference of the Animal Behavior Society*, July 28–August 1, 2013.
- [64] Pavlic, T.P. Speed–accuracy tradeoffs in *Temnothorax rugatulus* ants: Sequential-sampling models of quorum detection while house hunting. In: *2013 Society for Mathematical Biology Annual Meeting and Conference (SMB 2013)*, June 10–13, 2013.
- [65] Pavlic, T.P., and S.C. Pratt. Sequential-sampling models of quorum detection in house-hunting ants. In: *2012 North American Section Meeting of the International Union for the Study of Social Insects (IUSSI-NAS 2012)*, October 5–7, 2012.

CONFERENCE
POSTERS

- [66] Xin Su, and T.P. Pavlic. Dynamical Characterizations of Complex Behavior in Consensus Networks with Stochastic Link Failures. In: *Proceedings of the 2017 SIAM Conference on Dynamical Systems*, May 21–25, 2017. Snowbird, UT, USA. Poster abstract.
- [67] Burchill, A.T., T.P. Pavlic, and S.C. Pratt. Consistent self-organized foraging allocations in the macronutrient-regulating carpenter ant, *Camponotus fragilis*. In: *2016 XXV International Congress of Entomology*, September 25–30, 2016. Orlando, FL, USA. Poster abstract. doi:10.1603/ICE.2016.114782
- [68] Pavlic, T.P. Physical Stigmergy for Decentralized Constrained Optimization: An Intelligent Lighting Example. In: *Proceedings of the 4th International Conference on Cyber-Physical Systems (ICCP 2013)*, April 8–11, 2013. Poster abstract.
- [69] Pavlic, T.P., S. P. Peddi, P.A.G. Sivilotti, and B.W. Weide. Getting Out of the Way – Safety Verification without Compromise. In: *Proceedings of the 2012 IEEE/ACM Third International Conference on Cyber-Physical Systems (ICCP 2012)*, April 17–19, 2012. Poster abstract.
- [70] Pavlic, T.P., P.A.G. Sivilotti, A.D. Weide, and B.W. Weide. Verification of Smooth and Close Collision-Free Cruise Control. In: *Proceedings of the 2011 Symposium on Control and Modeling Cyber-Physical Systems*, October 20–21, 2011. Poster abstract.
- [71] Özgüner, Ü., A. Krishnamurthy, F. Özgüner, K. Redmill, P. Sivilotti, B. Weide, and T. Pavlic. CPS: Autonomous driving in urban environments. In: *Proceedings of the 2011 NSF CPS PI Meeting*, August 1–2, 2011. Poster abstract.
- [72] Pavlic, T.P., and K.M. Passino. Cooperative task processing. In: *Proceedings of the ICAM 2009 Symposium: Emergence in Physical, Biological, and Social Systems IV*, November 13, 2009. Poster abstract.

INVITED TALKS

- [73] Pavlic, T.P. Technically a Model: Animal Behavior in Engineering Design. In: *58th Annual Conference of the Animal Behavior Society (ABS 2021)*, 2021. Virtual conference. Past-President Symposium speaker.
- [74] Caetano-Anollés, K., B. Ewers, S. Iyer, J.R. Lucas (presenter), T.P. Pavlic, A.P. Seale, and Y. Zeng. A minimal framework for describing living systems: a multi-dimensional view of life across scales. In: *58th Annual Conference of the Animal Behavior Society (ABS 2021)*, 2021. Virtual conference.
- [75] Pavlic, T.P. Viewing the socio-technological dimensions of vehicle autonomy through the lens of ecology and organismal and integrative biology. In: *IPAM Workshop IV: Social Dynamics Beyond Vehicle Autonomy*, November 30 – December 4, 2020. UCLA.

- [76] Pavlic, T.P. Thinking about Randomness for Thinking. In: Google/O'Reilly Science Foo Camp (SciFoo 2020), October 23–25, 2020.
- [77] Pavlic, T.P. Cognition in Tiny, Random Spaces: What You Get for Free When There is No Free Energy. In: Soft Condensed Matter & Physics of Living Systems Seminar, March 10, 2020. Georgia Institute of Technology.
- [78] Pavlic., T.P. Enclosed Autonomy: Opportunities and Challenges for Intelligent Systems in Closed Worlds. In: Life and Systems in Closed Worlds workshop, December 11–13, 2019, Oracle, AZ.
- [79] Pavlic, T.P. Beyond Gilding Refined Gold: Does Biological Computation Compute?. In: Coffee@Beyond monthly seminar, January 28, 2019, Tempe, AZ.
- [80] Pavlic, T.P. Model Systems for Studying Information Spread. In: 2018 DARPA SocialSim PI Meeting and Challenge Event. December 11–13, 2018, Arlington, MA.
- [81] Pavlic, T.P. Thinking Outside the 'Bot: What Ecology, Physiology, and Conservation Biology can Offer to Engineering Design. In: *The Ohio State University, Department of Electrical & Computer Engineering Seminar*, September 13, 2018.
- [82] Pavlic, T.P. Thinking Outside the 'Bot: What Ecology, Physiology, and Conservation Biology can Offer to Engineering Design. In: *Georgia Institute of Technology Decision and Control Laboratory Seminar*, July 19, 2017.
- [83] Pavlic, T.P. Living laboratories and natural histories for distributed computing. In: *Moving and Computing 2017: 7th Research Meeting and School on Distributed Computing by Mobile Robots*, June 5–9, 2017.
- [84] Pavlic, T.P. Be Undisciplined. Lose Your Innocence. Get to Work. In: *TEDxASU 2017: Innovators*, March 23, 2017.
- [85] Pavlic, T.P. Free-loading isn't free: The lack of control of cheating in ants, bees, wasps, and collaborative robots. In: 2017 ASU Cooperation and Conflict Symposium, February 16, 2017. Tempe, AZ, USA.
- [86] Pavlic, T.P. Algorithmic foundations of biological matter: faster, cheaper, and more out of control. In: *Algorithmic Foundations of Programmable Matter (Dagstuhl Seminar 16271)*, July 3–8, 2016.
- [87] Pavlic, T.P. Kinetic modeling of collective behavior: When a good match goes bad. In: *KI-Net Workshop on Collective Dynamics and Model Verification: Connecting Kinetic Modeling to Data*, April 17–19, 2015.
- [88] Pavlic, T.P. The hidden demographics of distributed information processing: The role of intermediates in a social-insect colony. In: *Social Insects as Models for Biological Complexity: Lessons Learned and Challenges on the Horizon*, symposium of the 2014 Annual Meeting of the Entomological Society of America (Entomology 2014). November 16–19, 2014.
- [89] Pavlic, T.P. Understanding foraging patterns that achieve colony-level macronutrient regulation. In: *ASU–UWü International Symposium and Workshop on Frontiers in Insect Behavior, Social Organization, and Evolution*, May 23–30, 2014.
- [90] Pavlic, T.P. Take Home Messages: Evolution of Distributed Computational Networks. In: *BEYOND Center Physics of Living Matter Workshop: Information, Complexity, and Life*, February 24–25, 2013.

- [91] Pavlic, T.P. Biomathematics at “The New American University.” In: “Biomathematics Courses and Programs” expert panel at 2013 International Symposium on Biomathematics and Ecology Education and Research (BEER 2013), October 11–13, 2013.
- [92] Pavlic, T.P. The Economic Framework: Constrained Optimization and Colony Collapse Disorder. In: *Perspectives for Mathematical and Biological Interdisciplinary Research on Honeybees and Pollination*, June 14, 2013.
- [93] Pavlic, T.P. Stochastic Robotics: Complexity, Compositionality, and Scalability. In: *KI-Net Workshop on Kinetic Theory for the Emergence of Complex Behavior in Social and Economic Systems*, February 22–24, 2013.
- BOOK CHAPTERS [94] Pavlic, T.P. Social Models from Non-Human Systems. In: P. Davis, J. Pfautz, and Angela O’Mahony (Eds), *Social-Behavioral Modeling for Complex Systems*, ch. 11, pp. 231–261, 2019. doi:10.1002/9781119485001.ch11
- [95] Weinstein, S., and T.P. Pavlic. Noise and function. In: S.I. Walker, P.C.W. Davies, and G.F.R. Ellis (Eds), *From Matter to Life: Information and Causality*, ch. 9, pp. 126–143, 2017. doi:10.1017/9781316584200.009
- [96] Pavlic, T.P., and S.C. Pratt. Superorganismic Behavior via Human Computation. In: P. Michelucci (Ed.), *Handbook of Human Computation*, ch. 74, pp. 911–960. 2013. doi:10.1007/978-1-4614-8806-4_74
- OTHER PUBLICATIONS [97] Pavlic, T.P., P.A.G. Sivilotti, A.D. Weide, and B.W. Weide. Comments on ‘Adaptive Cruise Control: Hybrid, Distributed, and Now Formally Verified’. Tech. report OSU-CISRC-7/11-TR22, The Ohio State University, 2011.
- [98] Pavlic, T.P., and K.M. Passino. Cooperative Task-processing Networks: Parallel Computation of Non-trivial Volunteering Equilibria. Tech. report OSU-CISRC-3/11-TR05, The Ohio State University, 2011.
- [99] Pavlic, T.P. *Design and Analysis of Optimal Task-Processing Agents*. PhD thesis, The Ohio State University, Columbus, OH, 2010.
- [100] Pavlic, T.P. *Optimal Foraging Theory Revisited*. Master’s thesis, The Ohio State University, Columbus, OH, 2007.
- GRANTS **Awarded**
- [1] Co-Principal Investigator, “Center of Excellence for Accelerating Operational Efficiency (CAOE) - Year 4”, DHS, \$3,715,000, July 1, 2020 to June 30, 2021.
- [2] Co-Principal Investigator, “Center of Excellence for Accelerating Operational Efficiency (CAOE) - Year 3”, DHS, \$4,171,000, July 1, 2019 to June 30, 2020.
- [3] Co-Principal Investigator, “Energy-efficient Neuromorphic Computing in Light of the Structural and Functional Evolution of Multi-scale Insect Brains”, DARPA DSO, \$1,000,000, April 3, 2019 to October 2, 2020.
- [4] Co-Principal Investigator, “Autonomous System Control via Social Insect Models, Phase II”, DARPA I2O, \$550,000, August 18, 2019 to August 17, 2020.
- [5] Co-Principal Investigator, “Autonomous System Control via Social Insect Models”, DARPA I2O, \$990,792, May 17, 2018 to August 17, 2019.
- [6] Co-Principal Investigator, “Biomimicry for Sensory Communication”, Google, \$288,367, December 1, 2017 to July 31, 2018.

- [7] Co-Principal Investigator, “CRISP: Type 2/Collaborative Research: Design and Control of Coordinated Green and Gray Water Infrastructure to Improve Resiliency in Chemical and Agricultural Sectors”, NSF SES-1735579, \$1,874,988, September 1, 2017 to August 31, 2021.
- [8] Co-Principal Investigator, “A Methodology for Modeling Swarm Behavioral Dynamics from Local Observations”, DARPA I2O, \$175,000, June 1, 2017 to May 31, 2018.
- [9] Co-Principal Investigator, “BioSwarm: Bio-Inspired Swarming”, DARPA I2O, \$193,079, December 1, 2016 to February 28, 2018.
- [10] Co-Principal Investigator, “Emergent Computation in Collective Decision Making by the Crevice-Dwelling Rock Ant *Temnothorax rugatulus*”, NSF PHY-1505048, \$595,006, May 1, 2016 to April 30, 2019.
- [11] Senior staff, “CPS:Synergy: Collaborative Research: Collaborative Vehicular Systems”, NSF ECCS-1446730, \$914,802, January 1, 2015 to December 31, 2017.
- [12] Senior staff, “Autonomous Driving in Mixed-Traffic Urban Environments”, NSF, ECCS-0931669, \$1,499,833, September 1, 2009 to August 31, 2012.

ADVISING AND
MENTORING

Postdoctoral Scholars

- **Dr. Kaitlin Baudier**, 2017–2020
Co-advised by: Stephen C. Pratt and Jennifer H. Fewell
- **Dr. Gabrielle Valentini**, 2016–2020
Co-advised by: Stephen C. Pratt and Sara Imari Walker

Graduate Students

- **Jinyung Hong**, PhD Student, Computer Science Engineering, 2019–
- **Colin Lynch**, PhD Student, Animal Behavior, 2019–
Co-advised by: Jennifer H. Fewell
- **Xin Su**, PhD Student, Industrial Engineering, 2015–
- **Andrew Burchill**, PhD Student, Animal Behavior, 2015–
Co-advised by: Stephen C. Pratt
- **Taeyeong Choi**, PhD Student, Computer Science Engineering, 2016–2020 (graduated, PhD)
- **Sehyeok Kang**, MS Student, Computer Engineering, 2019–2020 (graduated, MS)
- **Christian Seto**, MS Student, Industrial Engineering, 2017–2018 (graduated, MS)

Undergraduate Honors Theses

- **Liliaokeawawa Cothren**, 2020–2021, Applied Mathematics, honors thesis (director)
Thesis topic: Mathematical investigation of the adaptive value of marginal-value heuristic in a model forager
- **Samantha Castro**, 2019–2020, Biological Sciences, honors thesis (director)
Thesis topic: The Individual Contribution to Cooperative Transport in the ant *Novomessor albisetosus*
- **Danielle Adams**, 2018–2019, Industrial Engineering, honors thesis (director)
Thesis topic: Simulation optimization of industrial foundry

- **Jeanbat Busisi**, 2018–2019, Industrial Engineering, honors thesis (director)
Thesis topic: A study of delay and long waiting time of healthcare service delivery in public healthcare systems
- **Robert Chandler**, 2018, Computer Science, honors thesis (second reader) Thesis director: Michael Clough
Thesis topic: Developing an Educational Manufacturing Simulation
- **Andrea Spence**, 2017–2018, Industrial Engineering, honors thesis (second reader)
Thesis director: Daniel McCarville
Thesis topic: Optimized Line Calling Strategies in Ultimate Frisbee
- **Erin Glavin**, 2017–2018, Industrial Engineering, honors thesis (director)
Thesis topic: A strategy for improved traffic flow
- **Mikaela Hall**, 2016–2017, Industrial Engineering, honors thesis (director)
Thesis topic: The effect of workplace culture on productivity
- **Garrett Burnett**, 2015–2016, Arts, Media, and Engineering, honors thesis (second reader)
Thesis director: Garth Paine
Thesis topic: SoundSwarm: An interactive exploration of 3-dimensional and behavioral modeled sound
- **Grant Doering**, 2015–2016, Aerospace Engineering, honors thesis (second reader)
Thesis director: Stephen C. Pratt.
Thesis topic: Reunification dynamics and consensus decisions in *Temnothorax rugatulus*
- **Christal Johnson**, 2012, Biology, honors thesis (second reader)
Thesis director: Stephen C. Pratt.
Thesis topic: Modeling and analysis of quorum detection during emigration behavior in *Temnothorax rugatulus* ants

Undergraduate Research

- **Samantha Castro**
Undergraduate student in Biology, Arizona State University. Laboratory support of research on collective transport in *Novomessor cockerelli* ants. 2018–2021
- **Ricardo Weir**
Undergraduate student in Computer Science Engineering, Arizona State University. Application of computer vision tools to automated tracking of ants. 2017–2018
- **Hana Putnam and Alex Nachman**
Undergraduate students in Biology, Arizona State University. Laboratory support of research on decentralized nutrient regulation in *Temnothorax rugatulus* ants. Primary adviser: Stephen C. Pratt. 2013.
- **Taylor Vance and P. Logan Rogers and Betsy Siegworth**
Undergraduate students in Biology, Arizona State University. Laboratory support of research on quorum detection by encounter rate in *Temnothorax rugatulus* ants. Primary adviser: Stephen C. Pratt. 2013.

TEACHING
EXPERIENCE

Arizona State University, Tempe, AZ

Instructor

Fall 2015 to present

- SOS 212 (Systems, Dynamics, and Sustainability)
- SOS 325 (Economics of Sustainability)
- IEE 475 (Simulating Stochastic Systems)
- SOS 591 (Selected Topics in Ecological Modeling)
- ANB 602/IEE 598 (Optimal Foraging Theory: From Biology to Engineering Design)
- ANB 602 (Noise and Function: Random Algorithms in Animal Behavior)
- IEE/CSE 598 (Bio-Inspired AI and Optimization)

Guest Lecturer

April 2015

- ASM 394: Great Adaptations: Origins of Complexity in Nature
 - Undergraduate course in the science and mathematics of anthropology
 - Main instructor: Joan B. Silk
 - Lecture: “Connecting Evolutionary Adaptation and the Engineering Design Process”

Guest Lecturer

October 2013

- ANB 601: Research Strategies in Animal Behavior
 - Graduate-level course in animal behavior
 - Main instructor: Ronald L. Rutowski
 - Lecture: “Mathematical, Computational, and Experimental Modeling: Granularity and Parsimony”

The Ohio State University, Columbus, OH

Instructor

March 2012 to August 2012

- Instructor for ECE 683: Undergraduate Design Project
 - Students designed retrofitable vehicle-to-vehicle communications system to aid in the development of verifiably safe adaptive cruise control.
 - Design project folded into larger research project on autonomous vehicles in mixed-traffic urban environments.

Teaching Assistant

September 2007 to August 2009

(sample graded material and student evaluations available upon request)

- Instructor for ECE 327: Electronic Devices and Circuits Laboratory I
 - Autumn 2007, Winter (2) and Spring 2008 (2), Winter (2) and Summer 2009
 - Responsible for 1-hour lecture and supervision of 3-hour laboratory. Students design and implement infrared modem and 8-ohm speaker driver.
 - Authored hundreds of pages of course material archived at <http://www.tedpavlic.com/teaching/osu/ece327>.
- Grader for ECE 481 Ethics in Electrical and Computer Engineering
 - Autumn 2007 and Autumn 2008
- Instructor for ECE 209: Circuits and Electronics Laboratory
 - Autumn 2008
 - Responsible for lecture and supervision of basic electronics laboratory.
 - Authored material at <http://www.tedpavlic.com/teaching/osu/ece209>.
- Instructor for ECE 557: Control, Signals, and Systems Laboratory
 - Summer 2008 (2 sections) and Summer 2009
 - Responsible for lecture and supervision of laboratory. Students used Simulink and dSPACE RTI1104 units for linear system control design.
 - Authored material at <http://www.tedpavlic.com/teaching/osu/ece557>.

- Lab Instructor for ECE 758: Control Systems Implementation Laboratory
 - Spring 2009 (2 sections)
 - Responsible for lecture and supervision of laboratory. Graduate and senior undergraduate students used Simulink, with dSPACE RTI1104 units for analysis of and advanced control implementation for linear and non-linear systems.
 - Authored material at <http://www.tedpavlic.com/teaching/osu/ece758>.

National Science Foundation GK-12 Graduate Fellow **September 2006 to October 2007**

Developed, implemented, and evaluated daily inquiry-based fourth-grade science lessons for a local inner-city public school class.

Instructor **March 2002 to June 2004**

- Member of *Fundamentals of Engineering for Honors* instructional team.
- Special graduate teaching appointment as undergraduate.
- Lectured weekly engineering laboratory for ENG H191, H192, and H193.
- Trained in-class undergraduate teaching assistants in laboratory procedure.
- Graded weekly lab reports and provided laboratory exams.

Teaching Assistant **September 2000 to March 2002**

- Assisted *Fundamentals of Engineering for Honors* instructional team.
- Provided support to first-year engineering students (ENG H191, H192, and H193).
- Graded daily assignments on programming and drafting.
- Developed on-line journal system for Physics Education Research Group (PERG).

Undergraduate Researcher **September 2000 to March 2002**

- Participated in the *Europa Undergraduate Research Forum*, a part of the *Reusable Software Research Group*.
- Studied component-based software engineering undergraduate pedagogy.
- Researched changes to RESOLVE/C++ implementation for ANSI compliance.

Grader **September 2001 to December 2001**

- Graded daily electromagnetics assignments (ECE 311).

PROFESSIONAL
SERVICE

Committee Service

- Officer, IEEE Special Technical Community for Human Computation

Referee Service

- *IEEE Conference on Decision and Control (CDC)*
- *International Journal of Control*
- *ASME Journal of Dynamic Systems, Measurement, and Control*
- *IEEE International Conference on Robotics and Automation (ICRA)*
- *IEEE Robotics and Automation – Letters*
- *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*
- *IEEE Transactions on Signal Processing*
- *IEEE Transactions on Control Systems Technology*
- *IEEE Transactions on Cybernetics*
- *IEEE Transactions on Intelligent Transportation Systems*
- *The International Journal of Robotics Research*
- *Engineering Applications of Artificial Intelligence*
- *Journal of Simulation*
- *Winter Simulation Conference (WSC)*
- *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*
- *International Journal of Nonlinear Sciences and Numerical Simulation*
- *IEEE Symposium on Artificial Life*

- *Bioinspiration & Biomimetics*
- *Swarm and Evolutionary Computation*
- *Journal of the Royal Society Interface*
- *Scientific Reports*
- *American Naturalist*
- *Biology Letters*
- *Behavioral Ecology*
- *Behavioral Ecology and Sociobiology*
- *Animal Behaviour*
- *Ecology and Evolution*
- *Ecological Research*
- *Current Zoology*
- *Journal of Theoretical Biology*
- *International Journal of the Commons*

Editorial Service (journals only)

- *PLOS Computational Biology*, guest associate editor (2020)
- *Human Computation*, editorial board (2014–)
- *Frontiers in Robotics and AI, Computational Intelligence*, review editorial board (2014–)

Conference Service

- Organizer for special session: “Quantitative Approaches for Conservation, Natural Resource Management, and Energy”, 2021 INFORMS Annual Meeting, Anaheim, CA, October 24–27, 2021.
- Program Committee: 8th Workshop on Biological Distributed Algorithms (BDA 2021), Virtual event, 2021.
- Program Committee: 2020 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2020), Washington, DC, 2020.
- Program Committee: 2020 IEEE Symposium on Artificial Life (IEEE ALIFE 2020)
- Publicity Chair: 2020 Southwest Robotics Symposium (SWRS 2020), Tempe, AZ, 2020.
- Program Committee: 7th Workshop on Biological Distributed Algorithms (BDA 2019), Toronto, Canada, 2019.
- Publicity Chair: 2019 Southwest Robotics Symposium (SWRS 2019), Tempe, AZ, 2019.
- Publicity Chair: 2018 International Symposium on Distributed Autonomous Robotic Systems (DARS 2018), Boulder, Colorado, 2018.
- Program Committee: 2017 IEEE Symposium on Artificial Life (IEEE ALIFE 2017), Honolulu, Hawaii, 2017.
- Program Committee: 2016 International Symposium on Intelligent Control (ISIC 2016), Buenos Aires, Argentina, September 19–22, 2016.
- Local Organizing Committee: 2015 Conference on Complex Systems (CCS’15), Tempe, AZ, September 28 – October 2, 2015.
- Co-organizer (with Yun Kang) for technical session: “Complex Systems of Social Insects in Research and Education”, 2013 International Symposium on Biomathematics and Ecology Education and Research (BEER 2013), Arlington, VA, October 11–13, 2013.
- Organizer for mini-symposium: “MS19: Optimization and Rationality in Eusocial Insects”, 2013 Society for Mathematical Biology Annual Meeting and Conference (SMB 2013), Tempe, AZ, June 10–13, 2013.

- Organizer/Associate Editor for invited session: “Correctness by Verification and Design”, 14th IEEE Conference on Intelligent Transportation Systems (ITSC 2011), Washington, DC, October 5–7, 2011.

PROFESSIONAL
EXPERIENCE

Arizona State University, Tempe, AZ

Assistant Professor

August 2015

- Joint Appointment:
 - School of Computing, Informatics, and Decision Systems Engineering
 - School of Sustainability
- Graduate faculty in Industrial Engineering/Operations Research, Sustainability, and Animal Behavior.
- Interdisciplinary laboratory focus on decision making and organization.

Associate Research Scientist

August 2014 to July 2015

Postdoctoral Scholar

July 2012 to August 2014

- Supervisor: Professor Stephen C. Pratt
- Novel application of sophisticated quantitative analysis and modeling techniques to animals, with social insects as a particular focus.
- Development of new algorithms for robotics and other autonomous systems based on animal behavior, with focus on distributed decision making.
- Supervision of graduate and undergraduate students in engineering, computer science, and biology in tasks related to biological analysis and modeling as well as technological bio-mimetic design.

The Ohio State University, Columbus, OH

Postdoctoral Researcher

September 2010 to June 2012

- Funding: National Science Foundation Cyber-Physical Systems (ENG, ECCS)
 - “Autonomous Driving in Mixed-Traffic Urban Environments” (grant #0931669)
 - Supervisor (co-PI): Professor Paolo A. G. Sivilotti
 - PI: Professor Ümit Özgüner
- Development of new approaches to software verification in the context of hybrid-state and hybrid-time dynamical systems.
- Supervision of student design project for novel vehicle-to-vehicle communications systems to assist in adaptive cruise control.

National Instruments, Austin, TX

Hardware R&D Intern for Multifunction DAQ

June 2003 to September 2003

- Designed final verification test fixture for use with STC2 MIO products.
- Designed and executed study of the effect of varying burn-in time on long-term drift of common industry voltage references.

Hardware R&D Intern for Multifunction DAQ

June 2002 to September 2002

- Designed and performed validation tests for 16-bit 800 kHz NI-6120 SMIO DAQ.
- Designed high-quality source to use with NI-5411 arbitrary function generator.

IBM Network Storage, Research Triangle Park, NC

Core Systems Software Developer for FlexNAS

June 2001 to September 2001

- Designed and implemented highly available multihop communications subsystem.
- Participated in software development of various vital box services.

CallTech Communications, Columbus, OH

Information Technology Systems Engineer

June 1997 to May 2001

- Responsible for the acquisition, setup, and administration of all hardware and software systems supporting NetWalk Internet service and web presence provider.
- Designed and implemented state-of-the-art open-source highly available load-balancing system supporting thousands of virtual servers.
- Developed call-center software for clients such as CompuServe, AOL, and Priceline.

MegaLinx Communications, Dublin, OH

Web Developer and Support Representative

June 1995 to May 1997

- Produced web content for commercial clients.
- Assisted in administration of UltraSPARC, x86, 680x0, and PowerPC systems.
- Developed multi-platform open-source file-sharing solution.
- Provided technical support for Internet and web presence customers.

**PROFESSIONAL
MEMBERSHIPS**

Institute for Operations Research and the Management Sciences (INFORMS), Member, 2015–present

- Applied Probability Society (2015–present)
- Artificial Intelligence Section (2015–present)
- Behavioral Operations Management (2015–present)
- Computing Society (2015–present)
- Decision Analysis Society (2015–present)
- Group Decision and Negotiation (2015–present)
- Optimization Society (2015–present)
- Organization Science Section (2015–present)
- Simulation Society (2015–present)
- Transportation Science and Logistics Society (2015–present)

Institute for Industrial Engineers (IIE), Member, 2015–present

- Operations Research division (2015–present)
- Sustainable Development division (2015–present)

Institute for Electrical and Electronics Engineers (IEEE), Member, 2002–present

- IEEE Control Systems Society (2004–present)
- IEEE Communications Society (2012–present)
- IEEE Computer Society (2009–present)
- IEEE Intelligent Transportation Systems Society (2011–present)
- IEEE Systems, Man, and Cybernetics Society (2011–present)
- IEEE Robotics and Automation Society (2011–present)
- IEEE Computational Intelligence Society (2013–present)
- IEEE Circuits and Systems Society (2013–present)
- IEEE Information Theory Society (2013–present)

Game Theory Society, Member, 2016–present

Animal Behavior Society (ABS), Member, 2011–present

International Union for the Study of Social Insects (IUSSI), Member, 2012–present

- North American Section (2012–present)

Entomological Society of America, Member, 2014–present

- Southwestern and Pacific Branch (2014–present)
- Systematics, Evolution, and Biodiversity Section (2014–present)

Society for Mathematical Biology (SMB), Member, 2012–present

Society for Industrial and Applied Mathematics (SIAM), Member, 2015–present

OTHER MEETING
ATTENDANCE

Invited Participant

- 12th Annual National Academies Keck Futures Initiative Conference (NAKFI 2014) on Collective Behavior: From Cells to Societies, November 13–15, 2014
- 2014 Computing Community Consortium Human Computation Roadmap Summit Workshop, June 18–20, 2014
- BEYOND Center for Fundamental Concepts in Science Workshop: Complex Systems Theory and Cancer Biology, February 22–23, 2014

General Participant

- NSF Workshop on Self-organizing Particle Systems, January 8, 2014
- 1st IEEE/ACM Workshop on Signal Processing Advances in Sensor Networks, April 8, 2013
- CoMSES Workshop on ABM in Education, February 28 – March 2, 2013
- 49th IEEE Conference on Decision and Control, December 15–17, 2010

SERVICE

Arizona State University School of Life Sciences Graduate Retreat 2014

- Panelist, “Securing a post-doc” session

Intel International Science and Engineering Fair (ISEF) 2013

- Grand Award Judge for Animal Sciences

Night of the Open Door, Arizona State University, 2013

- Staffed the “Ants of Arizona” exhibit
- Answered questions about ants and research related to them

Recent contributor to several open-source software projects, including:

- Vim-LaTeX suite
- Vimperator and Pentadactyl Firefox extensions
- Git distributed version control system
- Mercurial distributed version control system
- Personal projects archived at <http://hg.tedpavlic.com/>

Frequent contributor to [Wikipedia](#)

- Significant contributions to articles on control theory, electronics, and signals and systems.

Contributor to [Quora](#)

- Contributions to articles on thermodynamics, chaos theory, electronics, and evolutionary biology.

OSU FIRST Robotics Team, The Ohio State University, 2000–2004

- Introduced middle school and high school students to science and technology by participating with them in national robotics competitions.
- Led 2002 team to regional silver medal *Engineering Inspiration Award*.
- *Lead Team Mentor*, 2002–2004
- *Component Design Team Lead Mentor*, 2001–2002

Ohio Science Olympiad state competition, Robot Ramble Event, 2003

- Supervised setup and judging of event for middle-school and high-school students

Director of Computers, Engineers’ Council, The Ohio State University, 2002

[Linux Virtual Server Project](#), 1999–2000

- Early member of the team that formed the open-source project that is now an important load balancing solution for the Linux software platform.

[Greater Columbus Free-Net](#), 1995–1997

- Provided technical support services.

CompuTeen Bulletin Board System, 1993–1995

- Administrated dial-up bulletin board system.
- Founded and administrated TeenLiNK, an international electronic mail network that spread through the United States, Canada, and Australia and delivered mail over a series of electronic dial-up drop offs.

APPLICATION AREAS Autonomous and Unmanned Vehicles, Flexible Manufacturing Systems, Distributed Power Generation, Intelligent Lighting, Power Demand Response, Microgrids, Smart Grids

HARDWARE AND SOFTWARE SKILLS Analog and Digital Electronics:

- Bipolar and FET implementations of continuous and switched amplifiers, modulators, converters, and filters
- Computer-Aided Design Tools: Cadence OrCAD, NI Multisim, SPICE, pst-circ

Embedded and Real-time Systems:

- Software and hardware development with several MCU and DSP platforms (e.g., Motorola MCU's, Texas Instruments DSP's, Atmel ATmega MCU's, Microchip PIC MCU's, and others)

Instrumentation, Control, Data Acquisition, Test, and Measurement:

- dSPACE hardware (e.g., RTI1104) and Control Desk software, Simulink, LabVIEW and other National Instruments control and data acquisition hardware and software (e.g., MIO, SMIO, DSA, DMM, and others), Hewlett-Packard and Agilent bench-top equipment

Computer Programming:

- C, C++, Java, JavaScript, NetLogo, Pascal, Perl, PHP, Lisp, UNIX shell scripting (including POSIX.2), GNU make, AppleScript, SQL, MySQL, and others

Numerical Analysis:

- MATLAB, R, Maple, Mathematica

Version Control and Software Configuration Management:

- DVCS (Mercurial/MQ, Git/StGit), VCS (RCS, CVS, SVN, SCCS), and others

MATLAB skill set:

- Linear algebra, Fourier transforms, Monte Carlo analysis, nonlinear numerical methods, polynomials, statistics, N -dimensional filters, visualization
- Toolboxes: communications, control system, filter design, genetic algorithm and direct search, signal processing, system identification

Software Verification:

- KeY, PRISM, KeYmaera

Information/Internet Technology:

- Networking (UDP, TCP, ARP, DNS, Dynamic routing), Services (Apache, SQL, MediaWiki, POP, IMAP, SMTP, application-specific daemon design)

Desktop Editing and Productivity Software:

- Vim, Emacs, Eclipse
- T_EX (L_AT_EX, B_IB_TE_X, P_STricks),
- Microsoft Office, OpenOffice.org, LibreOffice, Corel WordPerfect, Google Docs
- GIMP, InkScape

Operating Systems:

- Microsoft Windows family, Apple OS X, IBM OS/2, Linux, BSD, IRIX, AIX, Solaris, and other UNIX variants

EXPERTISE

Mathematics:

- Applied Mathematics, Real and Complex Analysis, Measure Theory, Differential Geometry, Game Theory, Graph Theory, Combinatorics

Control Theory and Engineering:

- Linear and Nonlinear Systems Theory, Feedback, Variable Structure Systems and Sliding Modes, Distributed and Intelligent Control, Dynamic Optimization, Biomimicry, Bioinspiration, Hybrid and CyberPhysical Systems

Communications and Signal Processing:

- Probability, Random Variables, Stochastic Processes, Information Theory, Estimation, Networks

Computer Science and Engineering:

- Model Checking (automated, distributed, hybrid, probabilistic), Hybrid Automata, Software Verification, Component-Based Reusable Software

Natural and Social Sciences (Biology, Neuroscience, Psychology, Anthropology):

- Behavioral Ecology, Foraging Theory, Altruism, Impulsiveness, Evolution

AWARDS

National Science Foundation

- GK-12 Graduate Fellowship, 2006–2007
- Graduate Research Fellowship Honorable Mention, 2005

The Ohio State University

- Dean's Distinguished University (DDU) Graduate Fellowship, 2004–2010
- Electrical and Computer Engineering Bradshaw Scholarship, 2002–2004
- Electrical and Computer Engineering Shafstall Scholarship, 2001–2003
- University Scholarship, 1999–2003

POPULAR MEDIA

Pavlic, T.P. “Be Undisciplined. Lose Your Innocence. Get to Work.” In: *TEDxASU 2017: Innovators*, March 23, 2017.

<https://youtu.be/9GWXCRetOjk?list=PLsRNoUx8w3rOEkwS6gZashGbH8otAs3l4>

Pavlic, T.P. “Cognition in Ants, Robots, and Pre-biotic Chemistries: A Science on Google+ HOA with Dr. Ted Pavlic.” Interview by Chris Robinson. *Science on Google+: A Public Database*, April 15, 2015. <https://plus.google.com/u/0/events/cmbuh4hdnc558tqg1p86dqna35k>

Sigfried, Tom. “If the world is a computer, life is an algorithm”, *Science News: Context*, June 18, 2014. <https://www.sciencenews.org/blog/context/if-world-computer-life-algorithm>

“The Free & Unfree: Open Source Everywhere – How a Global Coding Coalition Built an Open Source Superserver”, *Wired*, 12(06), June 2004.

SECURITY CLEARANCE

Department of Defense Top Secret SCI with polygraph (expired: 2002)

REFERENCES AVAILABLE TO CONTACT

Dr. Stephen C. Pratt (e-mail: stephen.pratt@asu.edu; phone: +1-480-727-9425)

- Associate Professor, School of Life Sciences, Arizona State University
- ◇ School of Life Sciences, PO Box 874501, Tempe, AZ 85287-4501
- ★ *Dr. Pratt is my current postdoctoral supervisor.*

Dr. Spring M. Berman (e-mail: Spring.Berman@asu.edu; phone: +1-480-965-4431)

- Assistant Professor, Mechanical and Aerospace Engineering, Arizona State University
- ◇ School for Engineering of Matter, Transport, and Energy, PO Box 876106, Tempe, AZ 85287-6106
- ★ *Dr. Berman is collaborator on my bio-mimicry work.*

- Dr. Paul C. W. Davies** (e-mail: Paul.Davies@asu.edu; phone: +1-480-965-3240)
- Regents Professor and Director, Beyond Center for Fundamental Concepts in Science, Arizona State University
 - ◇ Beyond Center for Fundamental Concepts in Science, P.O. Box 871504, Tempe, AZ 85287-1504
 - ★ *Dr. Davies is collaborator on my origins-of-life work.*
- Dr. Sara Imari Walker** (e-mail: sara.i.walker@asu.edu; phone: +1-480-727-2394)
- Assistant Professor, School of Earth and Space Exploration, Arizona State University
 - ◇ ASU School of Earth and Space Exploration, PO Box 871404, Tempe, AZ 85287-1404
 - ★ *Dr. Walker is collaborator on my origins-of-life work.*
- Dr. Pietro Michelucci** (e-mail: pem@thinksplash.com; phone: +1-571-235-3288)
- Principal, ThinkSplash LLC, Washington, DC
 - ★ *I co-authored a chapter in the Handbook of Human Computation, for which Dr. Michelucci was the editor-in-chief.*
- Dr. Paolo A. G. Sivilotti** (e-mail: sivilotti.1@osu.edu; phone: +1-614-292-5835)
- Associate Professor, Computer Science and Engineering, The Ohio State University
 - ◇ 395 Drees Laboratories, 2015 Neil Ave., Columbus, OH 43210
 - ★ *Dr. Sivilotti is my past postdoctoral supervisor.*
- Dr. Bruce W. Weide** (e-mail: weide.1@osu.edu; phone: +1-614-292-1517)
- Professor and Associate Chair, Computer Science and Engineering
The Ohio State University
 - ◇ 395 Drees Laboratories, 2015 Neil Ave., Columbus, OH 43210
 - ★ *Dr. Weide is a co-PI on the NSF grant that funded my previous postdoctoral position.*
- Dr. Ian M. Hamilton** (e-mail: hamilton.598@osu.edu; phone: +1-614-292-9147)
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MORE
INFORMATION

More information and auxiliary documents can be found at
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