

Sameera S. Ponda

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RESEARCH INTERESTS **Decision Making** - networked multi-agent systems, robust distributed real-time algorithms
Trajectory Design & Control - information-rich planning, vehicle dynamics, feedback/adaptive control
Estimation & Learning - sensor fusion, filtering, machine learning, nonparametric Bayesian inference

EDUCATION **Massachusetts Institute of Technology,** Cambridge, MA
◇ Ph.D. in Aeronautics and Astronautics, Sept. 2012 (*GPA 4.9/5.0*)
◇ S.M. in Aeronautics and Astronautics, Sept. 2008 (*GPA 5.0/5.0*)
◇ S.B. in Aerospace Eng. with Information Technology, Minor in Economics, June 2004 (*GPA 4.3/5.0*)

ACADEMIC EXPERIENCE **Massachusetts Institute of Technology,** Cambridge, MA
Research Assistant - Aerospace Controls Lab **Sept. 2008 - Sept. 2012**
Developed multi-agent distributed planning algorithms for heterogeneous networked teams operating in real-time dynamic environments. Technical contributions and research highlights include:
◇ Robust distributed algorithms for stochastic planning under uncertainty
◇ Cooperative planning algorithms to enable mission execution in communication-limited environments
◇ Real-time algorithm validation through multi-UAV experimental flight tests
◇ Collaborations with Cornell University to integrate multi-agent planning and estimation algorithms. Real-time framework validation through human-robot search and track experiments.
Dissertation: “Robust Distributed Planning Strategies for Autonomous Multi-Agent Teams”
Advisor: Prof. Jonathan P. How

Massachusetts Institute of Technology, Cambridge, MA
Research Assistant - Draper Laboratory **Sept. 2006 - Aug. 2008**
Developed information-rich trajectory optimization algorithms for unmanned aerial vehicles performing target localization using vision-based sensors.
Dissertation: “Trajectory Optimization for Target Localization Using Small UAVs”
Advisors: Prof. Emilio Frazzoli, Dr. Richard Kolacinski

Massachusetts Institute of Technology, Cambridge, MA
Undergraduate Research Projects
◇ **Micro-Satellite Localization** **Sept. 2002 - May 2003**
Designed Monte Carlo Localization algorithms to perform position tracking and localization failure recovery for micro-satellites operating within the International Space Station.
◇ **Boeing Blended Wing Body Modeling** **Sept. 2002 - Dec. 2002**
Constructed a physical prototype of the BWB for use in wind tunnel testing and compared against state-of-the-art computational fluid dynamics models.
◇ **Complex Systems Classification** **Jan. 2002 - June 2002**
Collected and analyzed data to develop quantitative metrics used in complex systems classification.

PROFESSIONAL EXPERIENCE **The Charles Stark Draper Laboratory,** Cambridge, MA
Modeling & Simulation Engineer **June 2003 - Aug. 2006**
◇ Supported design, analysis, system prototyping, human-in-the-loop evaluation, and hardware-in-the-loop integration and test through simulation and analysis of complex systems
◇ Collaborated with navigation and control teams providing simulation support and systems validation
◇ Projects included various aerospace systems and personal navigation equipment

Avidyne Corporation, Lincoln, MA
Undergraduate Intern - Validation and Testing **June 2002 - Aug. 2002**
Supported human factors testing and validation of Avidyne’s Flightmax Entegra, a self-contained digital avionics system.

TEACHING EXPERIENCE **Massachusetts Institute of Technology,** Cambridge, MA
Course Instructor **Jan. 2012**
Hands-On Aerospace - Workshop focusing on creating practical hands-on demos in Aero/Astro that can be used as instructional materials for outreach activities.

Massachusetts Institute of Technology,
Teaching Assistant

Cambridge, MA
Sept. 2006 - May 2010

- ◇ 16.31 - **Feedback Control Systems** (Fall 2007, Fall 2008, Fall 2009)
- ◇ 16.322 - **Stochastic Estimation and Control** (Fall 2006, Spring 2008, Spring 2010)
- ◇ 16.323 - **Principles of Optimal Control** (Spring 2007, Spring 2008, Spring 2009)

HONORS AND
AWARDS

AIAA Best Paper Award, **Aug. 2011**
AIAA Guidance Navigation & Control Conference - "Decentralized Information-Rich Planning and Hybrid Sensor Fusion for Uncertainty Reduction in Human-Robot Missions" (AIAA Paper 2011-6238)

Invited Presenter at the Women in Aerospace Symposium, **Jan. 2011**
Dept. of Aeronautics and Astronautics, MIT - "Decentralized Mission Planning for Heterogeneous Human-Robot Teams"

Vickie Kerrebrock Award, **May 2012**
Dept. of Aeronautics and Astronautics, MIT - Awarded to the Women's Graduate Association of Aeronautics and Astronautics

Ph.D. Research Competition Finalist, **May 2012**
Dept. of Aeronautics and Astronautics, MIT - "Robust Distributed Task Allocation for Autonomous Multi-Agent Teams"

Northern Telecom / BNR Project Award, **May 2004**
Dept. of Electrical Eng. and Computer Science, MIT - for best Undergraduate Digital Systems Project

James E. Cunningham Memorial Scholarship, **Feb. 2003**
Dept. of Aeronautics and Astronautics, MIT

ACTIVITIES

Women's Graduate Association of Aeronautics and Astronautics - Co-Founder, Treasurer
◇ Objectives include building community/networking, fostering relationships, professional development
◇ Mentorship of undergraduate women in Aeronautics and Astronautics
◇ Outreach initiatives to support STEM education

American Institute of Aeronautics and Astronautics (AIAA) - Active member since 2000

SELECT
PUBLICATIONS

Book Chapters

S. Ponda, L. Johnson, A. Geramifard, J. P. How, "Cooperative Mission Planning for Multi-UAV Teams", Handbook of Unmanned Aerial Vehicles, Springer, 2012 (to appear)

Journal Articles

S. Ponda, L. Johnson, A. Kopeikin, H.-L. Choi, J. P. How, "Distributed Planning Strategies to Ensure Network Connectivity for Dynamic Heterogeneous Teams," IEEE Journal on Selected Areas in Communications, Vol. 30, No. 5, pp. 861-869, June 2012

Conference Publications

S. Ponda, L. Johnson, J. P. How, "Distributed Chance-Constrained Task Allocation for Autonomous Multi-Agent Teams", American Control Conf., Montreal, CA, June 2012

S. Ponda, N. Ahmed, B. Luders, E. Sample, T. Hoossainy, D. Shah, M. Campbell, J. P. How, "Decentralized Information-Rich Planning and Hybrid Sensor Fusion for Uncertainty Reduction in Human-Robot Missions", AIAA Guidance, Navigation, and Control Conf., Portland, OR, Aug. 2011, **AIAA Best Paper**

S. Ponda, L. Johnson, H.-L. Choi, J. P. How, "Ensuring Network Connectivity for Decentralized Planning in Dynamic Environments", AIAA Infotech@Aerospace Conf., St. Louis, MO, March 2011

S. Ponda, J. Redding, H.-L. Choi, J. P. How, M. Vavrina, J. Vian, "Decentralized Planning for Complex Missions with Dynamic Communication Constraints", American Control Conf., Baltimore, MD, July 2010

S. Ponda, R. Kolacinski, E. Frazzoli, "Trajectory Optimization for Target Localization Using Small Unmanned Aerial Vehicles", AIAA Guidance, Navigation, and Control Conf., Chicago, IL, Aug. 2009

For a full list of publications please see: <http://alum.mit.edu/www/sponda>
Publications and references available upon request. U.S. Citizen.