

Toby Schneider

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Born: February 8, 1985—New Haven, CT, USA

Nationality: American

Current position

Oceanographic Engineer, GobySoft, LLC, North Falmouth, MA.

Areas of specialization

marine robotics, ocean acoustics, physics.

Education

- 2013 PhD in Oceanographic Engineering. Massachusetts Institute of Technology, Cambridge, MA and Woods Hole Oceanographic Institution, Woods Hole, MA. Thesis entitled *Advances in Integrating Autonomy with Acoustic Communications for Intelligent Networks of Marine Robots*.
- 2007 BA in Physics with Honors, Magna Cum Laude. Williams College, Williamstown, MA

Recent research experience

- 2013- *GobySoft, LLC*. Nested autonomy middleware for marine robots. Networking techniques for bandwidth-constrained marine physical links.
- 2007-2014 *Laboratory for Autonomous Marine Sensing Systems, Massachusetts Institute of Technology*. Networking techniques and autonomy for undersea robotic communications. (H. Schmidt).
- 2013-2015 *Robotics, Vision, and Sensor Networks, Computer Science and Artificial Intelligence Laboratory (CSAIL), Massachusetts Institute of Technology*. Networking over difficult links for land robots in hazardous environments. (S. Teller).

- 2009 NATO Undersea Research Centre, Visiting Research Programme. Ship protection in a busy harbor using multiple unmanned surface vehicles. (T. Pastore).

Publications & talks

Selected recent conference papers & talks

- 2018 Schneider, T. and Schmidt, H. (2018), "NETSIM: A Realtime Virtual Ocean Hardware-in-the-loop Acoustic Modem Network Simulator." Presented at the UComms 2018 Conference, Lerici, Italy.
- 2016 Schneider, T. (2016), "Goby3: A new open-source middleware for nested communication on autonomous marine vehicles." Presented at the IEEE AUV Conference, Tokyo, Japan.
- 2015 Schneider, T., Petillo, S., Schmidt, H., and Murphy, C. (2015), "The Dynamic Compact Control Language Version 3." Presented at the IEEE OCEANS Conference, Genova, Italy.
- 2012 Schneider, T. and Schmidt, H. (2012), "Goby-Acomms version 2: extensible marshalling, queuing, and link layer interfacing for acoustic telemetry." Presented at the 9th IFAC Conference on Manoeuvring and Control of Marine Craft, Arenzano, Italy.
- 2012 Schneider, T. and Schmidt, H. (2012), "Approaches to improving acoustic communications on autonomous mobile marine platforms." Presented at the UComms 2012 Conference: Underwater Communications: Channel Modelling and Validation, Sestri Levante, Italy.
- 2011 Schneider, T. and Schmidt, H. (2011), "Pragmatic model-based adaptation for optimal acoustic communication and sensing on autonomous marine vehicles." Presented at the Acoustical Society of America Meeting, San Diego, CA.

Journal articles

- 2013 Schneider, T. and Schmidt, H. (2013), "A State Observation Technique for Highly Compressed Source Coding of Autonomous Underwater Vehicle Position." *IEEE Journal of Oceanic Engineering*.
- 2013 Schneider, T. and Schmidt, H. (2013), "Model-based Adaptive Behavior Framework for Optimal Acoustic Communication and Sensing by Marine Robots." *IEEE Journal of Oceanic Engineering*.
- 2010 Schneider, T. and Schmidt, H. (2010), "Unified Command and Control for Heterogeneous Marine Sensing Networks." *Journal of Field Robotics*.

Selected honors & awards

- 2013 Defense Advanced Research Projects Agency (DARPA) Director's Coin, Awarded at the DARPA Robotics Challenge 2013 Trials for critical networking assistance and personal integrity.
- 2007 Presidential Fellowship, MIT
- 2007- Phi Beta Kappa Member, Williams College
- 2007- Sigma Xi Student Member, Williams College

At-sea cruise experience as major technical contributor or lead:

- 2017-2018 SS-DTE: MCM AUV Neutralizer Test-bed.
- 2016 ICEX16: Passive acoustics with an AUV under the Arctic ice.
- 2013-2017 DASH-ST6, ST8A-C, ST10, ST12: Deep sea tracking using AUVs.
- 2011-2013 MBAT11, MBAT12, MBAT13: Collaborative active tracking.
- 2012 TIGER12: Three-hop heterogenous network.
- 2012 CYBORG12: Human-vehicle collaboration.
- 2011 CAPTURE11: Multi-hop imagery sending.
- 2009 CHAMPLAIN09: Telemetry of scalar CTD data based on thermocline detection.
- 2009-2011 SWAMSI09, SWAMSI11: Collaborative seafloor target detection.
- 2008-2010 GLINT08, GLINT09, GLINT10: Collaborative passive tracking.

Technical skills

Fluent in computer languages: C++ (C++03, C++11, C++14), C, SQL, MATLAB.

Familiarity with computer languages: Python, Go, LabVIEW, Mathematica, Assembly.

GNU/Linux expertise: Advanced configuration and usage, native software (e.g. C/C++) build configuration (make, CMake), Debian package development and deployment, embedded ARM (e.g. Gumstix, Beagleboard) systems, VCS proficiency (git, subversion, bazaar).

Open source project management: Goby Underwater Autonomy Project (<https://github.com/GobySoft/goby>), DCCL (<https://github.com/GobySoft/dccl>)