Wennie Tabib

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Objective

My long-term research objective is to accelerate the assimilation of intelligent active perceiver robots into society by innovating methods that (1) unify perceptual pipelines to enable perception in the small; (2) select informative visual fields to sense; and (3) model the consequences of actions.

Education

Ph.D. in Computer Science, Carnegie Mellon University — 2019
Thesis: *Approximate Continuous Belief Distributions for Exploration*
Advisors: Nathan Michael and Red Whittaker

M.S. in Robotics, Carnegie Mellon University — 2014
Thesis: *Crater Detection in Planetary Images*
Advisor: Red Whittaker

B.S. in Computer Science, Carnegie Mellon University — 2012
Thesis: *FPGA-Based Feature Detection*
Advisor: Red Whittaker

Employment

Postdoctoral Fellow — 2019 – present
Robotics Institute, Carnegie Mellon University
Resilient Intelligent Systems Lab (PI: Nathan Michael)

Research Assistant — 2014 – 2019
Computer Science Department, Carnegie Mellon University
Resilient Intelligent Systems Lab (PI: Nathan Michael)
Planetary Robotics Lab (PI: Red Whittaker)

Software Engineer — 2013 – 2015
Astrobotic Technology, Inc.

Hardware Engineer Intern — 2012
Astrobotic Technology, Inc.

Software Engineer Intern 2011
Apple, Inc.

Software Engineer Intern 2010
Northrop Grumman

Awards and Honors

NASA Space Technology Research Fellowship 2014-2018
$272,000 fellowship (54 awarded in 2014).

Paul and Daisy Soros Fellowship for New Americans 2013-2015
$90,000 fellowship for New Americans (30 awarded in 2013) 2013-2015

Entertainment Software Association Foundation Scholarship 2010-2011
$3,000 scholarship for Computer Science women and minority student

Carnegie Mellon Senior Leadership Award 2012
Awarded to students who have made unparalleled impact on the CMU community and who leave it a better place as a result of their leadership, vision, and initiative.

School of Computer Science College Honors 2012
Awarded to students in SCS in recognition of their outstanding academic achievements.

Intel First Year Research Experience 2008 - 2009
$2,500 research award to first-year undergraduate students.

Publications

Journal Articles

1. **Wennie Tabib**, Kshitij Goel, John Yao, Curtis Boirum, and Nathan Michael. Autonomous cave surveying with an aerial robot. *IEEE Transactions on Robotics (T-Ro)*. (under review) Preprint available at arXiv:2003.13883
2. **Wennie Tabib**, Cormac O'Meadhra, and Nathan Michael. On-manifold gmm registration. *IEEE Robotics and Automation Letters*, 3(4):3805–3812, 2018
3. Cormac O'Meadhra, **Wennie Tabib**, and Nathan Michael. Variable resolution occupancy mapping using gaussian mixture models. *IEEE Robotics and Automation Letters*, 4(2):2015–2022, 2018

Conference Papers

4. Kshitij Goel, **Wennie Tabib**, and Nathan Michael. Rapid and high-fidelity exploration of subter-

ranean voids with multiple aerial vehicles. In *International Symposium on Experimental Robotics*, 2021. To Appear

5. **Wennie Tabib** and Nathan Michael. Simultaneous localization and mapping of subterranean voids with gaussian mixture models. In *Conf. on Field and Service Robot., Tokyo, Japan*, 2019
6. **Wennie Tabib**, Kshitij Goel, John Yao, Mosam Dabhi, Curtis Boirum, and Nathan Michael. Real-time information-theoretic exploration with gaussian mixture model maps. In *Robotics: Science and Systems*, 2019
7. **Wennie Tabib**, Red Whittaker, and Nathan Michael. Efficient multi-sensor exploration using dependent observations and conditional mutual information. In *2016 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pages 42–47. IEEE, 2016
8. **Wennie Tabib**, Micah Corah, Nathan Michael, and Red Whittaker. Computationally efficient information-theoretic exploration of pits and caves. In *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3722–3727. IEEE, 2016
9. Corinne Vassallo, **Wennie Tabib**, and Kevin Peterson. Orbital slam. In *2015 12th Conference on Computer and Robot Vision*, pages 305–312. IEEE, 2015
10. Heather Jones, **Wennie Tabib**, and William L Whittaker. Planning views to model planetary pits under transient illumination. In *2015 IEEE Aerospace Conference*, pages 1–15. IEEE, 2015

Workshop Papers

11. **Wennie Tabib** and Nathan Michael. Generative modeling of depth observations with gmms for active perception. In *RSS Workshop on Aerial Interaction and Manipulation: Unsolved Challenges and Perspectives*, 2019
12. **Wennie Tabib**, Cormac O'Meadhra, and Nathan Michael. Robust real-time gmm registration. In *RSS Pioneers Workshop*, 2018

Mentoring

Kshitij Goel — 2018 – present
M.S. student, Carnegie Mellon University
Publications: [1, 4, 6]

Mosam Dabhi — 2018 – 2019
Research assistant, Carnegie Mellon University
Publication: [6]

Angad Sidhu, Logan Wan, Maitreya Naik, Clare Cui — 2016 – 2017
MRSD team, Carnegie Mellon University
https://mrsdprojects.ri.cmu.edu/2016teamb/team/

Corinne Vassallo — 2014–2015
Undergraduate student, Carnegie Mellon University

Publication: [9]

Teaching Experience

15-462/15-662 Computer Graphics — 2018
Teaching assistant, Carnegie Mellon University

15-780 Graduate Artificial Intelligence — 2016
Teaching assistant, Carnegie Mellon University

16-865 Advanced Mobile Robot Development — 2013
Teaching assistant, Carnegie Mellon University

16-861 Mobile Robot Design — 2012
Teaching assistant, Carnegie Mellon University

15-221 Technical Communications for Computer Scientists — 2012
Teaching assistant, Carnegie Mellon University

Invited Talks

2nd RSS Workshop on Informative Path Planning and Adaptive sampling — Jul 2019
Host: Dr. Graeme Best

Massachussets Institute of Technology — May 2019
Host: Prof. Nick Roy

Jet Propulsion Laboratory — Aug. 2016
Host: Dr. Larry Matthies

Service

Organizing Committee

Robotics: Science and Systems (RSS) 2019 — 2018-2019
Web Chair

Challenges and Opportunities for Resilient Collective Intelligence in Subterranean Environments Workshop at RSS 2018 — 2017-2018
Co-Organizer

Resilient Intelligence in Autonomous Systems: Challenges and Opportunities Workshop at RSS 2017 — 2016-2017
Co-Organizer

Refereeing: Conferences and Journals

IEEE Transactions on Robotics	2016, 19, 20
Robotics: Science and Systems	2019, 2020
Robotics And Automation Letters	2018-2020
International Symposium on Experimental Robotics	2018, 2020
IEEE International Conference on Robotics and Automation	2021

External Funding Acquired with My Assistance

NASA ESI: Autonomous Navigation for Exploration on Icy Moons — 2016-2018
Carnegie Mellon University: $500,000, Grant NNX16AD98G

NASA STTR Phase II: Subsurface Prospecting by Planetary Drones — 2016-2018
Astrobotic Technology and Carnegie Mellon University: $750,000, Grant NNX16CK16C

DOE Traineeship in Robotics — 2016-2019
Carnegie Mellon University: $3,000,000, Grant DE-EM-0004067

NASA STTR Phase I: Subsurface Prospecting by Planetary Drones — 2015-2016
Astrobotic Technology and Carnegie Mellon University: $125,000, Grant NNX15CK15C

Outreach

NASA Space Technology Research Grants Technology Day — 2017
Presented aerial robotic system and research in caves to members of the House and Senate on Capitol Hill in Washington, D.C.

Westmont Hilltop Elementary School — 2012
Gave a robotics presentation to a 4th grade class.