

# Toby Schneider

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

Nationality: American

## Current position

*Oceanographic Engineer*, GobySoft, LLC, Mashpee, MA, USA.

## Areas of specialization

marine robotics, ocean acoustics, physics.

## Education

- 2013 PhD in Oceanographic Engineering. Massachusetts Institute of Technology, Cambridge, MA, USA, and Woods Hole Oceanographic Institution, Woods Hole, MA, USA. 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, USA

## 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

- 2020 Schneider, T., Schmidt, H., and Randeni, S. (2020), "Self-Adapting Under-Ice Integrated Communications and Navigation Network." Accepted for pre-print and presentation at UComms 2020 Conference (postponed to 2021), Lerici, Italy.
- 2020 Randeni, S., Schneider, T., and Schmidt, H. (2020), "Construction of a High-Resolution Under-Ice AUV Navigation Framework using a Multidisciplinary Virtual Environment." Presented at the IEEE AUV Conference, St. Johns, NL, Canada.
- 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), "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.

### 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:

2020 ICEX20: Integrated Communications and Navigation Network with an under-ice AUV.  
2017-2019 SS-DTE: MCM AUV Neutralizer Test-bed.  
2016 ICEX16: Passive acoustics with an AUV under the Arctic ice in the Beaufort Sea.  
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

*Computer languages:* (Fluent): C++ (C++03, C++11, C++14), C, SQL, MATLAB. (Proficient): Python, Go, LabVIEW, Mathematica, Assembly.

*Robotic Middleware experience:* Goby3, MOOS-IvP, ROS, LCM.

*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, Raspberry Pi, Jetson) systems, VCS proficiency (git, subversion, bazaar), CI/CD (e.g. CircleCI).

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

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[http://gobysoft.org/dl/TES\\_CV.pdf](http://gobysoft.org/dl/TES_CV.pdf)— Last updated: October 26, 2020