

# Zak M. Kassas

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<b>Contact Information</b>	900 University Ave., 319 Winston Chung Hall 319 Winston Chung Hall Department of Electrical & Computer Engineering The University of California, Riverside Riverside, CA 92521, USA	Office: (951) 827-5652 Fax: (951) 827-2484 E-mail: zkassas@ieee.org Web: <a href="http://www.ece.ucr.edu/~zkassas">www.ece.ucr.edu/~zkassas</a> Lab: <a href="http://www.aspin.ucr.edu">www.aspin.ucr.edu</a>
<b>Research Interests</b>	Cyber-physical systems, autonomous vehicles, intelligent transportation systems, navigation systems	
<b>Education</b>	<b>The University of Texas at Austin</b> , Austin, TX <b>Ph.D.</b> , Electrical & Computer Engineering, May 2014 <b>Dissertation:</b> Analysis and Synthesis of Collaborative Opportunistic Navigation Systems <b>Advisors:</b> Todd E. Humphreys (primary) and Ari Arapostathis (co-advisor) <b>The University of Texas at Austin</b> , Austin, TX <b>M.S.E.</b> , Aerospace Engineering, August 2010 <b>Report:</b> Optimal $\mathcal{H}_2$ and $\mathcal{H}_\infty$ Control of Large Segmented Telescopes <b>Advisor:</b> Robert H. Bishop <b>The Ohio State University</b> , Columbus, OH <b>M.S.</b> , Electrical & Computer Engineering, December 2003 <b>Thesis:</b> An Optimal Nonlinear Bayesian Filter Design and Combined Hospitality and Synthetic Inclination Approach for Tracking <b>Advisor:</b> Ümit Özgüner <b>Lebanese American University</b> , Byblos, Lebanon <b>B.E.</b> with Honors, Electrical Engineering, March 2001 <b>Final Project:</b> Using the GPS as a Reliable Standalone Positioning System <b>Advisor:</b> Samer S. Saab	
<b>Employment</b>	<b>Assistant Professor</b> University of California, Riverside Department of Electrical & Computer Engineering	<b>Jul. 2014 – present</b>
	<b>Graduate Research Assistant</b> The University of Texas at Austin Radionavigation Laboratory	<b>Jun. 2011 – Jun. 2014</b>
	<b>Adjunct Professor</b> Texas State University, San Marcos, TX Ingram School of Engineering	<b>Jan. – May, 2008 – 2011</b>
	<b>Research and Development (R&amp;D) Engineer</b> National Instruments Corp., Austin, TX Control Design & Dynamical Systems Simulations Group	<b>Oct. 2004 – Dec. 2010</b>
	<b>Graduate Research Associate</b> The Ohio State University Collaborative Center of Control Science (CCCS)	<b>Apr. 2002 – Sep. 2004</b>

**Laboratory Research Assistant** **Mar. 2001 – May 2001**  
Lebanese American University, Byblos, Lebanon  
GPS Laboratory

**Undergraduate Teaching Assistant** **Oct. 2000 – Feb. 2001**  
Lebanese American University, Byblos, Lebanon

**Research  
Grants**

- **Title:** Ultimate Navigation Chip (uNavChip): Chip-Scale Personal Navigation System Integrating Deterministic Localization and Probabilistic Signals of Opportunity  
**Sponsor:** National Institute of Standards and Technology (NIST)  
**Amount:** \$1,960,613, **My Share:** **\$350,000**  
**Period:** 2017–2020  
**PI:** A. Shkel, **Co-PI:** **Z. Kassas**, S. Kia
- **Title:** A Collaborative Opportunistic Framework for Resilient and Accurate Navigation in GPS-Challenged Environments  
**Sponsor:** Office of Naval Research (ONR)  
**Amount:** **\$510,000**  
**Period:** 2016–2019  
**PI:** **Z. Kassas**
- **Title:** Geophysical Navigation of Unmanned Underwater Vehicles (UUVs)  
**Sponsor:** Office of Naval Research (ONR)  
**Amount:** \$225,000, **My Share:** **\$112,500**  
**Period:** 2016–2019  
**PI:** **Z. Kassas**; **Co-PI:** J. Farrell
- **Title:** Developing a New Generation of Engineers with Cutting-Edge Knowledge in Resilient Navigation and Communication Systems in Contested Electromagnetic Environments  
**Sponsor:** Office of Naval Research (ONR)  
**Amount:** \$750,000; **My Share:** **\$718,174**  
**Period:** 2016–2019  
**PI:** **Z. Kassas**; **Co-PI:** P. Liang
- **Title:** Towards Optimal Information Gathering in Unknown Stochastic Environments  
**Sponsor:** National Science Foundation (NSF)  
**Amount:** **\$175,000**  
**Period:** 2016–2018  
**PI:** **Z. Kassas**

**Academic  
Research  
Experience**

**Assistant Professor** **Jul. 2014 – present**  
**University of California, Riverside**  
**Affiliation:** Department of Electrical & Computer Engineering  
**Funding Sources:** Office of Naval Research (ONR); National Science Foundation (NSF); University of California, Riverside  
**Director of Autonomous Systems Perception, Intelligence, and Navigation (ASPIN) Laboratory. ASPIN Research Achievements:**

- Analyzed stochastic observability and uncertainty characterization of simultaneous receiver and emitter localization
- Developed information fusion strategies for collaborative autonomous vehicle navi-

- gation with radio simultaneous localization and mapping (SLAM)
- Developed a tightly-coupled signal of opportunity (SOP)-aided inertial navigation system (INS) framework and demonstrated ground vehicles and unmanned aerial vehicles (UAVs) navigating via this framework in the absence of GPS signals, achieving “GPS-like” performance
  - Developed cellular CDMA and LTE navigation software-defined receivers (SDRs) and demonstrated ground vehicles and UAVs navigating exclusively with cellular CDMA and LTE signals with meter-level accuracy
  - Analyzed sector clock bias mismatch in cellular systems and derived analytical models describing the error’s dynamics along with estimation performance lower- and upper bounds in the presence of mismatch
  - Developed a real-time, multi-channel LabVIEW-based GPS SDR
  - Demonstrated significant vertical dilution of precession (VDOP) reduction of a GPS-based navigation solution by incorporating cellular CDMA signals
  - Established an analytically tractable solution to the problem of optimal receiver placement to map unknown signals of opportunity and quantified the optimal estimation performance as a function of time and varying number of receivers
  - Developed an indoor localization algorithm based on floor plans, fingerprinting, and trilateration that could achieve sub-meter-level accurate localization
  - Synthesized adaptive filters for on-the-fly characterization of navigation signals of opportunity

**Graduate Research Assistant**

**Jun. 2011 – Jun. 2014**

**The University of Texas at Austin**

**Affiliations:** Radionavigation Laboratory, Wireless Networking & Communications Group (WNCG)

**Funding Sources:** Boeing Advanced Network and Space Systems; National Science Foundation (NSF); Harris Corporation; Northrop Grumman Electronic Systems

- Formalized the theoretical framework of collaborative opportunistic navigation (COpNav) systems, which is aimed at enabling anytime, anywhere navigation by exploiting ambient radio frequency signals of opportunity
- Analyzed the observability and estimability of COpNav environments
- Proposed greedy motion planning strategies for optimal simultaneous signal landscape mapping and receiver localization with proven convexity properties
- Studied the effectiveness and limitations of receding horizon receiver trajectory optimization versus greedy motion planning for optimal information gathering
- Synthesized hierarchical information fusion and decision making architectures for collaborative signal landscape mapping with a negligible price of anarchy
- Developed a COpNav numerical simulator to validate theoretical predictions and gain insight for cases of theoretical intractability
- Designed a LabVIEW-based GPS SDR
- Demonstrated research outcomes experimentally via SDRs
- Assisted with developing Time Stability Transfer Toolkit for Iridium satellites

**Graduate Research Associate**

**Apr. 2002 – Sep. 2004**

**The Ohio State University**

**Affiliation:** Collaborative Center of Control Science (CCCS)

**Funding Sources:** Air Force Research Laboratory (AFRL); Orbital Research Inc.

- Developed nonlinear estimators for in-surveillance and out-of-surveillance ground mobile target tracking via unmanned aerial vehicles (UAVs)
- Implemented optimal Bayesian nonlinear filters coupled with algorithms that address the curse of dimensionality with negligible performance degradation

**Laboratory Research Assistant** **Oct. 2000 – May 2001**  
**Lebanese American University**

**Affiliation:** Global Positioning System (GPS) Laboratory

- Proposed a power matching algorithm aimed at extending GPS coverage
- Validated the proposed algorithm via experimental demonstrations

**Industrial  
Experience**

**National Instruments Corp., Austin, TX** **Oct. 2004 – Dec. 2010**  
**Research and Development (R&D) Engineer**

**Product Development:**

- Developed software: LabVIEW Control Design & Simulation Module, System Identification Toolkit, and PID & Fuzzy Control Toolkit
- Executed various phases (research, implementation, and testing) of the development cycle of six major and minor releases of software
- Coded multi-platform algorithms for off-line design and simulation and Real-Time (RT) and Field Programmable Gate Array (FPGA) deployment
- Led initiatives to improve quality of software, resulting in automated frameworks guaranteeing numerical robustness and reducing testing time from months to hours

**Supervision:**

- Guided junior engineers in overseas company branches (China and Brazil)
- Served as an industrial advisor for projects from The Ohio State University, Virginia Tech, California State University, and Brigham Young University

**Leadership:**

- Interviewed candidates for software and hardware R&D positions
- Organized on-campus recruiting booths at Engineering Career Fairs of The Ohio State University
- Assisted with organizing the National Instruments Conference (NI Week), Austin, TX, August 2005 and 2007; an event that attracts more than 3,000 engineers, educators, and scientists

**Teaching  
Experience**

**University of California, Riverside, CA** **Oct. 2014 – present**

**Graduate Courses:**

- EE 235: Linear Systems Theory (Fall 2014, 2015, 2016), 77 students
- EE 260: Advanced Detection & Estimation Theory (Spring 2017), 8 students
- EE 260: Global Navigation Satellite System Signal Processing & Software-Defined Radio Design (Fall 2015), 10 students

**Undergraduate Courses:**

- EE 132: Automatic Control (Spring 2015, 2016), 188 students

**Texas State University, San Marcos, TX** **Jan. – May, 2008 – 2011**

**Undergraduate Courses:**

- MFGE 4376: Control Systems & Instrumentation (Spring 2008, 2009, 2010), 100 students
- EE 4377: Digital Signal Processing (Spring 2011), 13 students

## Honors & Awards

- Best paper presentation award, “Performance characterization of positioning in LTE systems,” ION GNSS+ Conference, 2016
- Best paper presentation award, “Signals of opportunity aided inertial navigation,” ION GNSS+ Conference, 2016
- NSF Computer and Information Science and Engineering (CISE) Research Initiation Initiative (CRII) award, 2016
- Best research poster finalist, “Navigation with cellular CDMA signals,” Southern California Robotics Symposium, 2016
- Best student paper award, “A software-defined receiver architecture for cellular CDMA-based navigation,” IEEE/ION Position, Location, and Navigation Symposium, 2016
- Best paper award, “Optimal receiver placement for collaborative mapping of signals of opportunity,” ION GNSS+ Conference, 2015
- The University of Texas Research Excellence award, 2013
- Best paper presentation award, “Observability analysis of opportunistic navigation with pseudorange measurements,” AIAA Guidance, Navigation & Control Conference, 2012
- Best student paper award, “Constructing a continuous phase time history from TDMA signals for opportunistic navigation,” IEEE/ION Position, Location & Navigation Symposium, 2012
- The University of Texas Professional Development award, 2011–2013
- IEEE Senior Member promotion, 2011
- Lebanese American University School of Engineering Scholarship, 2000
- Lebanese American University Dean’s List of Distinguished Students, 1999–2001

## Journal Publications

- [J13] **Kassas, Z.** (2017). Collaborative navigation architectures for optimal information gathering from signals of opportunity. *IEEE Trans. on Aerospace and Electronic Systems*, in preparation.
- [J12] Morales, J., & **Kassas, Z.** (2017). Stochastic observability and uncertainty characterization in simultaneous receiver and transmitter localization. *IEEE Trans. on Aerospace and Electronic Systems*, in preparation.
- [J11] Khalife, J., & **Kassas, Z.** (2017). Navigation with cellular CDMA signals – Part II: performance analysis and experimental results. *IEEE Trans. on Signal Processing*, submitted.
- [J10] Khalife, J., Shamaei, K., & **Kassas, Z.** (2017). Navigation with cellular CDMA signals – Part I: signal modeling and software-defined receiver design. *IEEE Trans. on Signal Processing*, submitted.
- [J9] Shamaei, K., Khalife, J., & **Kassas, Z.** (2016). Exploiting LTE signals for navigation: theory to implementation. *IEEE Trans. on Wireless Communications*, submitted.
- [J8] Morales, J., & **Kassas, Z.** (2016). Optimal receiver placement and collaborative estimation performance for mapping terrestrial transmitters. *IEEE Trans. on Aerospace and Electronic Systems*, submitted.
- [J7] **Kassas, Z.**, & Humphreys, T. (2015). Receding horizon trajectory optimization in opportunistic navigation environments. *IEEE Trans. on Aerospace and Electronic*

*Systems*, 51(2), 866–877.

[J6] **Kassas, Z.**, Arapostathis, A., & Humphreys, T. (2015). Greedy motion planning for simultaneous signal landscape mapping and receiver localization. *IEEE Journal of Selected Topics in Signal Processing*, 9(2), 247–258.

[J5] Pesyna, K., **Kassas, Z.**, Heath, R., & Humphreys, T. (2014). A phase reconstruction technique enabling low-power centimeter-accurate mobile positioning. *IEEE Trans. on Signal Processing*, 62(10), 2595–2610.

[J4] **Kassas, Z.**, & Humphreys, T. (2014). Observability analysis of collaborative opportunistic navigation with pseudorange measurements. *IEEE Trans. on Intelligent Transportation Systems*, 15(1), 260–273.

[J3] **Kassas, Z.** (2011). Discretisation of continuous-time dynamic multi-input multi-output systems with non-uniform delays. *IET Control Theory & Applications*, 5(14), 1637–1647.

[J2] **Kassas, Z.**, & Ozguner, U. (2010). A nonlinear filter coupled with hospitability and synthetic inclination maps for in-surveillance and out-of-surveillance target tracking. *IEEE Trans. on Systems, Man, and Cybernetics - Part C*, 40(1), 87–97.

[J1] Saab, S., & **Kassas, Z.** (2006). Power matching approach for GPS coverage extension. *IEEE Trans. on Intelligent Transportation Systems*, 7(2), 156–166.

## Conference Publications

[C32] Shamaei, K., & **Kassas, Z.** (2017). Computationally efficient receiver design for mitigating multipath for positioning with LTE signals. *ION Global Navigation Satellite Systems Conference*. Portland, OR, accepted.

[C31] Morales, J., & **Kassas, Z.** (2017). Collaborative signals of opportunity aided inertial navigation with intermittent communication. *ION Global Navigation Satellite Systems Conference*. Portland, OR, accepted.

[C30] Shamaei, K., Khalife, J., & **Kassas, Z.** (2017). Code phase error analysis for positioning with LTE signals. *European Signal Processing Conference*. Kos Island, Greece, accepted (special session).

[C29] Khalife, J., Ragothaman, S., & **Kassas, Z.** (2017). Pose estimation with lidar odometry and cellular pseudorange measurements. *IEEE Intelligent Vehicles Symposium*. Redondo Beach, CA, accepted.

[C28] Khalife, J., & **Kassas, Z.** (2017). Modeling and analysis of sector clock bias mismatch for navigation with cellular signals. *American Control Conference*. Seattle, WA, accepted.

[C27] Morales, J., Khalife, J., & **Kassas, Z.** (2017). Collaborative autonomous vehicles with signals of opportunity aided inertial navigation systems. *Proc. of ION International Technical Meeting* (pp. 805–818). Monterey, CA.

[C26] Shamaei, K., Khalife, J., & **Kassas, Z.** (2017). Comparative results for positioning with secondary synchronization signal versus cell specific reference signal in LTE systems. *Proc. of ION International Technical Meeting* (pp. 1256–1268). Monterey, CA.

[C25] Morales, J., Roysdon, P., & **Kassas, Z.** (2016). Signals of opportunity aided

- inertial navigation. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 1492–1501). Portland, OR.
- [C24] Shamaei, K., Khalife, J., & **Kassas, Z.** (2016). Performance characterization of positioning in LTE systems. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 2262–2270). Portland, OR.
- [C23] Khalife, J., & **Kassas, Z.** (2016). Characterization of sector clock biases in cellular CDMA systems. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 2281–2285). Portland, OR.
- [C22] Khalife, J., Shamaei, K., & **Kassas, Z.** (2016). A software-defined receiver architecture for cellular CDMA-based navigation. *Proc. of IEEE/ION Position, Location, and Navigation Symposium* (pp. 816–826). Savannah, GA.
- [C21] Morales, J., Khalife, J., & **Kassas, Z.** (2016). GNSS vertical dilution of precision reduction using terrestrial signals of opportunity. *Proc. of ION International Technical Meeting* (pp. 664–669). Monterey, CA.
- [C20] Morales, J., & **Kassas, Z.** (2015). Optimal receiver placement for collaborative mapping of signals of opportunity. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 2362–2368). Tampa, FL.
- [C19] Khalife, J., **Kassas, Z.**, & Saab, S. (2015). Indoor localization based on floor plans and power maps: non-line of sight to virtual line of sight. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 2291–2300). Tampa, FL.
- [C18] **Kassas, Z.**, Ghadiok, V., & Humphreys, T. (2014). Adaptive estimation of signals of opportunity. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 1679–1689). Tampa, FL.
- [C17] **Kassas, Z.**, Bhatti, J., & Humphreys, T. (2013). A graphical approach to GPS software-defined receiver implementation. *Proc. of IEEE Global Conference on Signal and Information Processing* (pp. 1226–1229). Austin, TX.
- [C16] **Kassas, Z.**, & Humphreys, T. (2013). The price of anarchy in active signal landscape map building. *Proc. of IEEE Global Conference on Signal and Information Processing* (pp. 165–168). Austin, TX.
- [C15] **Kassas, Z.**, Bhatti, J., & Humphreys, T. (2013). Receding horizon trajectory optimization for simultaneous signal landscape mapping and receiver localization. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 1962–1969). Nashville, TN.
- [C14] **Kassas, Z.**, & Humphreys, T. (2013). Motion planning for optimal information gathering in opportunistic navigation systems. *Proc. of AIAA Guidance, Navigation, and Control Conference* (pp. 4551–4565). Boston, MA.
- [C13] **Kassas, Z.**, & Humphreys, T. (2012). Observability and estimability of collaborative opportunistic navigation with pseudorange measurements. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 621–630). Nashville, TN.
- [C12] **Kassas, Z.**, & Humphreys, T. (2012). Observability analysis of opportunistic navigation with pseudorange measurements. *Proc. of AIAA Guidance, Navigation,*

and Control Conference (pp. 4760–4775). Minneapolis, MN.

[C11] **Kassas, Z.**, & Bishop, R. (2012). Optimal  $\mathcal{H}_2$  and  $\mathcal{H}_\infty$  control of extremely large segmented telescopes. *Proc. of AIAA Guidance, Navigation, and Control Conference* (pp. 4529–4540). Minneapolis, MN.

[C10] Pesyna, K., **Kassas, Z.**, & Humphreys, T. (2012). Constructing a continuous phase time history from TDMA signals for opportunistic navigation. *Proc. of IEEE/ION Position, Location, and Navigation Symposium* (pp. 1209–1220). Myrtle Beach, SC.

[C9] Pesyna, K., **Kassas, Z.**, Bhatti, J., & Humphreys, T. (2011). Tightly-coupled opportunistic navigation for deep urban and indoor positioning. *Proc. of ION Global Navigation Satellite Systems Conference* (pp. 3605–3617). Portland, OR.

[C8] **Kassas, Z.** (2011). Numerical simulation of continuous-time stochastic dynamical systems with noisy measurements and their discrete-time equivalents. *Proc. of IEEE International Symposium on Computer-Aided Control System Design* (pp. 1397–1402). Denver, CO.

[C7] **Kassas, Z.** (2011). Methodologies for implementing FPGA-based control systems. *Proc. of IFAC World Congress* (pp. 9911–9916). Milan, Italy.

[C6] **Kassas, Z.**, & Morrow, G. (2008). A numerical algorithm for reconstructing continuous-time linear models with pure integrators from their discrete-time equivalents. *Proc. of IEEE International Symposium on Computer-Aided Control System Design* (pp. 377–382). San Antonio, TX.

[C5] MacCleery, B., & **Kassas, Z.** (2008). New mechatronics development techniques for FPGA-based control of electromechanical systems. *Proc. of IFAC World Congress* (pp. 4434–4439). Seoul, South Korea.

[C4] **Kassas, Z.**, & Dunia, R. (2008). A unified approach for classroom and laboratory control systems education. *Proc. of IFAC World Congress* (pp. 14618–14623). Seoul, South Korea.

[C3] **Kassas, Z.**, & Dunia, R. (2006). Discretization of MIMO systems with nonuniform input and output fractional time delays. *Proc. of IEEE Conference on Decision and Control* (pp. 2541–2546). San Diego, CA.

[C2] **Kassas, Z.**, Ozguner, U., & Layne, J. (2004). Out-of-surveillance target state estimation: a combined hospitability and synthetic inclination approach. *Proc. of IEEE Conference on Decision and Control* (pp. 710–715). Paradise Island, Bahamas.

[C1] Saab, S., & **Kassas, Z.** (2002). Map-based land vehicle navigation system with DGPS. *Proc. of IEEE Intelligent Vehicle Symposium* (pp. 209–214). Versailles, France.

## Magazine Articles

[M4] **Kassas, Z.**, Khalife, J., Shamaei, K., & Morales, J. (2017). I hear, therefore I know where I am: compensating for GNSS deficiencies with cellular signals. *IEEE Signal Processing Magazine*, accepted (invited).

[M3] **Kassas, Z.**, Morales, J., Shamaei, K., & Khalife, J., (2017, April). LTE steers UAV. *GPS World*, (28)4, 18–25, cover article.

[M2] Morales, J., Khalife, J., & **Kassas, Z.** (2016, March). Opportunity for accuracy.



*GPS World*, (27)3, 22–29, cover article.

[M1] **Kassas, Z.** (2013, June). Collaborative opportunistic navigation. *IEEE Aerospace and Electronic Systems Magazine*, (28)6, 38–41.

**Book  
Chapters**

[BC1] Layne, J., Eilders, M., **Kassas, Z.**, & Ozguner, U. (2003). A hospitability map approach for estimating a mobile target location. In S. Butenko, R. Murphey, & P. Pardalos (Eds.), *Recent Developments in Cooperative Control and Optimization* (pp. 117–124). Norwell, MA: Kluwer Academic Publishers.

**Patents**

[P4] **Kassas, Z.**, & Morales, J. (2016). Signals of opportunity aided inertial navigation system. U.S. Provisional Patent Application No. 62/398,413.

[P3] **Kassas, Z.**, Shamaei, K., & Khalife, J. (2016). SDR for navigation with LTE signals. U.S. Provisional Patent Application No. 62/398,403.

[P2] **Kassas, Z.**, Khalife, J., & Shamaei, K. (2016). SDR for navigation with cellular CDMA signals. U.S. Provisional Patent Application No. 62/294,758.

[P1] **Kassas, Z.**, & Lewis, J. (2012). Multi-channel algorithm infrastructure for programmable hardware elements. U.S. Patent No. 8,122,238. Washington, DC: U.S. Patent and Trademark Office.

**Invited  
Presentations**

- 2017 GPS World Magazine, Online Webinar.
- 2017 Department of Mechanical, Materials & Aerospace Engineering , Illinois Institute of Technology, Chicago, IL.
- 2017 Department of Electrical Engineering, University of California, Los Angeles, CA.
- 2017 Department of Electrical & Computer Engineering, The Ohio State University, Columbus, OH.
- 2017 Department of Electrical & Computer Engineering, Carnegie Mellon University, Silicon Valley, CA.
- 2017 Department of Electrical Engineering & Computer Science, University of California, Irvine, CA.
- 2016 Department of Electrical & Computer Engineering, Air Force Institute of Technology, Wright-Patterson Air Force Base, OH.
- 2016 Department of Electrical Engineering & Computer Science, Ohio University, Athens, OH.
- 2016 Department of Electrical & Computer Engineering, The Ohio State University, Columbus, OH.
- 2016 Department of Aeronautics & Astronautics, University of Washington, Seattle, WA.
- 2016 ION Southern California Section, John Deere, Torrance, CA.
- 2016 Department of Aeronautics & Astronautics, Stanford University, Stanford, CA.
- 2015 Department of Electrical Engineering, University of South Florida, Tampa, FL.
- 2015 Department of Electrical & Computer Engineering, University of California, Santa Barbara, CA.

- 2015 Department of Electrical & Computer Engineering, University of California, Riverside, CA.
- 2015 Naval Research Laboratory, Washington, D.C.
- 2014 Department of Aerospace Engineering & Mechanics, University of Minnesota, Twin Cities, Minneapolis, MN.
- 2014 Department of Electrical & Computer Engineering, American University of Beirut, Lebanon.
- 2014 Department of Electrical & Computer Engineering, University of California, Riverside, CA.
- 2013 The Aerospace Corporation, El Segundo, CA.
- 2013 Northrop Grumman Electronic Systems, Woodland Hills, CA.
- 2013 Charles Stark Draper Laboratory, Cambridge, MA.
- 2013 Robotics & Autonomous Vehicles Summit, National Instruments Week Conference, Austin, TX.
- 2013 Academic Forum, National Instruments Week Conference, Austin, TX.
- 2012 IEEE Global Conference on Signal & Information Processing, Austin, TX.
- 2012 Texas Wireless Summit, Austin, TX.
- 2012 National Science Foundation Wireless Internet Center for Advanced Technology (NSF-WICAT), Virginia Tech, Blacksburg, VA.
- 2008 Department of Electrical & Computer Engineering, American University of Beirut, Lebanon.
- 2007 Mechatronics Symposium, National Instruments Week Conference, Austin, TX.
- 2007 Air Force Research Laboratory, Wright-Patterson Air Force Base, OH.
- 2007 L-3 Communications, Cincinnati, OH.
- 2007 Belcan Engineering, Cincinnati, OH.
- 2007 Center for Automotive Research, The Ohio State University, Columbus, OH.
- 2005 Department of Electrical & Computer Engineering, The Ohio State University, Columbus, OH.

**Journal  
Editorship**

- Associate editor, *IEEE Transactions on Aerospace and Electronic Systems*, (2016 – Present).

**Professional  
Service**

- Track chair, *IEEE/ION Position, Location and Navigation Symposium*, Monterey, CA, 2018.
- Session chair, *ION Global Navigation Satellite System Conference*, Portland, OR, 2017.
- Review panelist, *National Science Foundation (NSF), Computer and Network Systems (CNS)*, Arlington, VA, 2017.
- Review panelist, *National Science Foundation (NSF), Cyber-Physical Systems (CPS)*, Arlington, VA, 2017.
- Session chair, *American Control Conference*, Seattle, WA, 2017.
- Associate editor, *American Control Conference*, Seattle, WA, 2017.
- Review panelist, *National Science Foundation (NSF), Smart and Autonomous Systems (S&AS)*, Arlington, VA, 2017.
- Session chair, *ION International Technical Meeting*, Monterey, CA, 2017.
- Review panelist, *National Science Foundation (NSF), Computer and Network Sys-*

*tems (CNS)*, Arlington, VA, 2016.

- Review panelist, *National Science Foundation (NSF), Cyber-Physical Systems (CPS)*, Arlington, VA, 2016.
- Session chair, *IEEE/ION Position, Location and Navigation Symposium*, Savannah, GA, 2016.
- Session chair, *ION International Technical Meeting*, Monterey, CA, 2016.
- Session chair, *AIAA Guidance, Navigation, & Control Conference*, Boston, MA, 2013.
- Review panelist, *IEEE Senior Membership Advancement*, Austin, TX, 2013.
- Advisory panelist, *The University of Texas at Austin Graduate Lecture Series: (i) Should I pursue a Ph.D.?, (ii) How to approach research?, and (iii) The importance of getting published*, Austin, TX, 2012.
- Session chair, *IFAC World Congress*, Milan, Italy, 2011.

## Peer-Review Activities

### Journals

- IEEE Transactions on Aerospace and Electronic Systems
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Signal Processing
- IEEE Journal of Selected Topics in Signal Processing
- IEEE Aerospace and Electronic Systems Magazines

### Magazines

- IEEE Aerospace and Electronic Systems Magazines

### Conferences

- ION International Technical Meeting 2016 – 2018
- ION GNSS Conference 2016 – 2017
- IEEE Conference on Control Technology and Applications 2017
- European Signal Processing Conference 2017
- IEEE Intelligent Vehicles Symposium 2017
- IEEE Vehicular Technology Conference 2017
- IEEE/ION Position, Location, and Navigation Symposium 2016
- AIAA Guidance, Navigation, and Control Conference 2013 – 2016
- American Control Conference 2014
- IEEE Multiconference on Systems and Control 2011
- IFAC World Congress 2011

## Professional Memberships

- Institute of Electrical and Electronics Engineers (IEEE) Senior Member
- IEEE Aerospace and Electronic Systems Society, IEEE Control Systems Society, IEEE Signal Processing Society, and IEEE Communications Society
- Institute of Navigation (ION)

## University Committees

### Campus

- Cluster Hiring in Autonomy, Robotics, and Dynamics Committee

### College

- Research & Instructional Infrastructure Committee

**Department**

- Colloquium Series Co-organizer (2016–2017)
- Undergraduate Curriculum Committee
- Outreach, Recruitment, & Publicity Committee
- Department Webpage Redesign Committee

**M.S. Thesis  
Committees**

- Jiarui Liu, “Analysis of EV Charging Load Based on Household Driving Data in California,” Jul. 2015.

**Ph.D.  
Dissertation  
Defense  
Committees**

- Yiming Chen, “A New Approach for Computationally Efficient and Reliable Carrier Integer Ambiguity Resolution in GPS/INS,” Dec. 2014.
- Sheng Zhao, “Realtime, Decimeter Accuracy Navigation Using Sliding Window Estimator and Autonomous Vehicle Trajectory Tracking Control,” Dec. 2014.