Tichakorn (Nok) Wongpiromsarn

Department of Computer Science
College of Liberal Arts and Sciences
Iowa State University

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EDUCATION

California Institute of Technology, Pasadena, CA

Ph.D. in Mechanical Engineering *June 2010*

Minor:	Control and Dynamical Systems
Dissertation:	Formal Methods for Design and Verification of Embedded Control Systems
Relevant coursework:	Classical Control Theory, Modern Control, Robust Control, Distributed Control, Networked Control Systems, Communication Networks, Dynamical Systems, Manifolds and Tensor Analysis, Robot Kinematics, Robot Navigation and Vision, Formal Software Verification
GPA:	4.1/4.0
Advisor:	Prof. Richard Murray

Master of Science in Mechanical Engineering *June 2006*

GPA:	4.1/4.0
Advisor:	Prof. Joel Burdick

Cornell University, Ithaca, NY

Bachelor of Science in Mechanical Engineering (Summa Cum Laude) *May 2005*

GPA:	4.1/4.0 (cumulative), 4.2/4.0 (major)
Advisor:	Prof. Raffaello D'Andrea

HONORS AND AWARDS

Best Intelligent Systems Paper (2011)	AIAA Infotech@Aerospace Conference
Powell Fellowship and Henry L. Guenther Fellowship (2005)	Caltech (scholarship for the first year of graduate study)
Frank O. Ellenwood Prize (2005)	Cornell University (awarded to the senior with the highest composite average in heat and power-related engineering courses)

GRANTS

- Co-PI, "CPS: Medium: Resource-Aware Hierarchical Runtime Verification for Mixed-Abstraction-Level Systems of Systems", NSF 2038903, $1,200,000, 1 January 2021–31 December 2023.

- Co-PI, "Autonomous Mission Translation, Decomposition and Execution System", TL Seed Funding R394-000-068-232, S$50,000, 1 August 2012–31 July 2013.

RESEARCH INTERESTS

- Specification, design, and analysis of cyber-physical systems
- Situational reasoning and decision making in complex, dynamic and uncertain environments
- Modeling, analysis, and optimization of large-scale multi-agent systems

PROFESSIONAL EXPERIENCE

Iowa State University Ames, IA

Assistant Professor August 2020–Present
Department: Computer Science

University of Texas at Austin Austin, TX

Research Fellow January 2020–August 2020
Group: Autonomous Systems

Aptiv Singapore

Principal Research Scientist October 2018–December 2019
Team: Chief Scientist Office

- Developed a behavior validation module to determine whether an autonomous vehicle exhibits correct behaviors based on prioritized traffic rules.
- Redesigned the motion planner, the decision making component and the planner-controller interface to ensure that autonomous vehicles respect formal behavior specifications derived from traffic rules and human-driven behaviors. The new design focuses on the modularity and scalability of the planning-control architecture to allow different algorithms to be implemented, tested and evaluated quickly and independently.
- Supervised junior researchers on projects related to planning, decision making and controls.

nuTonomy Singapore

Principal Research Scientist, Team Lead October 2015–October 2018
Team: Planning

- Led the planning and decision-making team with members in Boston and Singapore.
- Designed, implemented and maintained a motion planner and decision making logic based on the minimum-violation planning approach with the goal of providing a correctness guarantee of the autonomous vehicles with respect to a given set of traffic rules.
- Developed and maintained a controller for autonomous vehicles to closely follow the motion planner generated paths.

Thailand Center of Excellence for Life Sciences Bangkok, Thailand

Project Manager February 2014–September 2015
Group: Medical Robotics

- Promoted and supported commercialization of innovations and research.
- Developed Medical Robotics Technology Development Roadmap.
- Collaborated with private and academic partners to develop and commercialize medical robots, including an automatic drug dispensing system and an elderly care robot.

Singapore-MIT Alliance for Research and Technology — Singapore

Postdoctoral Associate — October 2010–December 2012
Group: Future Urban Mobility
Advisor: Prof. Emilio Frazzoli

- Built an autonomous vehicle testbed to demonstrate the role of autonomy in mobility-on-demand
- Developed a sensor package enabling perception (navigation and situational awareness) for an autonomous vehicle, at a cost that is a fraction of that of current systems with similar capabilities by exploiting prior knowledge of the environment as well as the availability of the existing infrastructure such as cellular networks and traffic cameras.
- Investigated new transportation pricing strategies to reduce traffic congestion.
- Developed methodologies to control traffic light signal timing for multi-junctions zone using real-time sensor feedback on vehicle flow status.

California Institute of Technology — Pasadena, CA

Postdoctoral Scholar — June 2010–September 2010
Project: Specification, Design and Verification of Distributed Embedded Systems
Advisor: Prof. Richard Murray

- Investigated the use of formal methods in the specification, design and verification of the vehicle management systems in modern avionics.
- Developed a software toolbox TuLiP (https://github.com/tulip-control/tulip-control) for formal synthesis of embedded control systems, incorporating receding horizon temporal logic planning.

Research Assistant — June 2006–May 2010
Project: Specification, Design and Verification of Distributed Embedded Systems
Advisor: Prof. Richard Murray

- Investigated the control, specification and verification of distributed embedded systems operating in physical environments.
- Developed a technique for safety verification of periodically controlled hybrid systems, a subclass of hybrid systems frequently encountered in applications involving embedded system with periodic sensing and actuation.
- Applied formal methods (model checking and theorem proving) to verify correctness of several components of Alice, an autonomous vehicle that competed in the 2007 DARPA Urban Challenge.
- Proposed a methodology for automatic synthesis of embedded control software that provides a formal guarantee of system correctness, with respect to its requirements expressed in linear temporal logic.
- Introduced a receding horizon framework for linear temporal logic (LTL) specifications to alleviate the computational complexity associated with LTL synthesis.

Research Assistant — July 2005–September 2005
Project: Distributed Cooperative Control of Multiple Vehicle Systems over Wireless Networks
Advisor: Prof. Joel Burdick

- Investigated the use of communication-based coordination of automobiles to minimize traffic accidents, reduce traffic congestion and increase driver safety and comfort.
- Developed a path planning approach based on potential field for navigating an automobile on a highway. The controlled vehicles attempt to maintain a certain default speed to keep traffic moving while avoiding other cars and changing speed and lanes as appropriate.

Nanyang Technological University Singapore

Visiting Researcher July 2009–September 2009
Project: A Consensus Approach to the Assignment Problem
Advisor: Prof. Lihua Xie

- Developed a consensus-based technique to solve the assignment problem in a completely distributed manner without any central management or global knowledge.
- Applied the proposed technique to the mobile sensor dispatch problem.

Cornell University Ithaca, NY

Research Assistant August 2004–May 2005
Project: Robot Motion Planning
Advisor: Prof. Raffaello D'Andrea and Dr. Venkatesh Rao

- Developed dynamic refinement techniques that transform the polygonal path computed by a geometric planning layer into a feasible trajectory for a specific vehicle by fitting suitable geometric primitives.

DESIGN EXPERIENCE

Team Caltech, California Institute of Technology Pasadena, CA

Systems Team Leader June 2006–November 2007
Project: DARPA Urban Challenge

- Worked with a team of approximately 50 people on the Caltech's entry in the 2007 DARPA Urban Challenge, a race for unmanned, autonomous vehicles in complex urban environments.
- Coordinated the Systems Team consisting of undergraduates, graduate students and researchers from the Jet Propulsion Laboratory and Northrop Grumman Corporation. The team is responsible for systems engineering (system-level communications and architecture, including the canonical software architecture), health and contingency management (framework for responding to failures), system testing (test harnesses, field testing, log analysis), and simulation and visualization (tools for simulating the system and the environment and visualizing system state).
- Member of the Integrated Product Team responsible for systems engineering activities such as requirements and specifications development, functional analysis, system architecture and system design, and trade studies.
- Designed and implemented the mission management subsystem capable of reasoning about complex, uncertain, spatiotemporal environments and making decisions that enable autonomous missions to be accomplished safely and efficiently, with ample contingency planning.
- Designed and implemented the decision making logic of the planning module.

Sibley School of Mechanical and Aerospace Engineering, Cornell University Ithaca, NY

Team Member January 2004–May 2005
Project: Snake Arm

- Worked with a team of approximately 20 students to design, construct, and control a versatile multi-segmented robotic arm capable of operating in complex environments and responding to dynamic conditions.
- Responsible for the control and computer science components of the project.
- The project won first place in the 2004 nationwide ASME Student Mechanism Design Competition held in Salt Lake City, Utah from September 28th to October 2nd.

TEACHING AND MENTORING EXPERIENCE

Iowa State University   Ames, IA

Lecturer   Fall 2020
Course: DS 301 – Applied Data Modeling and Predictive Analysis

Lecturer   Spring 2021
Course: COM S 476/576 – Motion Strategy Algorithms and Applications

Research Mentor   Spring 2021
First Year Honors Mentor program
Project: Multi-Agent Interactions under Minimum-Violation Planning

European Embedded Control Institute (EECI)   Istanbul, Turkey

Lecturer   9–13 March 2020
Course: Specification, Design, and Verification for Self-Driving Cars

King Mongkut's University of Technology Thonburi   Bangkok, Thailand

Lecturer   Fall 2015
Course: FRA 638 – Mobile robots

European Embedded Control Institute (EECI)   L'Aquila, Italy

Lecturer   14–18 May 2012
Course: Specification, Design, and Verification of Distributed Control Systems

Urban Transport Programme, SIM University   Singapore

Thesis Advisor   December 2011–March 2012
Thesis Title: An Evaluation of the Effectiveness of Electronic Road Pricing in Singapore

European Embedded Control Institute (EECI)   Supelec, France

Lecturer   21–25 March 2011
Course: Specification, Design, and Verification of Distributed Embedded Systems

California Institute of Technology   Pasadena, CA

Research Mentor   June–September 2008
Summer Undergraduate Research Fellowships program
Project: Automatically Synthesizing Supervisory Control of Alice from Linear Temporal Logic Specifications

Teaching Assistant   October 2006–May 2007
Course: Introduction to Multidisciplinary Systems Engineering

Research Mentor   June–September 2007
Freshmen Summer Institute
Project: Dealing with Intesecgen Deadlock

Research Mentor   June–September 2006
Freshmen Summer Institute
Project: Trajectory Planning in Uncertain, Dynamic Environments

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Cornell University   Ithaca, NY

Teaching Assistant   September–December 2004
Course: Mechatronics

PROFESSIONAL ACTIVITIES

Workshop/Invited Session organizer
- "Formal Methods in Control", IEEE Conference on Decision and Control (CDC) 2012
- "Formal Methods for Design and Verification of Aerospace Systems", AIAA Infotech@Aerospace Conference 2012
- "Verification and Validation of Aerospace Systems", AIAA Infotech@Aerospace Conference 2011
- "Formal Methods for Robotics and Automation", IEEE International Conference on Robotics and Automation (ICRA) 2010

Reviewer
- Autonomous Robots, Control and Intelligent Systems Journal, IEEE Robotics and Automation Magazine, IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Robotics, International Journal of Robotics Research, Mathematical Structures in Computer Science, SIAM Journal on Control and Optimization, Springer Nature, Unmanned Systems, American Control Conference (ACC), Automation and Mechatronics (CIS-RAM), International Conference on Unmanned Aircraft Systems (ICUAS), International Conference on Control and Fault Tolerant Systems (SysTol), IEEE Annual Conference on Intelligent Transportation Systems (ITSC), IEEE Conference on Decision and Control (CDC), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Federation of Automatic Control (IFAC), Hybrid Systems: Computation and Control (HSCC), Mediterranean Conference on Control and Automation (MED), Robotics Science and Systems (RSS), Workshop on Control of Cyber-Physical Systems

Committee/Board Member
- Associate member of the AIAA Intelligent Systems Technical Committee (ISTC)
- Robotics Science and Systems, Program Committee
- NASA Formal Methods Symposium, Program Committee
- Unmanned Systems, Editorial Board Member

PUBLICATIONS

[1] A. Badithela, T. Wongpiromsarn, and R. M. Murray. Leveraging classification metrics for quantitative system-level analysis with temporal logic specifications. In *Proceedings of the 60th IEEE Conference on Decision and Control (CDC)*, 2021. submitted

[2] B. Helou, A. Dusi, A. Collin, N. Mehdipour, Z. Chen, C. Lizarazo, C. Belta, T. Wongpiromsarn, R. D. Tebbens, and O. Beijbom. The reasonable crowd: Towards evidence-based and interpretable models of driving behavior. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021. submitted

[3] S. Carr, T. Wongpiromsarn, and U. Topcu. Quantifying faulty assumptions in heterogeneous multi-agent systems. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021. submitted

[4] S. Bharadwaj, T. Wongpiromsarn, N. Neogi, J. Muffoletto, and U. Topcu. Minimum-violation traffic management for urban air mobility. In *The 13th NASA Formal Methods Symposium*, 2021. to appear

[5] T. Wongpiromsarn, K. Slutsky, E. Frazzoli, and U. Topcu. Minimum-violation planning for autonomous systems: Theoretical and practical considerations. In *2021 American Control Conference*, 2021. to appear

[6] K. Slutsky, D. Yershov, T. Wongpiromsarn, and E. Frazzoli. Hierarchical multiobjective shortest path problems. In *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2020

[7] A. Censi, K. Slutsky, T. Wongpiromsarn, D. Yershov, S. Pendleton, J. Fu, and E. Frazzoli. Liability, ethics, and culture-aware behavior specification using rulebooks. In *2019 International Conference on Robotics and Automation (ICRA)*, pages 8536–8542, 2019

[8] T. Wongpiromsarn, U. Topcu, and A. Lamperski. Automata theory meets barrier certificates: Temporal logic verification of nonlinear systems. *IEEE Transactions on Automatic Control*, 61(11):3344–3355, 2016

[9] V. Raman, M. Fält, T. Wongpiromsarn, and R. M. Murray. Online horizon selection in receding horizon temporal logic planning. In *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3493–3499, 2015

[10] J. Gregoire, X. Qian, E. Frazzoli, A. de La Fortelle, and T. Wongpiromsarn. Capacity-aware back-pressure traffic signal control. *IEEE Transactions on Control of Network Systems*, 2(2):164–173, 2015

[11] P. Chaudhari, T. Wongpiromsarn, and E. Frazzoli. Incremental minimum-violation control synthesis for robots interacting with external agents. In *2014 American Control Conference*, pages 1761–1768, 2014

[12] J. Gregoire, E. Frazzoli, A. de La Fortelle, and T. Wongpiromsarn. Back-pressure traffic signal control with unknown routing rates. *IFAC Proceedings Volumes*, 47(3):11332–11337, 2014

[13] N. Xiao, X. Wang, L. Xie, T. Wongpiromsarn, E. Frazzoli, and D. Rus. Road pricing design based on game theory and multi-agent consensus. *IEEE/CAA Journal of Automatica Sinica*, 1(1):31–39, 2014

[14] A. Ulusoy, T. Wongpiromsarn, and C. Belta. Incremental controller synthesis in probabilistic environments with temporal logic constraints. *International Journal of Robotics Research*, 33(8):1130–1144, 2014

[15] T. Wongpiromsarn, U. Topcu, and R. M. Murray. Synthesis of control protocols for autonomous systems. *Unmanned Systems*, 1(1):21–39, 2013

[16] X. Wang, N. Xiao, T. Wongpiromsarn, L. Xie, E. Frazzoli, and D. Rus. Distributed consensus in noncooperative congestion games: An application to road pricing. In *2013 10th IEEE International Conference on Control and Automation (ICCA)*, pages 1668–1673, 2013

[17] S. Mitra, T. Wongpiromsarn, and R. M. Murray. Verifying cyber-physical interactions in safety-critical systems. *IEEE Security Privacy*, 11(4):28–37, 2013

[18] N. Xiao, X. Wang, T. Wongpiromsarn, K. You, L. Xie, E. Frazzoli, and D. Rus. Average strategy fictitious play with application to road pricing. In *2013 American Control Conference*, pages 1920–1925, 2013

[19] T. Wongpiromsarn, A. Ulusoy, C. Belta, E. Frazzoli, and D. Rus. Incremental synthesis of control policies for heterogeneous multi-agent systems with linear temporal logic specifications. In *2013 IEEE International Conference on Robotics and Automation (ICRA)*, pages 5011–5018, 2013

[20] T. Wongpiromsarn, U. Topcu, and R. M. Murray. Receding horizon temporal logic planning. *IEEE Transactions on Automatic Control*, 57(11):2817–2830, 2012

[21] T. Wongpiromsarn, S. Mitra, A. Lamperski, and R. M. Murray. Verification of periodically controlled hybrid systems: Application to an autonomous vehicle. *ACM Transactions on Embedded Computing Systems*, 11(S2), 2012

[22] T. Wongpiromsarn, N. Xiao, K. You, K. Sim, L. Xie, E. Frazzoli, and D. Rus. Road pricing for spreading peak travel: Modeling and design. In *International Conference of Hong Kong Society for Transportation Studies*, 2012

[23] B. Rebsamen, T. Bandyopadhyay, T. Wongpiromsarn, S. Kim, Z. J. Chong, B. Qin, M. H. Ang, E. Frazzoli, and D. Rus. Utilizing the infrastructure to assist autonomous vehicles in a mobility on demand context. In *TENCON 2012 IEEE Region 10 Conference*, pages 1–5, 2012

[24] T. Wongpiromsarn, T. Uthaicharoenpong, Y. Wang, E. Frazzoli, and D. Wang. Distributed traffic signal control for maximum network throughput. In *2012 15th International IEEE Conference on Intelligent Transportation Systems*, pages 588–595, 2012

[25] T. Wongpiromsarn, A. Ulusoy, C. Belta, E. Frazzoli, and D. Rus. Incremental temporal logic synthesis of control policies for robots interacting with dynamic agents. In *2012 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 229–236, 2012

[26] Z. J. Chong, B. Qin, T. Bandyopadhyay, T. Wongpiromsarn, B. Rebsamen, P. Dai, S. Kim, M. H. Ang, D. Hsu, D. Rus, and E. Frazzoli. Autonomy for mobility on demand. In *2012 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pages 4235–4236, 2012

[27] T. Wongpiromsarn and E. Frazzoli. Control of probabilistic systems under dynamic, partially known environments with temporal logic specifications. In *Proceedings of the 51st IEEE Conference on Decision and Control (CDC)*, pages 7644–7651, 2012

[28] A. Ulusoy, T. Wongpiromsarn, and C. Belta. Incremental control synthesis in probabilistic environments with temporal logic constraints. In *Proceedings of the 51st IEEE Conference on Decision and Control (CDC)*, pages 7658–7663, 2012

[29] Z. J. Chong, B. Qin, T. Bandyopadhyay, T. Wongpiromsarn, B. Rebsamen, P. Dai, E. S. Rankin, and M. H. Ang. Autonomy for mobility on demand. In *International Conference on Intelligent Autonomous Systems*, pages 671–682, 2012

[30] Z. J. Chong, B. Qin, T. Bandyopadhyay, T. Wongpiromsarn, E. S. Rankin, M. H. Ang, E. Frazzoli, D. Rus, D. Hsu, and K. H. Low. Autonomous navigation in crowded campus environments. In *IROS Workshop on Perception and Navigation*, 2011

[31] T. Wongpiromsarn, S. Karaman, and E. Frazzoli. Synthesis of provably correct controllers for autonomous vehicles in urban environments. In *2011 14th International IEEE Conference on Intelligent Transportation Systems (ITSC)*, pages 1168–1173, 2011

[32] Z. J. Chong, B. Qin, T. Bandyopadhyay, T. Wongpiromsarn, E. S. Rankin, M. H. Ang, E. Frazzoli, D. Rus, D. Hsu, and K. H. Low. Autonomous personal vehicle for the first- and last-mile transportation services. In *2011 IEEE 5th International Conference on Cybernetics and Intelligent Systems (CIS)*, pages 253–260, 2011

[33] H. Kress-Gazit, T. Wongpiromsarn, and U. Topcu. Correct, reactive, high-level robot control. *IEEE Robotics Automation Magazine*, 18(3):65–74, 2011

[34] N. Ozay, U. Topcu, R. M. Murray, and T. Wongpiromsarn. Distributed synthesis of control protocols for smart camera networks. In *2011 IEEE/ACM Second International Conference on Cyber-Physical Systems*, pages 45–54, 2011

[35] T. Wongpiromsarn, U. Topcu, N. Ozay, H. Xu, and R. M. Murray. TuLiP: A software toolbox for receding horizon temporal logic planning. In *Proceedings of the 14th International Conference on Hybrid Systems: Computation and Control*, HSCC '11, page 313–314, New York, NY, USA, 2011. Association for Computing Machinery

[36] T. Wongpiromsarn, U. Topcu, and R. Murray. Formal synthesis of embedded control software: Application to vehicle management systems. In *Infotech@Aerospace 2011*, 2011

[37] T. Wongpiromsarn, K. You, and L. Xie. A consensus approach to the assignment problem: Application to mobile sensor dispatch. In *IEEE ICCA 2010*, pages 2024–2029, 2010

[38] T. Wongpiromsarn, U. Topcu, and R. M. Murray. Automatic synthesis of robust embedded control software. In *AAAI Spring Symposium on Embedded Reasoning: Intelligence in Embedded Systems*, 2010

[39] T. Wongpiromsarn, U. Topcu, and R. M. Murray. Receding horizon control for temporal logic specifications. In *Proceedings of the 13th ACM International Conference on Hybrid Systems: Computation*

and Control, HSCC '10, page 101–110, New York, NY, USA, 2010. Association for Computing Machinery

[40] T. Wongpiromsarn, U. Topcu, and R. M. Murray. Receding horizon temporal logic planning for dynamical systems. In *Proceedings of the 48h IEEE Conference on Decision and Control (CDC) held jointly with 2009 28th Chinese Control Conference*, pages 5997–6004, 2009

[41] T. Wongpiromsarn, S. Mitra, R. M. Murray, and A. Lamperski. Periodically controlled hybrid systems. In R. Majumdar and P. Tabuada, editors, *Hybrid Systems: Computation and Control*, pages 396–410, Berlin, Heidelberg, 2009. Springer Berlin Heidelberg

[42] T. Wongpiromsarn and R. M. Murray. Distributed mission and contingency management for the DARPA Urban Challenge. In *International Workshop on Intelligent Vehicle Control Systems (IVCS)*, 2008

[43] N. E. Du Toit, T. Wongpiromsarn, J. W. Burdick, and R. M. Murray. Situational reasoning for road driving in an urban environment. In *International Workshop on Intelligent Vehicle Control Systems (IVCS)*, 2008

[44] J. W. Burdick, N. E. Du Toit, A. Howard, C. Looman, J. Ma, R. M. Murray, and T. Wongpiromsarn. Sensing, navigation and reasoning technologies for the DARPA Urban Challenge. Technical report, DARPA Urban Challenge Final Report, 2007

[45] V. G. Rao, T. Wongpiromsarn, T. Ho, K. Chung, and R. D'Andrea. Encapsulated path planning for abstraction-based control of multi-vehicle systems. In *2006 American Control Conference*, 2006

[46] T. Wongpiromsarn, V. Rao, and R. D'Andrea. Two approaches to dynamic refinement in hierarchical motion planning. In *AIAA Guidance, Navigation, and Control Conference and Exhibit*, 2005

PATENTS

[1] Identifying a stopping place for an autonomous vehicle. U.S. Patent 10331129, filed October 20, 2016, and issued June 25, 2019.

[2] Traffic signal control method and traffic signal controller. U.S. Patent 9601013, filed January 10, 2013, and issued March 21, 2017.

SELECTED PRESENTATIONS

[1] Formal Methods for Control Synthesis of Autonomous Systems, Invited talk at Worcester Polytechnic Institute (October 2020), California Institute of Technology (November 2020), and University of Pennsylvania (November 2020).

[2] RuleBooks for Autonomous Vehicles, Invited talk at 3rd VeHICaL Project Annual Meeting, Berkeley, CA, October 2019.

[3] Behavior Specifications of Autonomous Vehicles, Invited talk at Automotive Summit 2019, Bangkok, Thailand, June 2019.

[4] Behavior Specifications of Autonomous Vehicles, Invited talk at 3rd IAVSD Workshop on Dynamics of Road Vehicles, Connected and Automated Vehicles, Ann Arbor, MI, April 2019.

[5] An Exciting Journey with Autonomous Vehicles, Coding Girls, Singapore, August 2016

[6] Incremental Synthesis of Control Policies for Heterogeneous Multi-Agent Systems with Linear Temporal Logic Specifications, IEEE International Conference on Robotics and Automation (ICRA), Karlsruhe, Germany, May 2013.

[7] Control of Probabilistic Systems under Dynamic, Partially Known Environments with Temporal Logic Specifications, IEEE Conference on Decision and Control (CDC), HI, December 2012.

[8] Incremental Temporal Logic Synthesis of Control Policies for Robots Interacting with Dynamic Agents, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vilamoura, Portugal, October 2012.

[9] Distributed Traffic Signal Control for Maximum Network Throughput, Intelligent Transportation Systems Conference (ITSC), AK, September 2012.

[10] DVS: A Distributed Virtual Signboard for Information Dissemination and Preservation in Vehicular Networks, Intelligent Transportation Systems Conference (ITSC), AK, September 2012.

[11] Formal Synthesis of Embedded Control Software: Applications in Autonomy, Vehicle Management and Multi-Target Tracking, Invited talk at Cornell University, Ithaca, NY, October 2011.

[12] Synthesis of Provably Correct Controllers for Autonomous Vehicles in Urban Environments, IEEE conference on Intelligent Transportation Systems (ITSC), Washington, DC, October 2011.

[13] TuLiP: A Software Toolbox for Receding Horizon Temporal Logic Planning, Hybrid Systems: Computation and Control (HSCC), Chicago, IL, April 2011.

[14] Formal Synthesis of Embedded Control Software for Vehicle Management Systems, AIAA Infotech@Aerospace, St Louis, MO, March 2011.

[15] Formal Synthesis of Embedded Control Software: Applications in Autonomy, Vehicle Management and Multi-Target Tracking, Invited talk at Boston University, Boston, MA, October 2010.

[16] Formal Synthesis of Embedded Control Software: Applications in Autonomy, Vehicle Management and Multi-Target Tracking, Multiscale Systems Center and Gigascale Systems Research Center 1st Annual Joint Review, San Jose, CA, September 2010.

[17] Formal Methods for Design and Verification of Embedded Control Systems: Application to an Autonomous Vehicle, Invited talk at United Technologies Research Center, East Hartford, CT, May 2010.

[18] Receding Horizon Framework for Temporal Logic Specifications, ICRA Workshop on Formal Methods for Robotics and Automation, Anchorage, AK, May 2010.

[19] Receding Horizon Control for Temporal Logic Specifications, The 13th International Conference on Hybrid Systems: Computation and Control (HSCC), Stockholm, Sweden, April 2010.

[20] Automatic Synthesis of Robust Embedded Control Software, AAAI Spring Symposium on Embedded Reasoning: Intelligence in Embedded Systems, Palo Alto, CA, March 2010.

[21] Receding Horizon Temporal Logic Planning for Dynamical Systems, IEEE Conference on Decision and Control (CDC), Shanghai, China, December 2009.

[22] Specification, Design and Verification of Distributed, Real-Time, Embedded Systems, Invited talk at Temasek Laboratories, Singapore, September 2009.

[23] Receding Horizon Temporal Logic Planning for Dynamical Systems, Southern California Nonlinear Control Workshop, California Institute of Technology, Pasadena, CA, May 2009.

[24] Periodically Controlled Hybrid Systems: Verifying a Controller for an Autonomous Vehicle, The 12th International Conference on Hybrid Systems: Computation and Control (HSCC), San Francisco, CA, April 2009.

[25] Distributed Mission and Contingency Management for the DARPA Urban Challenge, The 2nd International Workshop on Intelligent Vehicle Control Systems, Funchal, Madeira, Portugal, May 2008.

[26] Formal Verification of an Autonomous Vehicle System, Invited talk at Jet Propulsion Laboratory, Pasadena, CA, April 2008.

[27] DARPA Urban Challenge: How to Incorporate Human Intelligence into a Self Driving Car, Invited talk at Chulalongkorn University, Bangkok, Thailand, March 2008.

[28] Formal Verification of an Autonomous Vehicle System, Southern California Nonlinear Control Workshop, University of Southern California, Los Angeles, CA, January 2008.

[29] Two Approaches to Dynamic Refinement in Hierarchical Motion Planning, AIAA Conference on Guidance, Navigation and Control, San Francisco, CA, August 2005.