Yoonchang Sung

32 Vassar Street, Cambridge, MA 02139, USA
☎ +1 540 922 9453 ✉yooncs8@csail.mit.edu 🏠 Personal website

EDUCATION

Virginia Tech, Blacksburg, VA, USA *Sep. 2019*
Ph.D. in Electrical & Computer Engineering
Advisor: Pratap Tokekar

Korea University, Seoul, Korea *Aug. 2013*
M.S. in Mechanical Engineering
Advisor: Woojin Chung

Korea University, Seoul, Korea *Feb. 2011*
B.S. in Mechanical Engineering

EMPLOYMENT

Postdoctoral Fellow *Oct. 2021–*
Department of Computer Science, The University of Texas at Austin, Austin, TX, USA
Host: Peter Stone

Postdoctoral Associate *Oct. 2019–Sep. 2021*
Computer Science and Artificial Intelligence Laboratory, MIT, Cambridge, MA, USA
Hosts: Leslie Pack Kaelbling & Tomás Lozano-Pérez

Research Assistant *Sep. 2016–Sep. 2019*
Dept. of Electrical & Computer Engineering, Virginia Tech, Blacksburg, VA, USA
Advisor: Pratap Tokekar

Research Assistant *Sep. 2014–Aug. 2016*
Dept. of Mechanical Engineering, Virginia Tech, Blacksburg, VA, USA
Advisor: Brian Lattimer

Research Intern *Aug. 2013–Jun. 2014*
Center for Bionics, Korea Institute of Science and Technology, Seoul, Korea
Supervisor: JongSuk Choi

Research Assistant *Mar. 2011–Aug. 2013*
Dept. of Mechanical Engineering, Korea University, Seoul, Korea
Advisor: Woojin Chung

TEACHING

Guest Lecturer
Dept. of Electrical & Computer Engineering, Virginia Tech, Blacksburg, VA, USA
ECE 4984: SS:Robot Motion Planning, Introduction to ROS *Aug. 2018*

Teaching Assistant
Dept. of Mechanical Engineering, Korea University, Seoul, Korea
MECH 210: Computer Aided Mechanical Drawing *Spring 2012*
MECH 328: Machine Component Design *Fall 2011*

PUBLICATIONS

Journal Articles

In Preparation

[*J*7] **Robotic environmental monitoring—a survey**
Y. Sung, S. Bearman, Z. Chen, J. Das, and P. Tokekar
Note: in preparation.

Under Review

[*J*6] **Online multi-robot exploration of a translating plume: competitive algorithm and experiments**
Y. Sung, D. Dixit, and P. Tokekar
Autonomous Robots (AURO), Note: revision under review.

Published

[*J*5] **GM-PHD filter for searching and tracking an unknown number of targets with a mobile sensor with limited FOV**
Y. Sung, and P. Tokekar
IEEE Transactions on Automation Science and Engineering (T-ASE), pp. 1-13, 2021.

[*J*4] **Game tree search for minimizing detectability and maximizing visibility**
Z. Zhang, J. Lee, J. M. Smereka, L. Zhou, **Y. Sung**, and P. Tokekar
Autonomous Robots (AURO), 45(2), pp. 283-297, 2021.

[*J*3] **Distributed assignment with limited communication for multi-robot multi-target tracking**
Y. Sung, A. K. Budhiraja, R. K. Williams, and P. Tokekar
Autonomous Robots (AURO), *Special Issue on Robot Communication Challenges*, 44(1), pp. 57-73, 2020.

[*J*2] **Team VALORs ESCHER: A novel electromechanical biped for the DARPA Robotics Challenge**
C. Knabe, R. Griffin, J. Burton, G. Cantor-Cooke, L. Dantanarayana, G. Day, O. Ebeling-Koning, E. Hahn, M. Hopkins, J. Neal, J. Newton, C. Nogales, V. Orekhov, J. Peterson, M. Rouleau, J. Seminatore, **Y. Sung**, J. Webb, N. Wittenstein, J. Ziglar, A. Leonessa, B. Lattimer, and T. Furukawa
Journal of Field Robotics (JFR), 34(5), pp. 912-939, 2017.

[*J*1] **Hierarchical sample-based joint probabilistic data association filter for following human legs using a mobile robot in a cluttered environment**
Y. Sung, and W. Chung

IEEE Transactions on Human-Machine Systems (T-HMS), 46(3), pp. 340-349, 2016.

Refereed Conference Publications

Under Review

[$C15$] **Towards optimal correlational object search**
K. Zheng, R. Chitnis, **Y. Sung**, G. Konidaris, and S. Tellex
Note: under review.

Published

[$C14$] **Learning when to quit: meta-reasoning for motion planning**
Y. Sung, L. P. Kaelbling, and T. Lozano-Pérez
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021.
Finalist for Best Cognitive Robotics Paper Award.

[$C13$] **Multi-resolution POMDP planning for multi-object search in 3D**
K. Zheng, **Y. Sung**, G. Konidaris, and S. Tellex
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021.
Winner of Best Robocup Paper Award.

[$C12$] **Environmental hotspot identification in limited time with a UAV equipped with a downward-facing camera**
Y. Sung, D. Dixit, and P. Tokekar
IEEE International Conference on Robotics and Automation (ICRA), 2021.

[$C11$] **Dynamically reconfigurable planning under temporal logic specifications**
S. Li*, D. Park*, **Y. Sung***, J. Shah, and N. Roy
IEEE International Conference on Robotics and Automation (ICRA), 2021.

[$C10$] **A competitive algorithm for online multi-robot exploration of a translating plume**
Y. Sung, and P. Tokekar
IEEE International Conference on Robotics and Automation (ICRA), 2019.

[$C9$] **Tree search techniques for minimizing detectability and maximizing visibility**
Z. Zhang, J. Lee, J. M. Smereka, **Y. Sung**, L. Zhou, and P. Tokekar
IEEE International Conference on Robotics and Automation (ICRA), 2019.

[$C8$] **Distributed simultaneous action and target assignment for multi-robot multi-target tracking**
Y. Sung, A. K. Budhiraja, R. K. Williams, and P. Tokekar
IEEE International Conference on Robotics and Automation (ICRA), 2018.

[$C7$] **Hierarchical GM-PHD filter for false alarm reduction in search and tracking task**
Y. Sung, and P. Tokekar
US-KOREA Conference on Science, Technology and Entrepreneurship (UKC), 2017.

[$C6$] **Algorithms for searching and tracking an unknown and varying number of mobile targets using a limited FoV sensor**
Y. Sung, and P. Tokekar
IEEE International Conference on Robotics and Automation (ICRA), 2017.

[$C5$] **Bayesian estimation based real-time fire-heading in smoke-filled indoor environments using thermal imagery**
J. H. Kim, **Y. Sung**, and B. Lattimer
IEEE International Conference on Robotics and Automation (ICRA), 2017.

[$C4$] **Information measure for the optimal control of target searching via the grid-based method**

Y. Sung, and T. Furukawa

International Conference on Information Fusion (Fusion), 2016.

[$C3$] **Humanoid firefighting robot for structure fires**

B. Lattimer, J. Starr, J. McNeil, C. Nogales, J. Peterson, J. Ziglar, J. Burton, C. Knabe, **Y. Sung**, J. Seminatore, R. Griffin, J. Newton, V. Orekhov, M. Rouleau, M. Hopkins, D. Hong, and D. Lee

International Conference and Exhibition on Fire Science and Engineering (Interflam), 2016.

[$C2$] **Tracking human legs for an indoor mobile robot with a single laser range finder**

D. Cha, H. Cho, J. Jin, H. Kwon, J. Kim, H. Lee, J. Seong, C. Moon, H. Kim, **Y. Sung**, and W. Chung

International Conference on Engineering and Applied Sciences (ICEAS), 2015.

[$C1$] **Human tracking of a mobile robot with an onboard LRF(Laser Range Finder) using human walking motion analysis**

Y. Sung, and W. Chung

International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), 2011.

Refereed Workshop Publications

[$W3$] **Multi-robot coordination for hazardous environmental monitoring**

Y. Sung

Robotics: Science and Systems (RSS) Pioneers, 2020.

[$W2$] **Detecting and mapping hazardous plumes with aerial and surface robots**

Y. Sung, S. Buebel, and P. Tokekar

IEEE International Conference on Robotics and Automation (ICRA) Workshop on Robot Teammates Operating in Dynamic, Unstructured Environment, 2018.

[$W1$] **Distributed simultaneous action and target assignment for multi-robot multi-target tracking**

Y. Sung, AK Budhiraja, RK Williams, and P. Tokekar

IEEE International Conference on Robotics and Automation (ICRA) Workshop on Multi-robot Perception-driven Control and Planning, 2017.

Thesis Publications

[$T2$] **Multi-robot coordination for hazardous environmental monitoring**

Y. Sung

Ph.D. Dissertation, Virginia Tech, 2019.

[$T1$] **Novel tracking method for following human legs using a mobile robot in a cluttered environment**

Y. Sung

M.S. Dissertation, Korea University, 2013.

Book Chapters

[$B1$] **Team VALORs ESCHER: A novel electromechanical biped for the DARPA Robotics Challenge**

C. Knabe, R. Griffin, J. Burton, G. Cantor-Cooke, L. Dantanarayana, G. Day, O. Ebeling-Koning, E. Hahn, M. Hopkins, J. Neal, J. Newton, C. Nogales, V. Orekhov, J. Peterson, M. Rouleau, J. Seminatore, **Y. Sung**, J. Webb, N. Wittenstein, J. Ziglar, A. Leonessa, B. Lattimer, and T.

Furukawa
The DARPA Robotics Challenge Finals: Humanoid Robots To The Rescue. Springer, Cham., pp. 583-629, 2018.

Posters

[*P*1] **Implementation of JPDAFs to track humans for a mobile robot with a laser range finder**
Y. Sung, and W. Chung
IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), 2013.

Patents

[*P*1] **Leg tracking method based on SJPDAF method**
Y. Sung, and W. Chung
KR (No. 10-1573620)

THESIS SUPERVISION

MEng Students
- Shiloh Curtis, A hierarchical algorithm for probabilistically complete path planning in multi-floor environments, MIT *2021*

MENTORING EXPERIENCE

Ph.D. Students
- Kaiyu Zheng (Ph.D. advisor: Stefanie Tellex), Brown University *2019-2021*

M.S./MEng Students
- Shiloh Curtis (MEng advisor: Leslie Pack Kaelbling), MIT *2020-2021*
- Deeksha Dixit (M.S. advisor: Pratap Tokekar), Virginia Tech *2018-2019*

Mentoring Programs
- Inclusion@RSS, Freiburg, Germany *Jun. 2019*

SERVICE

Associate Editor
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Conference Editorial Board *2021*

Workshop Co-organizer
- Robotics: Science and Systems (RSS) Pioneers 2020, Oregon, USA *Jul. 2020*
- Full-day workshop, Robotics: Science and Systems (RSS), Freiburg, Germany *Jun. 2019*
Workshop Title: Robots in the wild: challenges in deploying robust autonomy for robotic exploration (link to the workshop website)

Reviewer
- *Journals*: International Journal of Robotics Research (IJRR), IEEE Transactions on Robotics (T-RO), Autonomous Robots (AURO), IEEE Transactions on Automation Science and Engineering (T-ASE)

- *Conferences*: IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Robotics: Science and Systems (RSS), Conference on Robot Learning (CoRL), Workshop on the Algorithmic Foundations of Robotics (WAFR), International Conference on Autonomous Agents and Multiagent Systems (AAMAS), American Control Conference (ACC)

INVITED TALKS

Robust Autonomy in the Wild

- Workshop on Robots in the Wild: Challenges in Deploying Robust Autonomy for Robotic Exploration at RSS 2020 *July. 2020*
- Mechanical Engineering, Michigan Tech, MI, USA *Mar. 2020*
- Brown Robotics, Brown University, RI, USA *Nov. 2019*
- NAVER LABS, Seoul, Korea *Jul. 2019*
- Dept. of Aerospace Engineering, KAIST, Daejeon, Korea *Jun. 2019*

HONORS

Awards

- Best Cognitive Robotics Paper Award Finalist, IROS *2021*
- Best Robocup Paper Award Winner, IROS *2021*
- RAS Travel Grants, ICRA *2017–2019*
- Robotics: Science and Systems (RSS) Pioneers *2019*
- DARPA Robotics Challenge (DRC) Finalist *2015*

Graduate Fellowship

- Research Assistant Scholarships, Virginia Tech, Blacksburg, VA, USA *Fall 2014–Fall 2019*
- The Welfare Section Scholarship, Korea University, Seoul, Korea *Spring 2012, Fall 2012*
- Research Assistant Scholarships, Korea University, Seoul, Korea *Fall 2011*
- The Second Stage of BK21 Scholarship, Korea University, Seoul, Korea *Spring 2011*

Undergraduate Fellowship

- Best Honors Scholarships, Korea University, Seoul, Korea *Spring 2010*
- Honors Scholarships, Korea University, Seoul, Korea *Fall 2008, Spring 2009, Fall 2010*
- National Science Scholarship, Korea University, Seoul, Korea *Fall 2009*

References Available Upon Request

Last updated: Sep 30, 2021