

Curriculum Vitae

JUNAED SATTAR
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Education

PhD, McGill University, Montreal, Quebec, Canada. Computer Science, Robotics June 2012

Dissertation/Thesis Title: A vision-based framework for robust human-robot interaction

Advisor: Gregory L Dudek

MS, McGill University, Montreal, Quebec, Canada. Computer Science, Robotics June 2006

Dissertation/Thesis Title: A visual servoing system for an amphibious legged robot

Advisor: Gregory L Dudek

BS, Bangladesh University of Engineering and Technology, Dhaka, N/A, Bangladesh. Computer Science and Engineering August 2001

Languages: Bengali, Hindi

Fellowships, Residencies, and Visiting Engagements

Fellowship

FRQNT Post Doctoral Fellow January 1, 2012 - June 30, 2014

Quebec Research Funds for Natural Science and Engineering, Computer Science

University of British Columbia

Industrial Research and Development Fellowship (IRDF) September 1, 2010 - August 31, 2012

National Science and Engineering Research Council of Canada

Declined

Doctoral Fellowship May 1, 2008 - April 30, 2011

Québec Research Funds for Natural Sciences and Engineering, Computer Science

Academic Appointments

University of Minnesota Twin Cities, Computer Science and Engineering: Assistant Professor January 2016 - Present

McGill University, Computer Science: Course Lecturer January 2007 - December 2009

Courses Taught:

COMP322 (Introduction to C++, Fall 2007, Spring and Fall 2008), COMP 417 (Spring 2007)

Brac University, Computer Science and Engineering:
Course Lecturer

September 2001 - July 2003

Courses Taught:

COMP 110: Programming Languages I: C (Fall 2001),
COMP 115: Programming Languages II: C++ (Spring
2002), COMP 211: Introduction to Algorithms (Fall 2002),
COMP 311: Microprocessors (Spring 2003)

Other Professional Positions

Clarkson University, Computer Science: Assistant
Professor

August 2014 - December 2015

The University of British Columbia, Computer Science:
Post-Doctoral Fellow

January 2012 - June 2014

Iponics Bangladesh Inc
System Analyst

June 2000 - July 2001

Consulting

For Profit Organization, Kinsol Research Inc

Victoria, Other, Canada

January 1, 2012 - December 31,
2012

Current Membership in Professional Organizations

Institute of Electrical and Electronics Engineers

June 1, 2004 - Present

HONORS AND RECOGNITION

External Sources

Best Presentation Award, "From the Deep Seas to Our Homes– Towards a
Seamless Inter- face for Human-Machine Interaction", University of
British Columbia
\$150

September 14, 2012

Best Robotics Paper Award, International Conference on Computer and
Robot Vision
\$0

May 27, 2009

RESEARCH, SCHOLARSHIP, AND CREATIVE WORK

Grants, Contract, Awards: External Sources

Award: Agricultural Weed Control Using Autonomous Mowers- Phase 2

Status: Accepted

Sponsoring Organization: LEGISLATIVE-CITIZEN COMMISSION ON MN RES

Award Dates: July 1, 2019 - August 30, 2022

Project: Agricultural Weed Control Using Autonomous Mowers- Phase 2

Project Team: Junaed Sattar (Co-Investigator), Eric Buchanan (Principal),
Jonathan Chaplin (Co-Investigator), Ibrahim Isler (Co-Investigator)

Status: Approved
Project Dates: July 1, 2019 - August 30, 2022

Award: NRI: Collaborative Research: Autonomous Quadrotors for 3D Modeling and Inspection of Outdoor Infrastructure

Principal Investigator: Sattar, Junaed

Status: Accepted

Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION

Award Dates: September 1, 2016 - August 31, 2021

1. **Project: NRI: Collaborative Research: Autonomous Quadrotors for 3D Modeling and Inspection of Outdoor Infrastructure**
Project Team: Junaed Sattar (Principal), Peter Seiler Jr (Co-Investigator), Stergios Roumeliotis
Status: Approved
Project Dates: September 1, 2016 - August 31, 2021
2. **Project: NRI: Collaborative Research: Autonomous Quadrotors for 3D Modeling and Inspection of Outdoor Infrastructure**
Project Team: Junaed Sattar (Principal), Stergios Roumeliotis
Status: Approved
Project Dates: September 1, 2016 - August 31, 2021

Award: EAGER: Towards robust and natural underwater human-robot interaction

Principal Investigator: Sattar, Junaed

Status: Accepted

Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION

Award Dates: May 15, 2019 - April 30, 2021

1. **Project: EAGER: Towards robust and natural underwater human-robot interaction**
Project Team: Junaed Sattar (Principal)
Status: Approved
Project Dates: May 15, 2019 - April 30, 2021
2. **Project: REU Supplement - EAGER Towards**
Project Team: Junaed Sattar (Principal)
Status: Approved
Project Dates: May 15, 2019 - April 30, 2021

Pending/Submitted:

Proposal: CAREER: Towards Safe and Intuitive Underwater Human-Robot Collaboration

Role: Principal

Proposal ID: CON000000088743

Status: Submitted

Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION

Date Submitted: August 7, 2020

Purpose: Research

Proposal: Automated weed management for herbicide water runoff reduction

Role: Principal
Proposal ID: CON000000086778
Status: Submitted
Sponsoring Organization: LEGISLATIVE-CITIZEN COMMISSION ON MN RES
Date Submitted: April 28, 2020
Purpose: Research

Proposal: Water Quality and Robots: Experientially Educating Minnesota's Youth

Role: Co-Investigator
Proposal ID: CON000000086780
Status: Submitted
Sponsoring Organization: LEGISLATIVE-CITIZEN COMMISSION ON MN RES
Date Submitted: April 28, 2020
Purpose: Research

Proposal: Pollinator Education in the Science Classroom

Role: Principal
Proposal ID: CON000000086779
Status: Submitted
Sponsoring Organization: LEGISLATIVE-CITIZEN COMMISSION ON MN RES
Date Submitted: April 28, 2020
Purpose: Other Sponsored Activity

Proposal: NRI: INT: Identification, localization and conservation of rare aquatic species with a novel, modular co-robotic platform

Role: Principal
Proposal ID: CON000000085472
Status: Submitted
Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION
Date Submitted: February 24, 2020
Purpose: Research

Proposal: Towards Safe and Productive Human Machine Collaboration

Role: Principal
Proposal ID: CON000000083253
Status: Submitted
Sponsoring Organization: MICROSOFT CORPORATION
Date Submitted: October 14, 2019
Purpose: Research

Proposal: Task-driven Multi-view Image Generation for Enhanced Visual Object Detection

Role: Principal
Proposal ID: CON000000082664
Status: Submitted
Sponsoring Organization: SONY CORPORATION OF AMERICA
Date Submitted: September 11, 2019
Purpose: Research

Proposal: Enhanced underwater visual perception for efficient human-robot teams

Role: Principal
Proposal ID: CON000000082244
Status: Submitted
Sponsoring Organization: USDOD NAVY
Date Submitted: August 14, 2019
Purpose: Research

Proposal: CAREER: Perception, learning, and interaction for natural underwater human-robot collaboration

Role: Principal
Proposal ID: CON000000081762
Status: Submitted
Sponsoring Organization: THE NATIONAL SCIENCE FOUNDATION
Date Submitted: July 15, 2019
Purpose: Research

Proposal: Learning, Perception, and Navigation for Robotic Aquatic Litter Management

Role: Principal
Proposal ID: CON000000078391
Status: Submitted
Sponsoring Organization: GOOGLE INC
Date Submitted: January 17, 2019
Purpose: Research

Publications

Asterisk() - indicates student author*

Peer-Reviewed Journal Article

- Islam, M. J.*, Xia, Y.*, & **Sattar, J.** (2020). Fast Underwater Image Enhancement for Improved Visual Perception. *IEEE Robotics and Automation Letters*, 5(2), (pp. 3227-3234). [doi: 10.1109/LRA.2020.2974710](https://doi.org/10.1109/LRA.2020.2974710)
- Islam, M. J.*, Hong, J.*, & **Sattar, J.** (2019). Person Following by Autonomous Robots: A Categorical Overview. *International Journal of Robotics Research*, 38(14), (pp. 1581-1618). [doi: 10.1177/0278364919881683](https://doi.org/10.1177/0278364919881683)
- Islam, M. J.*, Ho, M.*, & **Sattar, J.** (2019). Understanding human motion and gestures for underwater human-robot collaboration. *Journal of Field Robotics*, 36(5), (pp. 851-873). [doi: 10.1002/rob.21837](https://doi.org/10.1002/rob.21837)
- Islam, M. J.*, Fulton, M. S.*, & **Sattar, J.** (2019). Towards a Generic Diver-Following Algorithm: Balancing Robustness and Efficiency in Deep Visual Detection. *IEEE Robotics and Automation Letters*, 4(1), (pp. 113-120). [doi: 10.1109/LRA.2018.2882856](https://doi.org/10.1109/LRA.2018.2882856)
- Sattar, J.**, & Dudek, G. (2017). Visual Identification of Biological Motion for Underwater Human-Robot Interaction. *Autonomous Robots*, 42(1), (pp. 111-124). [doi: https://doi.org/10.1007/s10514-017-9644-y](https://doi.org/10.1007/s10514-017-9644-y)
- Sattar, J., Giguère, P., & Dudek, G. (2009). Sensor-Based Behavior Control for an Autonomous Underwater Vehicle. *International Journal of Robotics Research*, 28(6), (pp. 701-713).
- Dudek, G., Giguère, P., Prahacs, C., Saunderson, S., Sattar, J., Torres-Mendez, L.-A., . . . Georgiades, C. (2007). Aqua: An Amphibious Autonomous Robot. *IEEE Computer*

Magazine, 40(1), (pp. 46–53).

Conference Proceeding

- Islam, M. J.*, Luo, P.*, & Sattar, J. (2020). *Simultaneous Enhancement and Super-Resolution of Underwater Imagery for Improved Visual Perception*. Corvallis, OR: Robotics: Science and Systems.
- Edge, C. M.*, Enan, S. S.*, Fulton, M. S.*, Hong, J.*, Mo, J.*, Barthelemey, K.*, . . . **Sattar, J.** *Design and Experiments with LoCO AUV: A Low Cost Open-Source Autonomous Underwater Vehicle*. Las Vegas, NV: IEEE/RSJ International Conference on Intelligent Robots and Systems. *Accepted*.
- Mo, J.*, & **Sattar, J.** *Place Recognition for Stereo Visual Odometry using LiDAR descriptors*. Las Vegas, NV: IEEE/RSJ International Conference on Intelligent Robots and Systems. *Accepted*.
- Islam, M. J.*, Edge, C. M.*, Xiao, Y.*, Luo, P.*, Mehtaz, M.*, Morse, C.*, . . . **Sattar, J.** *Semantic Segmentation of Underwater Imagery: Dataset and Benchmark*. Las Vegas, NV: IEEE/RSJ International Conference on Intelligent Robots and Systems. *Accepted*.
- Hong, J.*, Fulton, M.*, & **Sattar, J.** (2020). *A Generative Approach Towards Improved Robotic Detection of Marine Litter*. Paris: International Conference on Robotics and Automation (Acceptance rate 42%).
- de Langis, K. J. D.*, & **Sattar, J.** *Real-Time Multi-Diver Tracking and Re-identification for Underwater Human-Robot Collaboration*. Paris: International Conference on Robotics and Automation (Acceptance rate 42%). (International Conference on Robotics and Automation (ICRA), June 2020, Paris, France.) *Accepted*.
- Islam, M. J.*, Enan, S. S.*, Luo, P.*, & **Sattar, J.** *Underwater Image Super-Resolution using Deep Residual Multipliers*. Paris: International Conference on Robotics and Automation (Acceptance rate 42%). (International Conference on Robotics and Automation (ICRA), June 2020, Paris, France.) *Accepted*.
- Mo, J.*, & **Sattar, J.** *Extending Monocular Visual Odometry to Stereo System by Scale Optimization* (pp. 6921-6927). Macau: IEEE/RSJ International Conference on Intelligent Robots and Systems. doi: [10.1109/IROS40897.2019.8968272](https://doi.org/10.1109/IROS40897.2019.8968272)
- Fulton, M. S.*, Edge, C. M.*, & **Sattar, J.** *Robot Communication Via Motion: Closing the Human-Robot Interaction Loop Underwater* (pp. 4660-4666). Montreal, QC: IEEE International Conference on Robotics and Automation (Acceptance rate 44%). doi: [10.1109/ICRA.2019.8793491](https://doi.org/10.1109/ICRA.2019.8793491)
- Fulton, M. S.*, Hong, J.*, Islam, M. J.*, & **Sattar, J.** *Robotic Detection of Marine Litter Using Deep Visual Detection Models* (pp. 5752-5758). Montreal, QC: IEEE International Conference on Robotics and Automation (Acceptance rate 44%). doi: [10.1109/ICRA.2019.8793975](https://doi.org/10.1109/ICRA.2019.8793975)
- Xia, Y.*, & **Sattar, J.** *Visual Diver Recognition for Underwater Human-Robot Collaboration* (pp. 6839-6845). Montreal, QC: IEEE International Conference on Robotics and Automation (Acceptance rate 44%). doi: [10.1109/ICRA.2019.8794290](https://doi.org/10.1109/ICRA.2019.8794290)
- Islam, M. J.*, Ho, M.*, & (2018). *Dynamic Reconfiguration of Mission Parameters in Underwater Human-Robot Collaboration* (pp. 6212-6219). IEEE International Conference on Robotics and Automation (Acceptance Rate 40.6%). doi: [10.1109/ICRA.2018.8461197](https://doi.org/10.1109/ICRA.2018.8461197)
- Fabbri, C.*, Islam, M. J.*, & (2018). *Enhancing Underwater Imagery using Generative*

- Adversarial Networks* (pp. 7159 - 7165). IEEE International Conference on Robotics and Automation (Acceptance Rate 40.6%). [doi: 10.1109/ICRA.2018.8460552](https://doi.org/10.1109/ICRA.2018.8460552)
- Shkurti, F., Chang, W.-D., Henderson, P., Islam, M. J., Higuera, J. C. G., Li, J., . . . Sattar, J. (2017). *Underwater Multi-Robot Convoying using Visual Tracking by Detection* (pp. 4189-4196). IEEE/RSJ International Conference on Intelligent Robots and Systems (Acceptance Rate 41%). [doi: 10.1109/IROS.2017.8206280](https://doi.org/10.1109/IROS.2017.8206280)
- Islam, M. J.*, & **Sattar, J.** (2017). *Mixed-domain Biological Motion Tracking for Underwater Human-Robot Interaction* (pp. 4457-4464). IEEE International Conference on Robotics and Automation (Acceptance rate 41%). [doi: 10.1109/ICRA.2017.7989516](https://doi.org/10.1109/ICRA.2017.7989516)
- Fabbri, C., & Sattar, J. (2016). smartTalk: A Learning Based Framework for Natural Human-Robot Interaction. *Proceedings of the Thirteenth International Conference on Computer and Robot Vision (CRV)*. Victoria, BC, Canada:.
- Gonzalez-Garcia, L. C., Martinez, J., Sattar, J., Torres-Mendez, L. A., & Little, J. (2015). Are You Talking to Me? Detecting Attention in First-Person Interactions. *Proceedings of the Seventh International Conference on Advanced Cognitive Technologies and Applications*. Nice, France:.
- TalebiFard, P., Sattar, J., & Mitchell, I. (2014). A Risk Assessment Infrastructure for Powered Wheelchair Motion Commands without Full Sensor Coverage. *Proceedings of the IEEE International Conference on Intelligent Robots and Systems, IROS*. (pp. 3592–3597). Chicago, IL, USA:.
- Sattar, J., & Little, J. J. (2014). Ensuring Safety in Human-Robot Dialog – a Cost-Directed Approach. *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA*. (pp. 6660–6666). Hong Kong, China:.
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5979633
- Sattar, J., & Dudek, G. (2011). Towards Quantitative Modeling of Task Confirmations in Human–Robot Dialog. *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA* (pp. 1957–1963). Shanghai, China:.
- Sattar, J., & Dudek, G. (2010). Reducing Uncertainty in Human-Robot Interaction – a Cost Analysis Approach. *Proceedings of the Twelfth International Symposium on Experimental Robotics (ISER)*. New Delhi and Agra, India:.
- Sattar, J., Xu, A., Charette, G., & Dudek, G. (2010). Graphical State-Space Programmability as a Natural Interface for Robotic Control. *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA* (pp. 4609–4614). Anchorage, Alaska, USA: [doi: 10.1109/ROBOT.2010.5509269](https://doi.org/10.1109/ROBOT.2010.5509269)
- Rekleitis, I., Dudek, G., Schoueri, Y., Philippe Giguère, & Sattar, J. (2010). Telepresence Across the Ocean. *Proceedings of the Seventh Canadian Conference on Robot Vision (CRV)* (pp. 261–268). Ottawa, Ontario, Canada:.
- Sattar, J., & Dudek, G. (2009). Underwater Human-Robot Interaction via Biological Motion Identification. *Proceedings of the International Conference on Robotics: Science and Systems V, RSS* (pp. 185–192). Seattle, Washington, USA: MIT Press.
- Sattar, J., & Dudek, G. (2009). A Vision-based Control and Interaction Framework for a Legged Underwater Robot. *Proceedings of the Sixth Canadian Conference on Robot Vision (CRV)* (pp. 329–336). Kelowna, British Columbia:.
- Sattar, J., & Dudek, G. (2009). Robust Servo-control for Underwater Robots using Banks of Visual Filters. *Proceedings of the IEEE International Conference on Robotics and*

- Automation, ICRA* (pp. 3583–3588). Kobe, Japan:.
- Sattar, J., Dudek, G., Chiu, O., Rekleitis, I., Mills, A., Giguère, P., . . . Lobos, J.-P. (2008). Enabling Autonomous Capabilities in Underwater Robotics. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 3628–3634). Nice, France:.
- Sattar, J., & Dudek, G. (2008). A Boosting Approach to Visual Servo-Control of an Underwater Robot. *Experimental Robotics – The Eleventh International Symposium. Springer Tracts in Advanced Robotics, ISER* (vol. 54, pp. 417–428). Athens, Greece:.
- Xu, A., Dudek, G., & Sattar, J. (2008). A Natural Gesture Interface for Operating Robotic Systems. *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA* (pp. 3557–3563). Pasadena, California:.
- Sattar, J., & Dudek, G. (2007). Where is your dive buddy: tracking humans underwater using spatio-temporal features. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 3654–3659). San Diego, California, USA:.
- Sattar, J., Bourque, E., Giguère, P., & Dudek, G. (2007). Fourier tags: Smoothly degradable fiducial markers for use in human-robot interaction. *Proceedings of the Fourth Canadian Conference on Computer and Robot Vision* (pp. 165–174). Montréal, QC, Canada: [doi: http://dx.doi.org/10.1109/CRV.2007.34](http://dx.doi.org/10.1109/CRV.2007.34)
- Dudek, G., Sattar, J., & Xu, A. (2007). A Visual Language for Robot Control and Programming: A Human-Interface Study. *Proceedings of the International Conference on Robotics and Automation ICRA* (pp. 2507–2513). Rome, Italy:.
- Dudek, G., Giguère, P., & Sattar, J. (2006). Sensor-Based Behavior Control for an Autonomous Underwater Vehicle. *Experimental Robotics – The Tenth International Symposium. Springer Tracts in Advanced Robotics, ISER* (vol. 39, pp. 267–276). Rio de Janeiro, Brasil:.
- Sattar, J., & Dudek, G. (2006). On the Performance of Color Tracking Algorithms for Underwater Robots under Varying Lighting and Visibility. *Proceedings of the IEEE International Conference on Robotics and Automation ICRA* (pp. 3550–3555). Orlando, Florida:.
- Sattar, J., Giguère, P., Dudek, G., & Prahacs, C. (2005). A Visual Servoing System for an Aquatic Swimming Robot. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 1483–1488). Edmonton, Alberta, Canada:.
- Dudek, G., Jenkin, M., Prahacs, C., Hogue, A., Sattar, J., Giguère, P., . . . Rekleitis, I. (2005). A Visually Guided Swimming Robot. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 3604–3609). Edmonton, Alberta, Canada:.

Technical Report

- Fabbri, C.*, & Sattar, J. (2018). *On Applications of GANs and Their Latent Representations*. Minneapolis, MN: Department of Computer Science, University of Minnesota Twin Cities.
- Xu, A., Dudek, G., & Sattar, J. (2007). *A Natural Gesture Interface for Operating Robotic Systems* (TR-CIM-07-02 ed.). Montreal, Canada: McGill University.

Publications Submitted or in Progress

Asterisk() - indicates student author*

Peer-Reviewed Journal Article

- Mo, J.*, & Sattar, J.* DirectSLAM: A Fast and Direct Stereo-Visual SLAM. *IEEE Transactions*

on Robotics. [In Preparation; Not Yet Submitted]

Islam, M. J.*, Wang, R.*, de Langis, K.*, & **Sattar, J.** SVAM: Saliency-guided Visual Attention Modeling by Autonomous Underwater Robots. *IEEE Transactions in Robotics*. [Submitted]

Fulton, M. S.*, Edge, C. M.*, & Sattar, J. Robot Communication Via Motion: A Study on Modalities for Robot-to-Human Communication in Field Environments. *ACM Transactions on Human-Robot Interaction*. [In Preparation; Not Yet Submitted]

Hong, J.*, Fulton, M. S.*, & **Sattar, J.** An Evaluation of Bayesian Methods for Bathymetry-based Localization of Autonomous Underwater Robots. *Journal of Field Robotics*. [In Preparation; Not Yet Submitted]

Islam, M. J.*, Mo, J.*, & **Sattar, J.** Robot-to-Robot Relative Pose Estimation using Humans as Markers. *Autonomous Robots*. [Revising to Resubmit]

Conference Proceeding

Edge, C. M.*, Islam, M. J.*, Morse, C. T.*, & **Sattar, J.** *A generative approach for detection-driven underater image enhancement*. (IEEE International Conference on Robotics and Automation, Xi'an, China, May 2021.)

de Langis, K.*, Fulton, M. S.*, & **Sattar, J.** *An Analysis of Deep Object Detectors For Diver Detection*. (IEEE International Conference on Robotics and Automation, Xi'an, China, May 2021.)

Hong, J.*, de Langis, K.*, Wyeth, C.*, Walaszek, C.*, & Sattar, J. *Semantically-Aware Strategies for Stereo-Visual Robotic Obstacle Avoidance*. (IEEE International Conference on Robotics and Automation, Xi'an, China, May 2021.)

Hong, J.*, Enan, S. S.*, Morse, C. T.*, & **Sattar, J.** *Visual Diver Face Recognition for Underwater Human-Robot Interaction*. (IEEE International Conference on Robotics and Automation, Xi'an, China, May 2021.)

Mo, J.*, Islam, M. J.*, & Sattar, J. *Learning Rolling Shutter Correction from Real Data without Camera Motion Assumption*. (IEEE International Conference on Robotics and Automation, Xi'an, China, May 2021.)

Fulton, M. S.*, Mehtaz, M.*, Queeglay, O., & **Sattar, J.** *Variation in Communication Modalities for Field HRI under Changing Domain, Viewpoint, and Content*. Boulder, CO: ACM/IEEE International Conference on Human-Robot Interaction.

Fulton, M. S.*, Ahmed, M.*, & **Sattar, J.** *By Land, Air, or Sea: Multi-Domain Robot Communication Via Motion*. (International Conference on Intelligent Robots and Systems, November 2019, Macau, China.)

Lu, Y.-C.*, Mo, J.*, & **Sattar, J.** *SafeDrive: A Robust Lane Tracking System for Autonomous and Assisted Driving Under Limited Visibility*. IEEE. (IEEE International Conference on Robotics and Automation)

Patents and Intellectual Property

Vehicle Lane Detection System.

Amphibious robotic device, patent #7427220. Issued: September 23, 2008
US Patent #7427220.

Invited Presentations, Posters, and Exhibits

Asterisk() - indicates student co-presenter*

Keynote/Plenary Address

Sattar, J. "Computational Approaches to Underwater Human-Robot Collaboration," Turkey Robotics Conference IEEE, Istanbul, Turkey. (June 26, 2019). *Invited.*

Demonstration

Sattar, J. "Underwater robots for environmental monitoring," Digi Labs, Wayzata, Minnesota, United States. (April 13, 2017). *Invited.*

Introduction to the Marine Robotics Sea Trials 2020

Sattar, J. "Introduction to the Marine Robotics Sea Trials 2020," Marine Robotics Sea Trials 2020 Bellairs Research Institute, Holetown, Barbados. (January 10, 2020). *Invited.*

Lecture

Sattar, J. "Perception, Learning, and Systems for Underwater Human-Robot Collaboration," Minnesota Robotics Institute Seminar Minnesota Robotics Institute, Minneapolis, Minnesota, United States. (October 9, 2020). *Invited.*

Presentation/Talk

Sattar, J. "Applied Deep Machine Learning for Underwater Human-Robot Collaboration," MIST Workshop on Learning Machine Learning: The ML Pipeline Bangladesh Military Institute of Science and Technology, DHaka, Bangladesh. (August 16, 2020). *Invited.*

Sattar, J. "Perception, Learning, and Systems for Underwater Human-Robot Collaboration," University of Iowa Computing Conference University of Iowa, Iowa City, Iowa, United States. (March 1, 2020). *Invited.*

Sattar, J. "Perception, Learning, and Systems for Underwater Human-Robot Collaboration," Aerospace Engineering and Mechanics Seminar Department of Aerospace Engineering and Mechanics, Minneapolis, Minnesota, United States. (February 28, 2020). *Invited.*

Sattar, J. "(Not) Rolling in the Deep!," University of Minnesota Robotics: Fall Tech Talks University of Minnesota Robotics, Minneapolis, Minnesota, United States. (October 23, 2019). *Invited.*

Sattar, J. "Living with Truly Intelligent Machines Perception, Cognition, Learning and Locomotion for Human-Robot Collaboration," TEDxYouth@MinnetonkaHS, Minnetonka, Minnesota, United States. (November 17, 2018). *Invited.*

Sattar, J. "Computational Approaches to Underwater Human-Robot Collaboration," Monash University, Melbourne, Australia. (June 8, 2018). *Invited.*

Autonomous robots are making great headways in a wide range of applications areas, including diverse areas such as manufacturing, healthcare, and surveillance. In many domains, however, autonomous robots are required to work alongside humans to ensure operational safety or augment human performance. The underwater domain is unique in many ways, but as an application area for autonomous robots, it stands out with numerous challenges -- in sensing, control, and human-robot interaction -- that can justifiably be considered extreme. I am the founding director of the Interactive Robotics and Vision Lab at the University of Minnesota where we investigate numerous issues in robust underwater human-robot collaboration. Our work looks into human-robot and robot-human communication, enhancing underwater visual imagery, locating and mapping trash deposits underwater, underwater localization using visual and depth sensors, and biological and non-biological object tracking. We primarily investigate computational solutions to these problems, and use methods from robotics, machine vision, stochastic reasoning, and (deep) machine learning. This talk will present a brief overview of our research and present an in-depth discussion of two recent projects in underwater human-robot interaction and imagery enhancement.

Sattar, J. "Computational Approaches to Underwater Human-Robot Collaboration," Commonwealth Scientific and Industrial Research Organisation, Hobart, Other, Australia. (May 28, 2018). *Invited*.

Autonomous robots are making great headways in a wide range of applications areas, including diverse areas such as manufacturing, healthcare, and surveillance. In many domains, however, autonomous robots are required to work alongside humans to ensure operational safety or augment human performance. The underwater domain is unique in many ways, but as an application area or autonomous robots, it stands out with numerous challenges -- in sensing, control, and human-robot interaction -- that can justifiably be considered extreme. I am the founding director of the Interactive Robotics and Vision Lab at the University of Minnesota where we investigate numerous issues in robust underwater human-robot collaboration. Our work looks into human-robot and robot-human communication, enhancing underwater visual imagery, locating and mapping trash deposits underwater, underwater localization using visual and depth sensors, and biological and non-biological object tracking. We primarily investigate computational solutions to these problems, and use methods from robotics, machine vision, stochastic reasoning, and (deep) machine learning. This talk will present a brief overview of our research and present an in-depth discussion of two recent projects in underwater human-robot interaction and imagery enhancement.

Sattar, J. "Robots in the water: IoT when the 'I' is hard to reach," IoT Fuse Conference, Minneapolis, Minnesota, United States. (May 4, 2018). *Invited*.

Sattar, J. "Embodiment of Artificial Intelligence - robots, autonomy, interaction and learning," Student Senate Expert Witness in AI, Roseville, Minnesota, United States. (March 28, 2017). *Invited*.

Sattar, J. "On land and in the water – vision for intelligent systems," Computer Science and Engineering Colloquium, Minneapolis, Minnesota, United States. (January 30, 2017). *Invited*.

Sattar, J. "Vision-guided intelligence for underwater robotics and assisted driving," Underwater Robot Sea Trials Bellairs Research Institute, McGill University, Folkestone, Other, Barbados. (January 10, 2017). *Invited*.

Sattar, J. "Towards Human-in-the-Loop Robot Autonomy: Algorithms, Applications and Systems," Brac University, Dhaka, Other, Bangladesh. (July 18, 2016). *Invited*.

Robots are increasingly being used in diverse environments in a variety of tasks, including but not limited to exploration, search-and-rescue and rehabilitation, and also personal applications. For safe, reliable and effective deployment of mobile robots, close collaboration between humans and robots are of utmost importance, as are robust, intuitive and natural communication methods. This talk will present insights into research in sensory human-robot interaction, and present findings from robot field trials, as well as from quantitative and qualitative studies. My research looks at algorithms for robust perception of human activities and intent, which improves interaction with and control of autonomous robots in arbitrary environments. A significant portion of this work has investigated vision-based approaches for underwater human-robot collaboration and interaction, including human-motion detection and visual tracking. Part of this research has looked at a quantitative model of human-robot dialog incorporating task cost and communication uncertainty, with the goal of preventing robots from carrying out potentially dangerous and unsafe tasks unless confirmed by its human partner. This human-robot dialog framework has been evaluated on-board a number of different robotic platforms including the Aqua amphibious robot, the Willow Garage PR2, and a collaboratively-controlled wheelchair being used by older adults with impaired cognitive abilities. Currently, this work is being extended to multi-robot, multi-human deployments and interaction scenarios for service robots and search-and-rescue applications using a number of autonomous ground and aerial vehicles, and incorporating wearable technology for robot-human collaboration. System building is an essential component of field robot deployments, and the talk will briefly discuss some of the inroads made towards achieving the goal of reliable, long-term and reproducible robot missions.

Sattar, J. "Underwater human-robot collaboration for monitoring and surveillance," Large Lakes Observatory, University of Minnesota Duluth, Duluth, Minnesota, United States. (March 31, 2016). *Invited*.

URL: http://prezi.com/piruv4pj8i8e/?utm_campaign=share&utm_medium=copy

Presentations, Posters, and Exhibits

Asterisk() - indicates student co-presenter*

Demonstration

Sattar, J. "Robots in the Wild," Discover STEM College of Science and Engineering. (August 8, 2018).

Sattar, J. "Robots in the Wild," Eureka! with Girls Inc. College of Science and Engineering and YMCA Minneapolis. (July 9, 2018).

Sattar, J. "Robots in the Wild," Eureka! with Girls Inc. College of Science and Engineering and YMCA Minneapolis. (July 5, 2018).

Creative and Artistic Practice, Performances, and Exhibits

Robotics Exhibit

Sattar, J., Fulton, M. S., Hong, J., Edge, C. M., Mo, J.,
Barthelemy, K., Orpen, K., "Robot Exhibit at the CS&E 50th
Year Celebration," Interactive Robotics and Vision Laboratory,
McNamara Alumni Center, Minneapolis, Minnesota, United
States November 24, 2019

Media Contributions

"Inventing Tomorrow," College of Science and Engineering November 2018
issuu.com/inventingtomorrow/docs/cse_inventing_tomorrow_fall_2018?e=0
Magazine cover story

"Research Spotlight: UMN underwater robots," College of November 2018
Science and Engineering
youtu.be/2qSBCUI_6hQ

"20,000 Leagues Under the Cloud," IEEE Spectrum Magazine February 8, 2016
spectrum.ieee.org/tech-talk/telecom/internet/20000-leagues-under-the-cloud

"AQUA le robot sous-marin," Canal Savoir June 23, 2011

"Swimming Robots? Six-legged Style?," National Science and June 30, 2010
Engineering Research Council
www.nserc-crsng.gc.ca/Media-Media/ImpactStory-ArticlesPercutant_eng.asp?ID=1038

"McGill's robot star attraction at G20 media centre," McGill June 24, 2010
Reporter
publications.mcgill.ca/reporter/2010/06/mcgills-robot-star-attraction-at-g20-media-centre/

"Swimming robot will follow your fins," New Scientist Online February 15, 2008
www.newscientist.com/blog/technology/2008/02/swimming-robot-will-follow-your-fins.html

"Daily Planet," Discovery Channel Canada February 7, 2008

January 2008 Aqua robot field trip to Barbados, as team manager.

"Gone Swimmin'," IEEE Spectrum June 2, 2006
spectrum.ieee.org/computing/hardware/gone-swimmin
Photo credits.

"Canadian researchers develop aqua robot," Canadian Television January 26, 2004
(CTV) Network

Other Research/Research in Progress

Sattar, J., Islam, M. J. Writing Results, "Mixed-domain Biological Motion Tracking for Underwater Human-Robot Interaction".

Sattar, J., Mo, J. Writing Results, "Robust Lane Tracking System for Autonomous and Assisted Driving Under Limited Visibility".

PROFESSIONAL DEVELOPMENT ACTIVITIES

University Teaching/Learning Program, "New Faculty September 1, 2016 - Present
Development Workshop," University of Minnesota,
Minneapolis, Minnesota, United States

ADVISING AND MENTORING

Undergraduate Students Activities

Other Advising Activities

Other

UROP Advisor. December 2018 - May 2019
Berik Kallevig

University of Minnesota

UROP Advisor. January 2020 - Present
Kevin Orpen

UROP Advisor. January 2020 - Present
Kimberley Barthelemy

UROP Advisor. January 2020 - Present
Mazzin Khidir

Undergraduate Honors Thesis. January 2019 - May 2019
Marc Ho

Graduate Student Activities

Advisees

Andrea Walker, Computer Science M S 2020 - Present

Sadman Sakib Enan, Computer Science Ph D 2019 - Present

Karin De Langis, Computer Science Ph D 2019 - Present

Chelsey Edge, Computer Science Ph D 2018 - Present

Michael Fulton, Computer Science Ph D 2017 - Present

Jungseok Hong, Computer Science Ph D 2017 - Present

Jiawei Mo, Computer Science Ph D 2017 - Present

Fabbri Cameron, Computer Science 2017 - Present

Md Jahidul Islam, Computer Science Ph D 2016 - Present

Pallavi Mitra, Computer Science M S 2019 - 2020

Santhosh Alladi, Computer Science M S 2019 - 2020

Thesis: Augmenting Electrocardiogram Datasets using
 Generative Adversarial Networks
 Jiawei Mo, Computer Science M S 2016 - 2019
 Janna Madden, Computer Science M S 2019
 Thesis: Algorithmically Recognizing Gait Variance from a
 Sensor-Based System
 Karin De Langis, Computer Science M S 2019
 Yi-Chun Lu, Data Science M S 2018 - 2019
 Janna Madden, Computer Science M S 2017 - 2018
 Thesis: Algorithmically Recognizing Gait Variance from a
 Sensor-Based System
 Cameron Fabbri, Computer Science M S 2018
 Thesis: Enhancing Visual Perception in Noisy Environments
 using Generative Adversarial Networks
 Liyao Lu, Data Science M S 2018
 Justin Diercks, Computer Science Ph D 2016 - 2017

Committee Advising

Doctoral Final Committee: Committee Member

Nikolaos Stefas, Computer Science Ph D 2020
 Thesis: Environmental Monitoring with Unmanned Aerial
 Vehicles
 Patrick Plonski, Computer Science Ph D 2019
 Thesis: Energy-aware Robotics for Engironmental Monitoring

Doctoral Final Committee: Committee Reviewer

Patrick Plonski, Computer Science Ph D 2019
 Thesis: Energy-aware Robotics for Engironmental Monitoring
 Trevor Stephens, Mechanical Engr Ph D 2019
 Thesis: Augmenting Surgical Robot Interactions with Intelligent
 Autonomy
 Mustafijur Rahman, Electrical Engineering Ph D 2016
 Thesis: Design of Low Power Integrated Radios
 Joel Hesch, Computer Science Ph D 2016
 Thesis: Consistency Analysis and Improvement for Vision-aided
 Inertial Navigation

Doctoral Preliminary Committee: Committee Chair

Jiawei Mo, Computer Science Ph D 2018 - Present
 Md Jahidul Islam, Computer Science Ph D 2018 - Present

Doctoral Preliminary Committee: Committee Member

Karin De Langis, Computer Science Ph D 2020 - Present
 Dario Canelon-Suarez, Mechanical Engr Ph D 2020 - Present
 Nikolaos Stefas, Computer Science Ph D 2017 - 2020
 Thesis: Environmental Monitoring with Unmanned Aerial
 Vehicles
 Wenbo Dong, Computer Science Ph D 2017 - 2020
 Thesis: 3D Computer Vision Algorithms for Semantic
 Reconstruction of Agricultural Environments
 Michael Fulton, Computer Science Ph D 2019 - Present
 Trevor Stephens, Mechanical Engr Ph D 2016 - 2019
 Thesis: Augmenting Surgical Robot Interactions with Intelligent

Autonomy
 Jungseok Hong, Computer Science Ph D 2019 - Present
 Robert Martin, Computer Science Ph D 2018 - Present

Master's Thesis/Research Committee: Committee Chair

Pallavi Mitra, Computer Science M S 2020
 Jack Perisich, Computer Science M S 2020
 Santhosh Alladi, Computer Science M S 2020
 Thesis: Augmenting Electrocardiogram Datasets using
 Generative Adversarial Networks
 Yi-Chun Lu, Data Science M S 2019
 Cameron Fabbri, Computer Science M S 2018
 Thesis: Enhancing Visual Perception in Noisy Environments
 using Generative Adversarial Networks
 Liyao Lu, Data Science M S 2018

Master's Thesis/Research Committee: Committee Member

Dario Canelon-Suarez, Mechanical Engr M S M E 2020
 Jungseok Hong, Computer Science M S 2019 - 2020
 Janna Madden, Computer Science M S 2019
 Thesis: Algorithmically Recognizing Gait Variance from a
 Sensor-Based System

Master's Thesis/Research Committee: Committee Reviewer

Trevor Stephens, Mechanical Engr M S M E 2016

Other Students Activities

High school

Honors Mentoring Connection, Wayzata Schools. October 16, 2018 - June 6, 2019
 Harshil Ganesha Murthy

High school sophomore

Minnetonka Research Program mentoring, Minnetonka Schools. September 30, 2017 - May 30, 2018
 Jai Chadha
 Mentoring research by Jai Chadha in creating an underwater diver
 assistance device as part of the research course offered under the
 Minnetonka Research program for high school students.

MENTORING/CAREER ADVISING

Harshil Ganesha Murthy, Wayzata High School October 16, 2018 - June 6, 2019

jai Chadha, Minnetonka High School January 1, 2018 - May 31, 2018

SERVICE

Service to the Discipline/Profession/Interdisciplinary Area(s)

Associate Editor

International Conference on Robotics and Automation September 2018 - May 2019
 International Conference on Intelligent Robots and Systems, February 15, 2017 - October 1, 2017
 Vancouver, B.C., Canada, approximately 50 hours spent per
 year

Assisted in the conference reviewing process by assigning papers to reviewers, collecting and summarizing reviews,

and recommending publications decisions to conference editors.
International Conference on Robotics and Automation (ICRA 2017), Singapore, N/A, Singapore, approximately 50 hours spent per year
September 16, 2016 - January 15, 2017
Assisted in the conference reviewing process by assigning papers to reviewers, collecting and summarizing reviews, and recommending publications decisions to conference editors.

Member

International Conference on Computer and Robot Vision, Edmonton, Alberta, Canada, approximately 10 hours spent per year
2016 - 2017

Registration Chair

International Conference on Robotics and Automation, Montreal, Quebec, Canada, approximately 20 hours spent per year
January 1, 2019 - June 1, 2019
Served as Registration Chair for ICRA 2019.

Reviewer

Autonomous Robots, Switzerland, approximately 5 hours spent per year
December 2019 - January 2020
IEEE International Conference on Robotics and Automation, Paris, France, approximately 20 hours spent per year
October 2019 - November 2019

Session Chair

IEEE/RSJ International Conference on Intelligent Robots and Systems, Macau, Macau SAR, China, approximately 1.5 hours spent per year
November 4, 2019 - November 8, 2019
IEEE International Conference on Robotics and Automation 2017, Singapore, Singapore, approximately 3 hours spent per year
2017
International Conference on Intelligent Robots and Systems, Vancouver, British Columbia, Canada, approximately 3 hours spent per year
2017

Service to the University/College/Department

University of Minnesota

College

Member, MnDrive Workshop and Seminars Committee
September 6, 2016 - Present
Member, MnDRIVE Vision Committee
October 2018 - August 2019
Member, MnDrive Industry and Outreach Committee
January 12, 2016 - September 6, 2016

Department

Member, Graduate Admissions Committee
September 2019 - Present
Member, Graduate Affairs Committee
September 2020 - August 2021
Member, Curriculum Committee
September 2019 - August 2020
Member, Faculty Hiring Committee
September 2018 - August 2019
Member, Strategic Planning Committee
September 2018 - August 2019
Member, Graduate Admissions Committee
January 1, 2016 - August 2018