

# BYUNG-CHEOL MIN

Assistant Professor, Purdue University

## CONTACT INFORMATION

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Computer and Information Technology  
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## RESEARCH INTERESTS

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My long-term research goal is to develop a mechanism that enables a number of heterogeneous robots and humans to interact seamlessly in any situations. In pursuit of this goal, my current research interests are multi-robot systems, human-robot interaction, and robot design and control, with focus on application in field robotics and assistive technology and robotics.

Topics: Distributed control, formation control, bio-inspired swarm robots, robotic sensor networks, multi-agent systems, networked robotics, search-and-rescue robots, unmanned aerial/surface/underwater vehicles, cyber-physical systems, accessibility.

## EDUCATION

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- Post-Doc, The Robotics Institute** June 2014 – July 2015  
**Carnegie Mellon University**, Pittsburgh, PA, USA  
Advisors: Prof. M. Bernardine Dias and Prof. Aaron Steinfeld
- Ph.D., Technology** (Specialization: Computer and Information Technology) May 2014  
**Purdue University**, West Lafayette, IN, USA  
Dissertation: Optimizing Self-organizing, Large-scale, Mobile Robotic Broadband Networks  
Advisor: Prof. Eric Matson
- M.S., Electronics and Radio Engineering** (Specialization: Automatic Control) Aug 2010  
**Kyung Hee University**, Yongin, Korea  
Thesis: Navigation Method for VTOL Type UAV using a Limit-cycle Navigation Method and Fuzzy Logic Control  
Advisor: Prof. Donghan Kim
- B.S., Electronics Engineering** Aug 2008  
**Kyung Hee University**, Yongin, Korea  
Thesis: Humanoid Robot with Webcam

## PROFESSIONAL EXPERIENCE

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- Assistant Professor** Aug 2015 – Present  
Department of Computer and Information Technology, Purdue Polytechnic Institute, Purdue University, West Lafayette, IN
- Postdoctoral Researcher** June 2014 – July 2015  
TechBridgeWorld Research Group, Field Robotics Center, The Robotics Institute, Carnegie Mellon University, Pittsburgh, PA
- Sergeant** July 2001 – Sept 2003  
Air Operations Command, Republic of Korea Army (ROKA), Icheon, Korea

## HONORS AND AWARDS

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- **Summer Faculty Research Fellowship**, Purdue Research Foundation (PRF) Summer Faculty Research Fellowship, Purdue University 2017

- **Polytechnic Post-Doc Support Competition Award**, Purdue University 2016
- **Best Paper Award** at the 28<sup>th</sup> ICROS (Institute of Control, Robotics and Systems) Annual Conference, for the paper: “A Dust Detection Sensor System for Improvement of a Robot Vacuum Cleaner” 2013
- **Research Scholarship** awarded to the student for top research accomplishment by Kyung Hee University 2009, 2010
- **3<sup>rd</sup> Place Award** at the International Robot Contest 2009 (IRC2009), participated in: FIRA Challenge Cup Robot Soccer Competition 2009
- **Best Paper Award** at the Proceedings of KIIS (Korean Institute of Intelligent System) Spring Conference 2009, for the paper: “Development of Violin Self-Training using Fuzzy Logic” 2009
- **4<sup>th</sup> Place Award** at the International Robot Contest 2008 (IRC2008), participated in: “FIRA Challenge Cup Robot Soccer Competition” 2008
- **The Gold Lion Prize** awarded for the top volunteer student; 232 total hours of volunteer service during 2006–2008, by Kyung Hee University 2008
- **Best Thesis Award** in Graduation Thesis Competition in the Fall of 2007 at Kyung Hee University, for the thesis: “Humanoid Robot with Webcam” 2008
- **Useful Idea Award** in the Contest for the 3<sup>rd</sup> Rehabilitation Assistive Devices, by Korean Ministry of Health and Welfare, for the idea: “Design of Electro Oculogram (EOG) Control for a Motorized Wheelchair” 2007
- **Academic Scholarship** awarded to the student for outstanding GPA by Kyung Hee University 2004, 2006, 2007

## PUBLICATIONS

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### Journal Publications

- [1] Jun Han Bae, Wonse Jo, Jee Hwan Park, Richard M. Voyles, and Byung-Cheol Min, “Sediment Sampling Methods for an Autonomous Water Quality Monitoring System”, *IEEE Journal of Ocean Engineering*. (Under Review)
- [2] Shaocheng Luo and Byung-Cheol Min, “Algae Harvesting with a Multi-robot Team”, *IEEE Transactions on Systems, Man, and Cybernetics: Systems*. (Under Review)
- [3] Jonghoek Kim, Ramvijas Parasuraman, Shaocheng Luo, and Byung-Cheol Min, “Multi-Point Rendezvous in Multi-Robot Systems”, *IEEE Transactions on Cybernetics*. (Under Review)
- [4] Jonghoek Kim, Shaocheng Luo, Ramvijas Parasuraman, Jun Han Bae, Eric T. Matson, and Byung-Cheol Min, “Multi-robot Rendezvous Based on Bearing-aided Hierarchical Tracking of Network Topology”, *Ad Hoc Networks*. (Under Review)
- [5] Mythra Vsm Balakuntala, Mustafa Ayad, Richard M. Voyles, Robin White, Robert Nawrocki, Shreyas Sundaram, Shashank Priya, George Chiu, Shawn Donkin, Byung-Cheol Min, and Kristy Daniels, “Global Sustainability through Closed-Loop Precision Animal Agriculture”, *Mechanical Engineering Magazine Select Articles*, Vol. 140, No. 06, S19-S23, June 2018.
- [6] Byung-Cheol Min, Ramvijas Parasuraman, Sangjun Lee, Jin-Woo Jung, and Eric T. Matson, “A Directional Antenna based Leader-Follower Relay System for End-to-End Robot Communications”, *Robotics and Autonomous Systems*, Vol. 101, pp. 57-73, March 2018.
- [7] Daniel K. Schrader, Byung-Cheol Min, Eric T. Matson, and J. Eric Dietz, “Real-time averaging of position data from multiple GPS receivers”, *Measurement*, Vol. 90, pp. 329-337, August 2016.
- [8] Byung-Cheol Min, Eric T. Matson, and Jin-Woo Jung, “Active Antenna Tracking System with Directional Antennas for Enhancing Wireless Communication Capabilities of a Networked Robotic System”, *Journal of Field Robotics*, Vol. 33, Issue 3, pp. 391-406, May 2016.
- [9] Byung-Cheol Min, Yongho Kim, Sangjun Lee, Jin-Woo Jung, and Eric T. Matson “Finding the Optimal Location and Allocation of Relay Robots for Building a Rapid End-to-end Wireless Communication”, *Ad Hoc Networks*, Vol. 39, Issue 15, pp. 23-44, March 2016.

- [10] Byung-Cheol Min, Eric T. Matson, Jinung An, and Donghan Kim, "Improvement of Violinist Robot using a Passive Damper Device", *Journal of Intelligent and Robotic Systems*, Vol. 72, Issue 3-4, pp. 343-355, Dec. 2013.
- [11] Byung-Cheol Min, John Lewis, Eric T. Matson, and Anthony H. Smith, "Heuristic Optimization Techniques for Self-orientation of Antennas in Long-distance Point-to-point Broadband Networks", *Ad Hoc Networks*, Vol. 11, Issue 8, pp. 2252-2263, Nov. 2013.
- [12] John Lewis, Eric T. Matson, Sherry Wei, and Byung-Cheol Min, "Implementing HARMS-based Indistinguishability in Ubiquitous Robot Organizations", *Robotics and Autonomous Systems*, Vol. 61, No. 11, pp. 1186-1192, Nov. 2013.
- [13] Dong-Hoe Kim, Byung-Cheol Min, and Donghan Kim, "A Dust Detection Sensor System for Improvement of a Robot Vacuum Cleaner", *Journal of Institute of Control, Robotics and Systems*, Oct. 2013.
- [14] Cory Q. Nguyen, Byung-Cheol Min, Eric T. Matson, Anthony H. Smith, J. Eric Dietz, and Donghan Kim, "Using Mobile Robots to Establish Mobile Wireless Mesh Networks and Increase Network Throughput", *International Journal of Distributed Sensor Networks*, Vol. 2012, Article ID 614532, 2012.
- [15] Byung-Cheol Min, Moon-Su Kim, and Donghan Kim, "Fuzzy Logic Path Planner and Motion Controller by Evolutionary Programming for Mobile Robots", *International Journal of Fuzzy Systems*, Vol. 11, No. 3, pp. 154-163, Sep. 2009.
- [16] Byung-Cheol Min, Donghan Kim, Yoon Hyuk Kim, Ki Yeoul Kim, and Chongkug Park, "Development of Violin Self-Training Algorithm Using Fuzzy Logic", *Journal of Korean Institute of Intelligent Systems*, Vol. 19, No. 4, Aug. 2009.

#### **Book Chapters (Refereed)**

- [1] Soo Hyeok Kang, Yong Ho Kim, Byung-Cheol Min, Soon-Geul Lee, Jinung An, Donghan Kim, "Smart Floor with Learning Capability for Mobile Robot System", *Recent Advances in Robotics and Automation (Series: Studies in Computational Intelligence)*, Vol. 480, pp. 205-215, Springer Berlin Heidelberg, 2013.

#### **Conference Proceedings (Refereed)**

- [1] Shaocheng Luo, Jun Han Bae, and Byung-Cheol Min, "Pivot-based Collective Coverage Control with a Multi-robot Team", *2018 IEEE International Conference on Robotics and Biomimetics (IEEE ROBIO 2018)*, Kuala Lumpur, Malaysia, December 12-15, 2018. (Under Review)
- [2] Tamzidul Mina and Byung-Cheol Min, "Penguin Huddling Inspired Distributed Boundary Movement for Group Survival in Multi-robot Systems using Gaussian Processes", *2018 IEEE International Conference on Robotics and Biomimetics (IEEE ROBIO 2018)*, Kuala Lumpur, Malaysia, December 12-15, 2018. (Under Review)
- [3] Ramvijas Parasuraman and Byung-Cheol Min, "Consensus Control of Distributed Robots Using Direction of Arrival of Wireless Signals", *International Symposium on Distributed Autonomous Robotic Systems 2018 (DARS 2018)*, Boulder, CO, USA, Oct 15-17, 2018. (Accepted)
- [4] Sangjun Lee and Byung-Cheol Min, "Distributed Direction of Arrival Estimation-aided Cyberattack Detection in Networked Multi-Robot Systems", *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)*, Madrid, Spain, October 1-5, 2018. (Accepted)
- [5] Ramvijas Parasuraman, Petter Ögren, and Byung-Cheol Min, "Kalman Filter based Spatial Prediction of Wireless Connectivity for Autonomous Robots and Connected Vehicles", *2018 IEEE Connected and Automated Vehicles Symposium (CAVS)*, Chicago, USA, August 27, 2018. (Accepted)
- [6] Tamzidul Mina and Byung-Cheol Min, "Penguin Huddling-inspired Energy Sharing and Formation Movement in Multi-robot Systems", *2018 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, Philadelphia, PA, USA, August 6-8, 2018.
- [7] Yeonju Oh, Ramvijas Parasuraman, Tim McGraw, and Byung-Cheol Min, "360 VR Based Robot Teleoperation Interface for Virtual Tour", *The 13th Annual ACM/IEEE International Conference on Human Robot Interaction (HRI), Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interactions (VAM-HRI)*, Chicago, Illinois, USA, March 5, 2018.

- [8] Sangjun Lee, Yongbum Cho, and Byung-Cheol Min, "Attack-aware Multi-sensor Integration Algorithm for Autonomous Vehicle Navigation Systems", *2017 IEEE International Conference on Systems, Man and Cybernetics (SMC)*, Banff, Canada, 5-8 October, 2017.
- [9] Yeonju Oh, Wei-Liang Kao, and Byung-Cheol Min, "Indoor Navigation Aid System Using No Positioning Technique for Visually Impaired People", *HCI International 2017*, Poster Extended Abstract, Vancouver, Canada, 9-14 July, 2017.
- [10] Manoj Penmetcha, Arabinda Samantaray, and Byung-Cheol Min, "SmartResponse: Emergency and Non-Emergency Response for Smartphone based Indoor Localization applications", *HCI International 2017*, Poster Extended Abstract, Vancouver, Canada, 9-14 July, 2017.
- [11] Hyun Hwang, Jun Han Bae, and Byung-Cheol Min, "Design Guidelines for Sensor Locations on 3D Printed Prosthetic Hands", *IEEE Robotic Computing (IRC) 2017*, Taichung, Taiwan, April 10-12, 2017.
- [12] Sangmi Shin, Byung-Cheol Min, Julia Rayz, and Eric T. Matson, "Semantic Knowledge-based Language Education Device for Children with Developmental Disabilities", *IEEE Robotic Computing (IRC) 2017*, Taichung, Taiwan, April 10-12, 2017.
- [13] Huanhuan Wang, Pai-Ying Hsiao, and Byung-Cheol Min, "Examine the Potential of Robots to Teach Autistic Children Emotional Concepts: A Preliminary Study", *The Eight International Conference on Social Robotics (ICSR)*, Kansas City, USA, Nov. 1-3, 2016.
- [14] Jun Han Bae, Jeehwan Park, Sangjun Lee, and Byung-Cheol Min, "Tri-SedimentBot: An Underwater Sediment Sampling Robot", *Automation Science and Engineering (CASE), 2016 IEEE International Conference on*, Fort Worth, Texas, USA, Aug. 21-24, 2016.
- [15] Kangwei Chen, Victoria Plaza-Leiva, Byung-Cheol Min, Aaron Steinfeld, and M. Bernardine Dias, "NavCue: Context Immersive Navigation Assistance for Blind Travelers", *11th ACM/IEEE International Conference on Human-Robot Interaction (HRI) Videos*, 2016.
- [16] Byung-Cheol Min, Suryansh Saxena, Aaron Steinfeld, and M. Bernardine Dias, "Incorporating Information from Trusted Sources to Enhance Urban Navigation for Blind Travelers", *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, Washington, May 26-30, 2015.
- [17] Byung-Cheol Min, Aaron Steinfeld, and M. Bernardine Dias, "How Would You Describe Assistive Robots to People Who are Blind or Low Vision?", *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI) Extended Abstracts*, 2015.
- [18] Byung-Cheol Min, Eric T. Matson, Anthony H. Smith, and J. Eric Dietz, "Using Directional Antennas as Sensors to Assist Fire-fighting Robots in Large Scale Fires", *2014 IEEE Sensors Applications Symposium (SAS)*, Queenstown, New Zealand, Feb. 18-20, 2014.
- [19] Byung-Cheol Min and Eric T. Matson, "Robotic Follower System using Bearing-only Tracking with Directional Antennas", in *Proc. International Conference on Robot Intelligence Technology and Applications (RiTA)*, pp. 37-58, 2014.
- [20] Esther Rolf, Matt Whitlock, Byung-Cheol Min, and Eric T. Matson, "Enhancing Wi-Fi Signal Strength of a Dynamic Heterogeneous System Using a Mobile Robot Provider", in *Proc. International Conference on Robot Intelligence Technology and Applications (RiTA)*, pp. 927-937, 2014.
- [21] Jae-Seok Yoon, Byung-Cheol Min, Seong-Og Shin, and Donghan Kim, "GA-based Optimal Waypoint Design for Improved Path Following of Mobile Robot", in *Proc. International Conference on Robot Intelligence Technology and Applications (RiTA)*, pp. 127-136, 2014.
- [22] Byung-Cheol Min, Eric T. Matson, and Bakytgul Khaday, "Design of a Networked Robotic System Capable of Enhancing Wireless Communication Capabilities", *11th IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, Sweden, Oct. 21-26, 2013.
- [23] Sangyup Lee, Byung-Cheol Min, Dong-Hoe Kim, Jae-Seok Yoon, and Donghan Kim, "Passive RFID Positioning System Using RF Power Control", in *Proc. International Conference on Robot Intelligence Technology and Applications (RiTA)*, Gwangju, Korea, Dec. 2012.

- [24] Ji Hyeon Hong, Byung-Cheol Min, Julia M. Taylor, Victor Raskin, and Eric T. Matson, "NL-Based Communication with Firefighting Robots", *2012 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, pp. 1461-1466, Seoul, Korea, Oct. 14-17, 2012.
- [25] Soo Hyeok Kang, Byung-Cheol Min, Ji Hyeon Hong, Eric T. Matson, Soon-Geul Lee, and Donghan Kim, "Novel Positioning System for Mobile Robot Using RFID Power Control", *Joint Proceedings of the 13th Annual TAROS Conference and the 15th Annual FIRA RoboWorld Congress*, Bristol, UK, August 20-23, 2012.
- [26] Daniel K. Schrader, Byung-Cheol Min, Eric T. Matson, and J. Eric Dietz, "Combining Multiple, Inexpensive Receivers to Improve Accuracy and Reliability", *2012 IEEE Sensors Applications Symposium (SAS)*, University of Brescia, Italy, Feb. 7-9, 2012.
- [27] Byung-Cheol Min, John Lewis, Daniel K. Schrader, Eric T. Matson, and Anthony H. Smith, "Self-orientation of Antennas, Assisted by Mobile Robots, for Receiving the Best Wireless Signal", *2012 IEEE Sensors Applications Symposium (SAS)*, University of Brescia, Italy, Feb. 7-9, 2012.
- [28] Eric T. Matson, Julia M. Taylor, Victor Raskin, Byung-Cheol Min, and E. Cho Wilson, "A Natural Language Exchange Model for Enabling Human, Agent, Robot and Machine Interaction", *5th International Conference on Automation, Robotics and Applications (ICARA)*, Wellington, New Zealand, Dec. 6-8, 2011.
- [29] Soo Hyeok Kang, Yong Ho Kim, Eun Jin Lee, Soon-Geul Lee, Byung-Cheol Min, Jinung An, and Donghan Kim, "Implementation of Smart Floor for Multi-Robot System", *5th International Conference on Automation, Robotics and Applications (ICARA)*, Wellington, New Zealand, Dec. 6-8, 2011.
- [30] Byung-Cheol Min, Ji Hyeon Hong, and Eric T. Matson, "Adaptive Robust Control (ARC) for an Altitude Control of a Quadrotor Type UAV Carrying an Unknown Payloads", *2011 11th International Conference on Control, Automation and Systems (ICCAS)*, KINTEX, Gyeonggi-do, Korea, Oct. 26-29, 2011.
- [31] Eric T. Matson and Byung-Cheol Min, "M2M infrastructure to integrate humans, agents and robots into collectives", *Instrumentation and Measurement Technology Conference (I2MTC)*, 2011 IEEE, Hangzhou, China, May 10-12, 2011.
- [32] Byung-Cheol Min, Hina Chaudhry, Eric T. Matson, Anthony H. Smith, and J. Eric Dietz, "Rural Energy Security using Autonomous Micro-turbine Smart Grids", *2011 IEEE Rural Power Conference (IEEE REPC)*, Chattanooga, Tennessee, USA, April 10-13, 2011.
- [33] Jeong Wan Kim, Yong Ho Kim, Byung-Cheol Min, and Donghan Kim, "Tacit Navigation Method for Multi-Agent System", in *Proc. FIRA Robot World Congress*, Bangalore, India, Sep. 15-17, 2010.
- [34] Byung-Cheol Min, Hee Yeul Kwon, and Donghan Kim, "Path Planning Algorithm for VTOL Type UAVs Based on the Methods of Ray Tracing and Limit Cycle", *IEEE International Symposium on Computational Intelligence in Robotics and Automation (CIRA)*, Dajeon, Korea, Dec. 2009.
- [35] Byung-Cheol Min, Chan Ho Cho, Kyung Min Choi, and Donghan Kim, "Development of a Micro Quad-Rotor UAV for Monitoring an Indoor Environment", in *Proc. FIRA Robot World Congress*, Incheon, Korea, Aug. 16-20, 2009.
- [36] Chan Ho Cho, Byung-Cheol Min, and Donghan Kim, "A Gait Generation for an Unlocked Joint Failure of the Quadruped Robot with Balance Weight", in *Proc. FIRA Robot World Congress*, Incheon, Korea, Aug. 16-20, 2009.
- [37] Byung-Cheol Min, Eun Jin Lee, Soo Hyeok Kang, and Donghan Kim, "Limit-cycle Navigation Method for a Quad-rotor Type UAV", *Industrial Electronics, 2009. ISIE 2009, IEEE International Symposium on*, pp. 1352-1357, Seoul, Korea, July 2009.

## Reports & Abstracts

- [1] Ramvijas Parasuraman, Sergio Caccamo, Luigi Freda, Petter Ögren, and Byung-Cheol Min, "An Approach to Retrieve from Communication Loss in Field Robots", *Robotics: Science and Systems (RSS) 2017, Workshop on Robot Communication in the Wild: Meeting the Challenges of Real-World Systems*, MIT, Massachusetts, USA, July 12-16, 2017.

- [2] Danilo Tardioli, Ramviyas Parasuraman, Petter Ögren, and Byung-Cheol Min, "Pound: A ROS Node to Improve Communication Latency Performance in Multi-Robot Systems", *Robotics: Science and Systems (RSS) 2017, Workshop on Robot Communication in the Wild: Meeting the Challenges of Real-World Systems*, MIT, Massachusetts, USA, July 12-16, 2017.
- [3] M. Bernardine Dias, Ermine Teves, Eric Hochendoner, Praneetha Sistla, Byung-Cheol Min, and Aaron Steinfeld, "Enhancing the Safety of Visually Impaired Travellers in and around Transit Stations", *The U.S. Department of Transportation, University Transportation Centers Program*, 2016.
- [4] Jun Han Bae, Dong Hun Lee, and Byung-Cheol Min, "Design and Concept of the Sediment Sampling Robot and Dynamic Buoy", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)*, Late-Breaking Reports, Daejeon, Korea, Oct. 9-14, 2016.
- [5] Jun Han Bae, Eric T. Matson, and Byung-Cheol Min, "Towards an Autonomous Water Monitoring System with an Unmanned Aerial and Surface Vehicle Team", *2015 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, West Lafayette, IN, USA, Oct. 18-20, 2015.
- [6] Byung-Cheol Min, Aaron Steinfeld, and M. Bernardine Dias, "Towards Effective Human-Robot Interaction for Visually Impaired Adults", *ICRA 2015*, Late-Breaking Reports, Seattle, May 26-30, 2015.
- [7] Alekhya Jonnalagedda, Lucy Pei, Suryansh Saxena, Ming Wu, Byung-Cheol Min, Ermine A. Teves, Aaron Steinfeld, and M. Bernardine Dias, "Enhancing the Safety of Visually Impaired Travelers in and around Transit Stations", tech. report CMU-RI-TR-14-28, Robotics Institute, Carnegie Mellon University, December, 2014.

## Patents

- [1] Byung-Cheol Min et al., "Method for providing guidance information based on user information", Patent No. 1011983850000, October 2012. (Korean Patent)
- [2] Byung-Cheol Min et al., "Apparatus for Cleaning Exterior Wall of Building", Patent No. 1011815400000, September 2012. (Korean Patent)
- [3] Byung-Cheol Min et al., "Walking guide Robot for blind person", Patent No. 1011468550000, May 2012. (Korean Patent)
- [4] Byung-Cheol Min et al., "LED Lighting Apparatus with Air Levitation System", Patent No. 1010905640000, November 2011. (Korean Patent)
- [5] Byung-Cheol Min et al., "Embedding Device for RFID Tag", Patent No. 101056 8640000, August 2011. (Korean Patent)

## GRANTS

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### External Research Grants

#### **Awarded**

- UNSA NEXUS: Robotic Water Quality Monitoring and Distribution Systems: A Pilot Study, Role: PI, Sponsor: Universidad Nacional de San Agustin, Amount: **\$365,439** (01/01/2018 – 12/31/2020).
- Cybersecurity and Safety Challenges in Autonomous Vehicles: Threats Identification and Countermeasures Development, Role: PI, Sponsor: National Institute of Justice, Amount: **\$50,000** (08/01/2017 – 07/31/2018).
- Workshop to Explore US/Korean Collaboration in Human-Friendly Co-Robotic Technologies, Role: Co-PI (PI: Richard Voyles), Sponsor: National Science Foundation, Amount: **\$14,980** (09/01/2017 – 08/31/2018).
- I/UCRC Phase I: Robots and Sensors for the Human Well-being, Role: Senior Personnel (PI: Richard Voyles), Sponsor: National Science Foundation, Amount: **\$429,100** (09/15/2014 – 08/31/2020).
- Sejong-Purdue Program 2016, Role: Co-PI (PI: Eric T. Matson), Sponsor: Sejong University, Korea, Amount: **\$89,998** (05/01/2016 – 12/31/2016).
- KyungPook National-IITP-Purdue Summer Software Program, Role: Co-PI (PI: Eric T. Matson), Sponsor: Kyungpook National University, Korea, Amount: **\$45,426** (05/01/2016 – 12/31/2016).

### ***In Review***

- CAREER: Adaptive Human Multi-robot Systems, Role: PI, Sponsor: National Science Foundation, Amount: **\$500,000** (08/01/2019 – 07/31/2022).
- PFI: Partnerships for Innovation in Interoperable Building Information Modeling Technology for Applications in Automated Building Code Compliance Checking and Modular Construction Automation, Role: Co-PI (PI: Jiansong Zhang), Sponsor: National Science Foundation, Amount: **\$749,769** (09/01/2018 – 08/31/2021).
- Collaborative Robotic Lift Assist for Improved Operator Compatibility, Role: Co-PI (PI: Richard Voyles), Sponsor: Fiat Chrysler Automobiles, Amount: **\$381,731** (01/01/2018 – 06/30/2019).
- CPS: Medium: Collaborative Research: Close Loop Sustainable Precision Animal Agriculture, Role: Co-PI (PI: Richard Voyles), Sponsor: National Science Foundation, Amount: **\$579,703** (08/14/2017 – 08/13/2020).

### **Internal Research Grants**

#### ***Awarded***

- Purdue Research Foundation (PRF) International Travel Grant, Role: PI, Sponsor: Purdue University, Amount: **\$2,000** (07/01/2018 - 06/30/2018).
- Mobile Crowd Sensing for Sustainability Challenges: A Behavioral Approach to Inducing User Participation, Role: Co-PI (PI: David J. Yu), Sponsor: Purdue Center for the Environment, Amount: **\$15,000** (06/01/2018 – 05/31/2019).
- FY18-19 PRF Research Grants: Towards Autonomous Robotic Systems for Control of Harmful Algae Blooms, Role: PI, Sponsor: Purdue University, Amount: **\$30,144** (05/10/2018 – 09/14/2019).
- Drone-based Visual Inspection for Airplane, Role: PI, Sponsor: Purdue Polytechnic Institute, Amount: **\$8,000** (04/01/2018 – 06/30/2018).
- Collaborative Interdisciplinary Machine Learning Research Infrastructure, Role: Co-PI (PI: Vetricia Byrd) , Sponsor: Purdue Polytechnic Institute, Amount: **\$8,000** (04/01/2018 – 06/30/2018).
- 17-18 Laboratory & University Core Facility Research Equipment Program, Role: PI, Sponsor: Purdue University, Amount: **\$83,500** (01/01/2018 – 12/31/2018).
- The Realizing the Digital Enterprise (RDE) Research Area Travel Grant, Role: PI, Sponsor: Purdue Polytechnic Institute, Amount: **\$3,000** (03/12/2018 – 06/30/2018).
- Purdue Research Foundation (PRF) Summer Faculty Research Grant, Role: PI, Sponsor: Purdue University, Amount: **\$8,000** (06/01/2017 – 07/31/2017).
- Provost Major Equipment Grant: Bi-Manual Dexterous Manipulation for Intuitive Autonomy, Role: Co-PI (PI: Richard Voyles), Sponsor: Purdue University, Amount: **\$144,732** (07/01/2016 – 06/31/2017).
- Polytechnic Post-Doc Support Competition Award, Role: PI, Sponsor: Purdue University, Amount: **\$100,000** (10/01/2016 – 09/31/2018)

#### ***In Review***

- None

### **SEMINARS, INVITED TALKS & PRESENTATIONS**

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|---|------------|
| [1] Korea Internet & Security Agency (KISA), Naju, Korea  | June, 2018 |
| [2] Korea Research Institute of Ships & Ocean Engineering (KRISO), Daejeon, Korea   | June, 2018 |
| [3] Hyundai KEFICO, Gunpo, Korea  | May, 2018  |
| [4] Keynote speech at the 2016 International Workshop on ICT in Medicine and Health Care (ICTMHC 2016), Yeongnam Univ., Korea | June 2016  |
| [5] DGIST, Daegu, Korea   | June, 2016 |
| [6] Chungnam National University, Daejeon, Korea  | June, 2016 |

[7] Dongguk University, Seoul, Korea	May, 2016
[8] Kyung Hee University, Yongin, Korea	May, 2016
[9] Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN USA	January, 2016
[10] Purdue University, Robotics Seminar Series, West Lafayette, IN USA	January, 2016
[11] Kyung Hee University, Yongin, Korea	October, 2015
[12] Gacheon University, Seongnam, Korea	April, 2015
[13] Dongguk University, Seoul, Korea	April, 2015
[14] Korea Institute of Science and Technology (KIST), Seoul, Korea	April, 2015
[15] Transportation Research Board 94th Annual Meeting, Washington D.C., USA	January, 2015

## COURSES TAUGHT

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### Undergraduate Courses

- CNIT 425 – Software Development for Mobile Devices II (Avg Course Eval: 4.9/5.0, Avg Student#: 11), Purdue Univ. Spring 2017, 2018
- CNIT 355 – Software Development for Mobile Computers (Avg Course Eval: 4.6/5.0, Avg Student#: 28), Purdue Univ. Fall 2016, 2017

### Graduate Courses

- CNIT 581-SDR – Software Design and Development for Robotics ( Avg Course Eval: 5.0/5.0, Avg Student#: 10), Purdue Univ. Spring 2016, 2017, 2018
- CNIT 581-ATR – Introduction to Assistive Technology and Robotics (Avg Course Eval: 4.6/5.0, Avg Student#: 9), Purdue Univ. Fall 2015, 2016, 2017

## POSTDOCS & STUDENTS

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### Postdocs

#### Advisees

##### Current Students (6 Ph.D. students; 2 M.S. students; 2 Undergrad students)

- Wonse Jo: Ph.D., Technology 2017 –
- Tamzidul Mina: Ph.D., Mechanical Engineering (co-advised with Dr. Galen King) 2017 –
- Manoj Penmetcha: Ph.D., Technology 2016 –
- Shaocheng Luo: Ph.D., Technology 2016 –
- Sangjun Lee: Ph.D., Technology 2016 –
- Jun Han Bae: Ph.D., Technology (co-advised with Dr. Richard Voyles) 2015 –
- Shyam Sundar Kannan: M.S., Computer and Information Technology 2017 –
- Jee Hwan Park: M.S., Mechanical Engineering 2018 –
- Yuta Hoashi: B.S., Mechanical Engineering 2018 –
- Robert Osborne: B.S., Computer and Information Technology 2018 –

##### Alumni (1 Postdoc; 2 M.S. students; 3 Undergrad students)

- Dr. Ramviyas Parasuraman, First Position at The University of Georgia as Assistant Professor 2018
- Arabinda Samantaray: M.S., Computer and Information Technology, First Position at Cisco 2018
- Yeonju Oh: M.S., Computer and Information Technology, First Position at Samsung Electronics 2018
- Jee Hwan Park: B.S., Mechanical Engineering, First Position at Purdue University (Grad student) 2018
- Yongbum Cho: B.S., Mechanical Engineering, First Position at Samsung Electronics 2017
- Dong Hun Lee: B.S., Mechanical Engineering Technology 2017

### Committee Member

##### Current Students (3 Ph.D. students; 1 M.S. students)

- Patchara Kitjacharoenchai: Ph.D., Industrial Engineering, Committee Chair: Dr. Seokcheon Lee 2017 –
- Hanlin Chen: Ph.D., Technology, Committee Chair: Dr. John Springer 2016 –



- Daniel Schrader: Ph.D., Technology, Committee Chair: Dr. Eric Matson 2015 –
- Justin Montgomery: M.S., Engineering Technology, Committee Chair: Dr. Richard Voyles 2018 –
- Hyun Hwang: M.S, Computer and Information Technology, Committee Chair: Dr. Eric Matson 2017 –

**Former Students** (3 Ph.D. students; 9 M.S. students)

- Mauricio Gomez: Ph.D., Technology, Committee Chair: Dr. Eric Matson Aug 2018
- Yazeed Mohammad Al Babbain: Ph.D., Technology, Committee Chair: Dr. Justin Yang Aug 2018
- Amy Wagoner: Ph.D., Technology, Committee Chair: Dr. Eric Matson July 2017
- Austin Riegsecker: M.S., Computer and Information Technology, Committee Chair: Dr. Eric Matson and Prof. Tony Smith May 2017
- Ho-Young Jeong: M.S., Industrial Engineering, Committee Chair: Dr. Seokcheon Lee May 2018
- Zhenzhi Xu: M.S., Computer and Information Technology, Committee Chair: Dr. Justin Yang May 2018
- Jin Hu: M.S., Mechanical Engineering Technology, Committee Chair: Dr. Xiumin Diao May 2018
- Sheifali Khare: M.S., Computer and Information Technology, Committee Chair: Prof. Alka Harriger July 2017
- Wang Tian: M.S., Computer and Information Technology, Committee Chair: Dr. Justin Yang May 2017
- Miae Kim: M.S., Computer and Information Technology, Committee Chair: Dr. Eric Matson May 2017
- Ji Yoon Lee: M.S., Computer and Information Technology, Committee Chair: Dr. Eric Matson May 2017
- Sang Mi Shin: M.S., Computer and Information Technology, Committee Chair: Dr. Eric Matson May 2016

**PROFESSIONAL ACTIVITIES**

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**Leadership Roles**

- Co-organizer: The 1st U.S.-Korea PI Meeting to Explore US/Korea Joint Collaboration in Robotics and Related Areas (NSF workshop to Explore US/Korean Collaboration in Human-Friendly Co-Robotic Technologies) 2017
- Co-organizer: 2015 International Workshop on Communication for Humans, Agents, Robots, Machines and Sensors (CHARMS 2015) 2015
- Associate Technical Program Chair: the 6th International Conference on Automation, Robotics, and Applications (ICARA 2015) 2015

**Editorial Boards**

- Guest Editor: International Journal of Advanced Robotic Systems, Special Issue on “Special Collection on Multi-robot System Assisted by Information Networks” 2018 – Present
- Guest Editor: Technologies (MDPI) Special Issue on “Assistive Robotics” 2017 – Present
- Senior Editor: International Journal of Information Communication Technology and Digital Convergence 2016 – Present
- Guest Editor: Sensors (MDPI) Special Issue on “Integration of Sensors in Complex, Intelligent Systems” 2015 – 2016

**Program Committee**

- Program Committee: The 1st International Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI) 2018
- Program Committee: The 18th IEEE International Conference on Bioinformatics and Bioengineering (IEEE BIBE 2018) 2018
- Program Committee: IEEE International Conference on Robotic Computing (IEEE IRC 2018) 2018
- Program Committee: 2018 International Workshop on Communication for Humans, Agents, Robots, Machines and Sensors (CHARMS 2018) 2018
- Program Committee: 2017 International Workshop on Communication for Humans, Agents, Robots, Machines and Sensors (CHARMS 2017) 2017
- International Program Committee: 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2017) 2017
- International Program Committee: 8th International Conference on Social Robotics (ICSR) 2016
- International Program Committee: 13th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2016) 2016
- Technical Program Committee: 2015 IEEE Sensors Applications Symposium (SAS 2015) 2015
- Technical Program Committee: International Workshop on Security and Privacy in Machine-to-Machine Communications (M2MSec'14) 2014
- Technical Program Committee: 2014 IEEE Sensors Applications Symposium (SAS 2014) 2014

- Program Committee: the 4th International Conference on Emerging Ubiquitous Systems and Pervasive Networks (EUSPN 2013) 2013
- Grant Reviewer**
- NSF 2017
- Journal Reviewer**
- IEEE Transactions on Cybernetics 2018
- IEEE Transactions on Industrial Informatics 2018
- IEEE Transactions on Mobile Computing 2017
- IEEE Transactions on Haptics 2014
- IEEE Journal on Selected Areas in Communications 2014
- IEEE Transactions on Mechatronics 2013
- Autonomous Robots 2015, 2018
- Robotics and Autonomous Systems 2018
- International Journal of Control 2018
- Journal of Intelligent and Robotic Systems 2012 – 2017
- ETRI Journal 2016 – 2018
- Frontiers in Human Neuroscience 2016
- Journal of Field Robotics 2014, 2015
- Soft Computing 2014, 2015
- Journal of Mechanical Engineering Science 2014
- Multimedia Tools and Applications 2014
- Journal of Electromagnetic Waves and Applications 2013
- The Journal of Korea Information and Communications Society (J-KICS) 2013
- International Journal of Advanced Robotic Systems 2012
- Journal of Institute of Control, Robotics and Systems 2012
- Conference Reviewer**
- IEEE International Symposium on Safety, Security and Rescue Robotics (SSRR) 2018
- International Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI) 2018
- IEEE International Conference on Robotic Computing (IRC) 2017
- International Workshop on Communication for Humans, Agents, Robots, Machines and Sensors (CHARMS) 2016, 2017
- IEEE International Conference on Robotics and Automation (ICRA) 2015 – 2017
- International Conference on Social Robotics (ICSR) 2016
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2014, 2016
- IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN) 2016
- AAAI Conference on Artificial Intelligence (AAAI) 2015
- IEEE Sensors Applications Symposium (SAS) 2012 – 2015
- International Conference on Robot Intelligence Technology and Applications (RiTA) 2012, 2013
- International Conference on Control, Automation and Systems (ICCAS) 2010
- Chinese Control Conference (CCC) 2009
- University Committee & Service**
- Member: Purdue Robotics Accelerator Committee, Purdue University 2016 – Present
- College Committee & Service**
- Co-organizer: Purdue Polytechnic Postdoctoral Seminar Series, Purdue University 2017 – Present
- Departmental Committee & Service**
- Member: Faculty Search & Screen Committee, Computer and Information Technology, Purdue University 2017 – Present
- Co-chair: Election Committee, Computer and Information Technology, Purdue University 2017 – Present
- Member: Curriculum Committee, Computer and Information Technology, Purdue University 2016 – Present
- Member: Grad Education Committee, Computer and Information Technology, Purdue University 2016 – Present

## PROFESSIONAL MEMBERSHIPS

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**Institute for Electrical and Electronics Engineers (IEEE)**, Student Member (2008 – 2014), Member 2014 – Present  
**Association for Computing Machinery (ACM)**, Member 2016 – Present

## MORE INFORMATION

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More information and auxiliary documents can be found at:  
<http://web.ics.purdue.edu/~minb/> or  
[www.smart-laboratory.org](http://www.smart-laboratory.org).