

## STEPHANIE M. PETILLO

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### SPECIALIZATIONS

Oceanographic engineering, marine robotics, autonomy algorithms, at-sea deployments, physical oceanography, aerospace engineering, Italian language & culture.

### EDUCATION

**MIT/WHOI Joint Program**, Massachusetts Institute of Technology, Cambridge, MA,  
& Woods Hole Oceanographic Institution, Woods Hole, MA

Ph.D., Oceanographic Engineering

Minor, Physical Oceanography

NDSEG Fellow

Thesis defended October 21st, 2014

Degree awarded February 2015

Dissertation Title: *Autonomous & Adaptive Oceanographic Feature Tracking On Board Autonomous Underwater Vehicles*

**University of Maryland**, College Park, MD

B.S., Aerospace Engineering, *magna cum laude*

Minor, Italian Language & Culture

College Park Scholars Citation

2008

**Sea Education Association**, Woods Hole, MA (credit through Boston University, Boston, MA)

SEA Summer Semester Certificate of Completion, S-212, 2007

Jake Peirson Summer Cruise, C-218A, 2008

### PROFESSIONAL & RESEARCH EXPERIENCE

**Oceanographic Engineer**, GobySoft, LLC, North Falmouth, MA, 2015-present

**NDSEG Fellow/Research Assistant**, Laboratory for Autonomous Marine Sensing Systems, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, 2008-2014

**Researcher**, Collective Dynamics and Control Laboratory, University of Maryland, College Park, MD, 2007-2008

**Primary Launch Team Leader/Researcher/Lab Worker**, Near Space Balloon Payload Project, Space Systems Laboratory, University of Maryland, College Park, MD, 2004-2008

**Student/Researcher**, SEA Summer Semester S-212, Sea Education Association, Woods Hole, MA, Summer 2007

**Guest Student/Intern/Lab Assistant**, Autonomous Systems Lab, Physical Oceanography Department, Woods Hole Oceanographic Institution, Woods Hole, MA, Summer 2006

### SPECIAL SKILLS

#### Ship Experience

**Ships:** *R/V Resolution* (2008-2014, intermittent), *NRV Alliance* (2008-2010, 3 weeks yearly), *R/V Endeavor* (2009, 2 weeks), *SSV Corwith Cramer* (2008, 1.5 weeks), *SSV Robert C. Seamans* (2007, 1 month), & smaller motor/fishing & sailing boats (occasionally)

**Research cruises:** BAYEX'14, MBAT'13, MBAT'12, MBAT'11, SWAMSI'11, GLINT'10, Champlain'09, DURIP'09, GLINT'09, SWAMSI'09, GLINT'08, C-218A, S-212, pre-AOSN/MB2006

**Oceanographic Equipment Experience**

**AUVs, gliders, & floats:** Bluefin-21 AUV, Bluefin-9 AUV, Iver 2 AUV, OEX AUV, Remus 100 AUV, Slocum Electric glider, ANT glider, Spray glider, Argo float

**Other:** Small buoy with GPS, acoustic array, & Freewave radio; WHOI acoustic modem (towfish); small acoustic source; towed & rigid hydrophone arrays; Freewave RF system; GPS; compass; radar; CTD; ADCP; XBT; Niskin bottle; towed net

**Research**

My Ph.D. research focuses on employing autonomous underwater vehicles (AUVs) to improve efficiency & synopticity in oceanographic sampling methods. To this end, I have implemented AUV autonomy algorithms for environmentally-adaptive ocean sampling within the MOOS-IvP autonomy system used on MIT's AUVs. Underwater acoustic communication using Goby Acomms gives near-real-time AUV mission configuration and data monitoring. With this setup, my autonomous & adaptive thermocline tracking and internal wave detection missions have been successfully completed in the field. I have also developed front and plume tracking algorithms for AUVs, which have been tested and evaluated in virtual experiments using MSEAS dynamic ocean model environments.

**Computer Experience**

**Programming Languages:** Matlab, C++, Octave, able to learn others as necessary

**Operating Systems:** Linux (mostly Ubuntu), MacOSX, Windows

**Word Processing & Graphics:** LaTeX, Adobe Illustrator, InDesign & Photoshop, Microsoft Office

**Languages**

English (native), Italian (strong/proficient), French (minimal)

**Other**

Experience with setup and deployment of a range of oceanographic equipment and systems (see *Oceanographic Equipment Experience* section)

Experience with computers, computer networks, circuitry, a wide range of electrical measurement equipment, and basic hand & power tools in laboratory & research cruise settings

Informal training in basic electrical wiring, soldering, woodworking, and plumbing techniques

Experience repairing and maintaining motor vehicles and household appliances

Experience with racecar preparation and maintenance: Formula Vee

Ability & willingness to learn to use hardware & software tools where current experience is lacking

**PROFESSIONAL AFFILIATIONS & HONOR SOCIETIES**

IEEE Oceanic Engineering Society

Tau Beta Pi (Maryland Beta) - The Engineering Honor Society

Sigma Gamma Tau - The National Honor Society in Aerospace Engineering

**PUBLICATIONS**

S. Petillo. "Autonomous & Adaptive Oceanographic Feature Tracking On Board Autonomous Underwater Vehicles." *Ph.D. Thesis*, Massachusetts Institute of Technology, Cambridge, MA, & Woods Hole Oceanographic Institution, Woods Hole, MA, 2015. In press.

H. Schmidt, M. R. Benjamin, S. Petillo, T. Schneider, and R. Lum. *Springer Handbook of Ocean Engineering*, ch. 10: "Nested Autonomy for Distributed Ocean Sensing." T. Curtin, M. Dhanak and N. Xiros (eds.). Springer, Berlin, Heidelberg, 2015. In press.

S. Petillo and H. Schmidt. "Exploiting Adaptive and Collaborative AUV Autonomy for Detection and Characterization of Internal Waves." *IEEE Journal of Oceanic Engineering*, vol. 39, no. 1, pp. 150-164, January 2014.

S. Petillo and H. Schmidt. “Autonomous and Adaptive Plume Detection and Tracking with AUVs: Concepts, Methods, and Available Technology.” Gabriele Bruzzone and Massimo Caccia (eds.). *Proceedings of the 9th IFAC Conference on Manoeuvring and Control of Marine Craft*, vol. 9, part 1, pp. 232-237, Arenzano, Italy, 19-21 September, 2012.

S. Petillo, H. Schmidt, and A. Balasuriya. “Constructing a Distributed AUV Network for Underwater Plume-Tracking Operations.” *International Journal of Distributed Sensor Networks*, vol. 2012, Article ID 191235, 12 pages, 2012.

S. Petillo, A. Balasuriya, H. Schmidt. “Autonomous Adaptive Environmental Assessment and Feature Tracking via Autonomous Underwater Vehicles.” *Proceedings of IEEE OCEANS’10 Conference*, Sydney, Australia, 24-27 May, 2010.

A. Balasuriya, S. Petillo, H. Schmidt, M. Benjamin. “Behavior-Based Planning and Prosecution Architecture for Autonomous Underwater Vehicles in Ocean Observatories.” *Proceedings of IEEE OCEANS’10 Conference*, Sydney, Australia, 24-27 May, 2010.

D. R. Thompson, S. Chien, Y. Chao, P. Li, B. Cahill, J. Levin, O. Schofield, A. Balasuriya, S. Petillo, M. Arrott, M. Meisinger. “Spatiotemporal Path Planning in Strong, Dynamic, Uncertain Currents.” *ICRA 2010*, 3-8 May 2010.

D. R. Thompson, S. Chien, M. Arrott, A. Balasuriya, Y. Chao, P. Li, M. Meisinger, S. Petillo, O. Schofield. “Mission Planning in a Dynamic Ocean Sensorweb.” *ICAPS SPARK 2009*, 19-23 September, 2009.

D. R. Thompson, S. Chien, M. Arrott, A. Balasuriya, Y. Chao, P. Li, M. Meisinger, S. Petillo, O. Schofield. “A Mission Planning System for Underwater Gliders.” *ICAPS Applications Showcase 2009*, 19-23 September, 2009.

S. Petillo. “Variations in Pycnoclines and Thermoclines Due to Small- and Large-Scale Currents in the Northeast Pacific Ocean.” *In Student Research Reports: S-212*, Sea Education Association, Woods Hole, MA, 2007.

## PRESENTATIONS

“Autonomous and Adaptive Front Tracking using AUVs in an MSEAS Dynamic Ocean Model.” *MOOS-DAWG’13*, MIT, Cambridge, MA, 30-31 July, 2013.

“Autonomous and Adaptive Plume Detection and Tracking with AUVs: Concepts, Methods, and Available Technology.” *9th IFAC Conference on Manoeuvring and Control of Marine Craft*, Arenzano, Italy, 19-21 September, 2012.

“iMSEAS: A MOOS Interface to MSEAS Dynamic Ocean Models.” *MOOS-DAWG’11*, MIT, Cambridge, MA, 19-20 July, 2011.

“PlumeSim: A Simulated Approach to Autonomous Adaptive Tracking with Multiple AUVs.” *MOOS-DAWG’11*, MIT, Cambridge, MA, 19-20 July, 2011.

“Autonomous Adaptive Environmental Feature Tracking via Autonomous Underwater Vehicles: Tracking the Thermocline.” *MOOS-DAWG’10*, MIT, Cambridge, MA, 24-25 August, 2010.

“Autonomous Adaptive Environmental Assessment and Feature Tracking via Autonomous Underwater Vehicles.” *IEEE OCEANS’10 Conference*, Sydney, Australia, 24-27 May, 2010.

“Behavior-Based Planning and Prosecution Architecture for Autonomous Underwater Vehicles in Ocean Observatories.” *IEEE OCEANS’10 Conference*, Sydney, Australia, 24-27 May, 2010. (Presented by A. Balasuriya.)

“Adaptive Oceanographic Sampling with Mobile Assets.” *OOI-CI Kick-Off Meeting*, Tabernash, CO, 9-11 September, 2009.

## CITIZENSHIP

U.S. Citizen