

Xi Yu

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Morgantown, West Virginia 26506

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PROFESSIONAL EXPERIENCE

West Virginia University, Morgantown, WV January 2021 - present
Assistant Professor
Department of Mechanical and Aerospace Engineering

University of Pennsylvania, Philadelphia, PA February 2018 – December 2020
Post-Doctoral Researcher (Advisor: Dr. M. Ani Hsieh)
GRASP Lab, Department of Mechanical Engineering and Applied Mechanics

EDUCATION

Boston University, Boston, MA January 2018
Ph.D., Mechanical Engineering
Dissertation: *Control and Scheduling of Multiple Agents for Persistent Monitoring*
Advisor: Dr. Sean B. Andersson
Committee members: Dr. Christos G. Cassandras, Dr. John Baillieul, Dr. Roberto Tron

Karlsruhe Institute of Technology, Karlsruhe, Germany October 2011
Dipl.-Ing., Mechanical Engineering
Thesis: *Reinforcement Learning Based Motion Control on a 2 DoF Robotic Arm*
Advisors: Dr. Markus Frietsch, Dr. Peter Meckl (Purdue University), Dr. Albert Albers

B.Sc., Mechanical Engineering October 2010

FELLOWSHIP / AWARD / GRANT

Travel Grant, NSF Robot Learning Workshop, Lehigh University 2019
TaR Fellowship, Center of Integration, Research, Teaching and Learning, Boston University 2015 - 2016
NSF Student Travel Award, the 53th IEEE Conference on Decision and Control 2014
Dean's Fellowship, College of Engineering, Boston University 2012 - 2013
Cheung Family Fellowship, College of Engineering, Boston University 2012 - 2013
Robert Bosch Stiftung (Fellowship), Karlsruhe Institute of Technology 2005 - 2009

PEER REVIEWED PUBLICATION

(Google Scholar Page: <https://scholar.google.com/citations?user=vdyFSuoAAAAJ&hl=en&oi=ao>)

Journal Articles

- [J5] N. Zhou, C. G. Cassandras, **X. Yu**, and S. B. Andersson, "The Price of Decentralization: Event-Driven Optimization Algorithms for Multi-Agent Persistent Monitoring Tasks", arXiv preprint [arXiv:1803.02798](https://arxiv.org/abs/1803.02798), *accepted IEEE Transactions on Control of Network Systems (T-CNS)*.
- [J4] **X. Yu** and M. A. Hsieh, "Synthesis of a Time-Varying Communication Network by Robot Teams with Information Propagation Guarantees", *IEEE Robotics and Automation Letters (RA-L)*, 5(2), pp.1413 – 1420, *with presentation* at the International Conference on Robotics and Automation (ICRA), 2020.
- [J3] **X. Yu**, M. A. Hsieh, C. Wei and H. G. Tanner, "Synchronous Rendezvous for Networks of Marine Robots in Large Scale Ocean Monitoring", *Frontiers in Robotics and AI* 6 (2019): 76.
- [J2] **X. Yu**, S. B. Andersson, N. Zhou, and C. G. Cassandras, "Scheduling Multiple Agents in a Persistent Monitoring Task Using Reachability Analysis", *IEEE Transactions on Automatic Control (T-AC)* 2019.
- [J1] N. Zhou, **X. Yu**, S. B. Andersson, and C. G. Cassandras, "Optimal Event-Driven Multi-Agent Persistent Monitoring of a Finite Set of Data Sources", *IEEE Tran. on Automatic Control (T-AC)* 63(12), pp.4204-4217.

Conference Proceedings

- [C12] **X. Yu**, D. Shishika, D. Saldana and M. A. Hsieh, "Modular Robot Formation and Routing for Resilient Consensus", in *Proc. of the IEEE American Control Conference (ACC)*, 2020.

- [C11] C. Wei, H.G. Tanner, **X. Yu**, and M.A. Hsieh, “Low-Range Interaction Periodic Rendezvous Along Lagrangian Coherent Structures”, in Proc. of the IEEE American Control Conference (ACC), 2019, pp. 4012-4017.
- [C10] N. Zhou, C. G. Cassandras, **X. Yu**, and S. B. Andersson, “Optimal Threshold-Based Control Policies for Persistent Monitoring on Graphs”, in Proc. of the IEEE American Control Conference (ACC), 2019, pp. 2030-2035.
- [C9] C. Wei, **X. Yu***(Primary Author), H.G. Tanner, and M.A. Hsieh, “Synchronous Rendezvous for Networks of Active Drifters in Gyre Flows”, in Distributed Autonomous Robotic Systems (DARS), pp. 413-425. Springer, Cham, 2019.
- [C8] **X. Yu**, S. B. Andersson, N. Zhou, and C. G. Cassandras, “Optimal visiting schedule search for persistent monitoring of a finite set of targets”, in Proc. of the IEEE American Control Conference (ACC), 2018, pp. 4032-4037.
- [C7] N. Zhou, C. G. Cassandras, **X. Yu**, and S. B. Andersson, “Decentralized Event-Driven Algorithms for Multi-Agent Persistent Monitoring”, in Proc. of the 56th IEEE Conference on Decision and Control (CDC), 2017, pp. 4064-4069.
- [C6] **X. Yu**, S. B. Andersson, N. Zhou, and C. G. Cassandras, “Optimal dwell times for persistent monitoring of a finite set of targets”, in Proc. of the IEEE American Control Conference (ACC), 2017, pp. 5544-5549.
- [C5] N. Zhou, C. G. Cassandras, **X. Yu**, and S. B. Andersson, “Optimal event-driven multi-agent persistent monitoring with graph-limited mobility”, in Proc. of the 20th IFAC World Congress, 2017, pp. 2217-2222.
- [C4] N. Zhou, **X. Yu**, S. B. Andersson, and C. G. Cassandras, “Optimal event driven multi-agent persistent monitoring of a finite set of targets”, in Proc. of the 55th IEEE Conference on Decision and Control (CDC), 2016, pp. 1814–1819.
- [C3] **X. Yu** and S. B. Andersson, “Preservation of system properties for networked linear, time invariant control systems in the presence of switching delays”, in Proc. of the 53th IEEE Conference on Decision and Control (CDC), 2014, pp. 5260–5265.
- [C2] **X. Yu** and S. B. Andersson, “Effect of switching delay on a networked control system”, in Proc. of the 52th IEEE Conference on Decision and Control (CDC), 2013, pp. 5945–5950.
- [C1] A. Albers, **X. Yu** and H. Sommer, “Effect of Initial Knowledge on Reinforcement Learning Based Control”, Conference of Danube Adria Association for Automation & Manufacturing, Vienna, Austria, 2011.

Manuscripts in Progress

- [J6] **X. Yu**, D. Saldana, D. Shishika, and M. A. Hsieh, “Resilient Formation and Routing for Large Number of Robots”, *under review*.
- [J7] **X. Yu**, S. B. Andersson, N. Zhou, and C.G. Cassandras, “Optimal Visiting Schedule Search for Persistent Monitoring of a Finite Set of Targets”, *in prep*.
- [C13] **X. Yu**, D. Kularatne and M. A. Hsieh, “Threshold Based Periodicity Control in Gyre Flow with Dissipation”, *in prep*.

POSTER / PUBLIC PRESENTATION

- [P14] “Intermittently Connected Robotic Systems in Dynamic Environments”, *invited group talk (virtual)* at Lehigh University, Bethlehem, PA, United States, September 2020
- [P13] “Modular Robot Formation and Routing for Resilient Consensus”, *conference talk* at the IEEE American Control Conference (virtual), Denver, CO, United States, July 2020
- [P12] “Synthesis of a Time-Varying Communication Network by Robot Teams with Information Propagation Guarantees”, *conference talk* at the International Conference on Robotics and Automation (virtual), Paris, France, June 2020
- [P11] “Intermittently Connected Robotic Systems in Dynamic Environments”, *invited seminar (virtual)* at West Virginia University, Morgantown, WV, United States, April 2020
- [P10] “Synthesizing Time-Varying Communication Networks with Provable Guarantees via Distributed Synchronous Rendezvous Strategies”, *poster* at the NSF Robot Learning Workshop, Bethlehem, PA, United States, October 2019
- [P9] “Synthesizing Time-Varying Communication Networks with Provable Guarantees via Distributed Synchronous Rendezvous Strategies”, *poster* at the Northeast Robotics Colloquium VIII, Philadelphia, PA, United States, October 2019

- [P8] “Synthesizing Time-Varying Communication Networks with Provable Guarantees via Distributed Synchronous Rendezvous Strategies”, together with Dr. D.Kularatne, *annual report presentation* at the ONR Annual Review Meeting, Arlington, VA, United States, August 2019.
- [P7] “Synchronous rendezvous for networks of active drifters in gyre flows”, together with Dr. M. Ani Hsieh, *annual report presentation* at the ONR Annual Review Meeting, Arlington, VA, United States, August 2018.
- [P6] “Optimal visiting schedule search for persistent monitoring of a finite set of targets”, *conference talk* at the IEEE American Control Conference, Milwaukee, WI, United States, June 2018.
- [P5] “Planning and control of heterogeneous robot teams for ocean monitoring applications”, *lightning presentation* at NSF Smart and Autonomous Systems PI Meeting, Alexandria, VA, United States, April 2018.
- [P4] “Multi-agent persistent monitoring of a finite set of targets”, GRASP *special seminar* at the GRASP Lab, University of Pennsylvania, Philadelphia, PA, United States, October 2017. YouTube Source: <https://youtu.be/CNbUTUIAypM>
- [P3] “Optimal dwell times for persistent monitoring of a finite set of targets”, *conference talk* at the IEEE American Control Conference, Seattle, WA, United States, May 2017.
- [P2] “Preservation of system properties for networked linear, time invariant control systems in the presence of switching delays”, *conference talk* at the IEEE Conference on Decision and Control, Los Angeles, CA, United States, December 2014.
- [P1] “Effect of switching delay on a networked control system”, *conference talk* at the IEEE Conference on Decision and Control, Florence, Italy, December 2013.

TEACHING / MENTORING

University of Pennsylvania, Philadelphia, PA

Mentor for master and undergraduate students in Robotics January 2020 - present

Master student: Arnav Dhamija; Undergraduate student: Emma Izzo

Boston University, Boston, MA

Mentor for high school students June 2017 - August 2017

Six weeks’ mentorship for a high school student participating “Research in Science & Engineering” program

Teaching training September 2014 - January 2016

20 hours training on STEM teaching with Department of Mechanical Engineering

Coursera course (with certificate): *An Introduction to Evidence-Based Undergraduate STEM Teaching*

Two semesters “Teaching as Research” project: *Project-based Learning in Elementary Engineering Courses*

Teaching assistant September 2014 - January 2016

Dynamics and Control of Mechanical Systems

Instrumentation and Theory of Experiments

Compressible Flow and Propulsion

Introduction to Linear Algebra for Engineers (Volunteered)

Lab supervisor for course related experiments September 2014 - December 2016

“Test PID controller for a flying wing”, “Introduction to oscilloscope and multi-meter”, “Wheatstone bridge and strain measurement”, “Drag coefficient of a sphere”, “Temperature measurement and calibration”

Karlsruhe Institute of Technology, Karlsruhe, Germany

October 2007 - October 2010

Mentor (9 groups of students, 3-4 students per group)

Vordiplom (Pre-diploma) Design Projects

Teaching assistant

Advanced Mathematics for Mechanical Engineers I & II, Mechanical Design II & III

PROFESSIONAL SERVICE

Academic Societies

Finance Chair

The 3rd IEEE International Symposium on Multi-Robot and Multi-Agent Systems, 2021

Associate Editor

IEEE International Conference on Robotics and Automation (ICRA), 2020

Program Committee

The 35th ACM/SIGAPP Symposium On Applied Computing in 2020, 2021

Reviewer

- Journals

IEEE Transaction of Automatic and Control (T-AC),

IFAC Automatica,

IEEE Transaction on Robotics (T-RO),

IEEE Robotics and Automation Letters (RA-L),

Autonomous Robots (AURO)

- Conferences

IEEE American Control Conference (ACC),

IEEE International Conference on Robotics and Automation (ICRA),

IFAC World Congress,

IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR).

University of Pennsylvania, Philadelphia, PA

Volunteer of the Penn Health-Tech Face Shields Rapid Response Team, 2020

GRASP Presenter and Exhibitor, 2018-2019

Boston University, Boston, MA

Organizer of Annual Graduate Student Workshop for Center for Information and System Engineering (CISE), 2016 & 2017

Student host for CISE invited seminar speakers and Mechanical Engineering faculty candidates, 2014-2017

Reach Out - Pioneer Charter School of Science, Everett, MA

Invited Judge for Annual Science and Technology Fair 2014, 2015 & 2017