

David Barclay

Dalhousie University, Department of Oceanography

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Education

- 2011 Scripps Institution of Oceanography, University of California, San Diego. Ph.D. in Oceanography
- 2005 McGill University, Canada. B.Sc. Honors in Physics, minor in Music Technology.

Research Experience

- 2015 **Assistant Professor**, Canada Research Chair (Tier II), Ocean Technology Systems, Department of Oceanography, Dalhousie University.
- 2014 **Post-Doctoral Fellow**, ONR Special Research Award in Ocean Acoustics, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution. Research topic: 3D ambient noise modeling
Supervisor: *Dr. Ying-Tsong Lin*
- 2013 **Post-Doctoral Scholar**, Deep Ocean Exploration Institute, Woods Hole Oceanographic Institution.
Research topics: Noise modeling using a 3D parabolic equation, spatial properties of sediment generated ambient noise, deep ocean ambient noise.
- 2012 **Post-Doctoral Fellow**, Physical Oceanography, Memorial University of Newfoundland
Supervisors: *Dr. Len Zedel, Dr. Alex Hay*
Research topic: Sediment transport in coastal environments
- 2005 - 2011 **Graduate Researcher**, Acoustical Oceanography, Marine Physical Lab, Scripps Institution of Oceanography, University of California, San Diego.
Supervisor: *Dr. Michael Buckingham*.
Thesis: Ambient Noise in the Deep Ocean
- 2004 **Undergraduate Researcher**, NSERC, Structured Surface Physics Lab, University of British Columbia, supervisor *Dr. Lorne Whitehead*.
- 2003 **Undergraduate Researcher**, NSERC, Dept. of Earth and Ocean Sciences, University of Victoria, supervisors *Dr. Chris Garrett* and *Dr. Svein Vagle*.
- 2002 **Undergraduate Researcher**, NSERC, Atmospheric physics, University of Toronto, supervisor *Dr. Kim Strong*.

Awards

- 2015 Canada Research Chair (Tier II), Ocean Technology Systems
- 2014 Postdoctoral Fellowship, Special Research Award in Ocean Acoustics, Office of Naval Research

2012	Deep Ocean Exploration Institution Post-Doctoral Scholar award, Woods Hole Oceanographic Institution.
2010	Graduate Traineeship, Special Research Award in Ocean Acoustics, Office of Naval Research.
2010	Acoustical Oceanography student presentation, second prize, Acoustical Society of America, Cancun meeting.
2009	University of California Ship Grant
2009	Student Presentation honorable mention, Underwater Acoustic Measurements, Technology and Results, Nafplion, Greece.
2008	Acoustical Oceanography student presentation, second prize, Acoustical Society of America, Paris meeting.
2007	Acoustical Oceanography, Best Student Paper, Acoustical Society of America, New Orleans meeting.
2005	Doherty Entrance Fellowship, Scripps Institution of Oceanography, University of California, San Diego.
2004	Outstanding Teaching Assistant, Faculty of Engineering, McGill University.
2002 - 2004	Natural Sciences and Engineering Research Council of Canada Undergraduate Student Research Award.
2000 - 2004	Hugh Brock Scholarship, McGill University

Student Supervision

Graduates

2016 -	Meghan Troup, MSc candidate
2016 -	Maxime Miron-Morin, MSc candidate
2015 -	Bruce Martin, PhD candidate
2015 -	Dugald Thomson, PhD candidate
2015 -	Carolyn Binder, PhD candidate, co-supervised with Dr. Paul Hines
2015 -	Anne Lombardi, MSc candidate, co-supervised with Dr. Alex Hay

Undergraduates

2016	Matthew Auvinen, Oceanography honours thesis
2016	Liang Bao, engineering co-op student, undergraduate research assistant
2016	Shannon Steele, undergraduate research assistant
2015 - 2016	Brian Little and Eric Hamilton, Electrical Engineering honors thesis
2015 - 2016	Nick Hansen, Andrew Noujaim and Duc Cuong Dinh, Cody Page, Electrical Engineering honors thesis
2015 - 2016	Danielle Moore, biology Co-op student, undergraduate research assistant

Teaching Experience

2016	OCEA 4311/5311, Fluid Dynamics, Oceanography, Dalhousie University
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2016 OCEA 4250/5250, Acoustical Oceanography, Oceanography, Dalhousie University

Field Experience

- 2016 **Minas Passage, Bay of Fundy**, Chief Scientist, R/V Nova Endeavour, Testing an array for low frequency noise measurement in high flow environments.
- 2016 **Canyon Acoustics Experiment**, Scientist, R/V Neil Armstrong, Recorded ambient noise and transmission loss in a shelf break canyon.
- 2014 **Schmidt Ocean Institute ‘Exploring the Mariana Trench’**, Scientist, R/V Falkor, Measured ambient noise in the Challenger Deep.
- 2013 **Advocate beach**, Bay of Fundy, scientist. Measured spatial properties of the noise field in the sediment due to near shore processes using passive acoustic arrays.
- 2012 **Tongan Trench expedition**, scientist, R/V Revelle. Deployed ‘Deep Sound’ instruments to profile noise field and land on the trench floor.
- 2012 **Advocate beach**, Bay of Fundy, scientist. Measured sediment transport and other near shore processes using active and passive acoustics alongside direct and optical methods.
- 2011 **Mississippi Delta cruise**, chief scientist. Measured ambient noise over 750 miles of the lower Mississippi river from a small sailboat.
- 2011 **Mariana Trench National Geographic cruise**, scientist, M/V Super Emerald. Assisted in deploying deep ocean landers to the bottom of the Sirena Deep.
- 2009 **Deep Sound cruise**, chief scientist, R/V Revelle. Deployed ‘Deep Sound’ in the Mariana Trench during three week cruise.
- 2009 **Northern Pacific Acoustic Laboratory, Philippine Sea Experiment**, scientist, R/V Kilo Moana. Deployed ‘Deep Sound’ and assisted with operation of the Four Octave Research Array (FORA) during a four week cruise.
- 2005 **Makai Experiment**, Kauai, scientist. Deployed and operated the Fly-By acoustic array during small boat operations.
- 2003 **Ocean Station Papa cruise**, technician, CCGS John P. Tully. Recovered, turned around and re-deployed Air-Sea gas exchange array during a month long cruise.

Peer Reviewed Publications (students underlined)

- Thomson, D.J., Dosso, S.E., Barclay, D.R., (2016), *Modeling AUV localization error in a long baseline acoustic positioning system*, IEEE J. Ocean. Eng., submitted.
- Lombardi, A., A.E. Hay, and D. Barclay (2016). *Soundscape characterization in a dynamic acoustic environment: Grand Passage, Nova Scotia, a planned in-stream tidal energy site*. Proc. of Meetings on Acoustics, Acoustical Society of America, submitted.
- Barclay, D.R., and Buckingham, M.J., (2014), *Spectral and spatial properties of wind-driven ambient noise at the bottom of the Tonga Trench*, J. Acoust. Soc., 136, pp 2497-2511
- Stark, N., Hay, A.E., Cheel, R., Zedel, L., Barclay, D.R., (2014), *Laboratory Measurements of Coarse Sediment Bedload Transport Velocity Using a Prototype Wideband Coherent Doppler Profiler (MFDop)*, J. Atmos. and Ocean. Tech., 31, pp 999-1011.

- Barclay, D.R. and Buckingham, M.J. (2013), *The depth-dependence of rain noise in the Philippine Sea*, J. Acoust. Soc. Am., 133, pp 2567.
- Barclay, D.R. and Buckingham, M.J. (2013), *Depth dependence of wind-driven, broadband ambient noise in the Philippine Sea*, J. Acoust. Soc. Am., 133, 1, pp 62-71.
- Barclay, D.R., Simonet, F. and Buckingham, M. J., (2009), *Deep Sound: A Free-Falling Sensor Platform for Depth-Profiling Ambient Noise in the Deep Ocean*, Marine Tech. Soc. J., 43, 144.
- Barclay, D.R. and Buckingham, M.J. (2009), *On the shapes of natural sand grains*, J. Geophys. Res., 114, B02209.
- Szyłowski, M., Mossman, M., Barclay, D., and Whitehead, L. (2006), *Novel fiber-based integrating sphere for luminous flux measurements*, Rev. Sci. Instr. 77, 063102

Invited Conference Presentations

- Barclay, D.R., Lin, Y.T. (2013), *Ambient noise modeling using sound field reciprocity*, J. Acoust. Soc. Am. Volume 134, 5, p. 4151, San Francisco, USA.
- Barclay, D.R. and Buckingham, M.J., (2011), *Rain noise in the deep ocean*, Underwater Acoustic Measurements, 4th International Conference, Kos, Greece.
- Barclay, D.R. and Buckingham, M.J., (2010), *Ambient noise in the Mariana Trench*, J. Acoust. Soc. Am., 128, 4, pp 2300, Cancun, Mexico.
- Barclay, D.R. and Buckingham, M.J., (2010), *Ambient noise in the Mariana Trench*, European Conference on Underwater Acoustics, Istanbul, Turkey.
- Barclay, D.R., Simonet, F., and Buckingham, M.J., (2010), *Depth-profiling ambient noise in the deep ocean*, J. Acoust. Soc. Am. Volume 127, 3, p. 1783, Baltimore, USA.
- Barclay, D.R. and Buckingham, M.J., (2009), *Noise Profiling with 'Deep Sound'*, Underwater Acoustic Measurements, 3rd International Conference, Nafplion, Greece.
- Barclay, D.R. and Buckingham, M.J., (2008), *Doppler Geo-Spectroscopy in the Makai Experiment*, J. Acoust. Soc. Am., 123, 5, p. 3364, Paris, France.

Other Conference Presentations

- Moore, D., and D.R. Barclay., (2016) *Modelling the performance of fish tag monitoring stations on the Scotian Shelf*, J. Acoust. Soc. Am. 139, 4, p. 2172, Salt Lake City.
- Barclay, D.R., Zedel, L., Hay, A.E., and Lin, Y-T., (2015), *Ambient noise measurements from hydrophones buried in a mixed-gravel beach*, Seabed and Sediment Acoustics, Institute of Acoustics (UK), Bath.
- Barclay, D.R. and Lin, Y-T., (2015) *Ambient noise modeling in shallow water environments*, 49th Canadian Meteorological and Oceanographic Society meeting, Whistler.
- Barclay, D.R. and Lin, Y-T., (2015) *Three-dimensional noise modeling in a submarine canyon*, J. Acoust. Soc. Am., 137, 4, 2421, Pittsburgh.
- Barclay, D.R. and Zedel, L., (2014) *Exploring wave and bedload transport generate noise*, 17th Ocean Sciences meeting, Hawaii.
- Barclay, D.R., Zedel, L., Hay, A., and Hatcher, M. (2013) *Modeling the spatial properties of sediment generated noise*, 1st UAC, pp 235. Corfu, Greece.

- Barclay, D.R., Zedel, L., Hay, A., and Hatcher, M. (2013) *The spatial properties of breaking wave generated and bedload transport generated noise in the sediment layer of a shallow water wave guide*, Proc. Meet. Acoust., pp 005002. Montreal, Canada.
- Barclay, D.R., Zedel, L., Hay, A.E., Stark, N., (2012), *The Simulation of Bedload Transport Measurement by Coherent Doppler Backscatter*, AGU Fall Meeting (poster)
- Barclay, D.R., Zedel, L., Hay, A.E., Stark, N., (2012), *Simulating coherent Doppler backscatter from a moving bottom: measuring bedload transport*, Can. Met. & Ocean. Soc. 46th congress
- Barclay, D.R. and Buckingham, M.J., (2009), *Synthesizing the shape of sand grains*, J. Acoust. Soc. Am., 125, 4, p. 2747.
- Barclay, D.R., Simonet, F., and Buckingham, M.J., (2008), *Vertical profiling of ambient noise with 'Deep Sound'*, J. Acoust. Soc. Am., 124, 4, p. 2599.
- Barclay, D.R. (2008), *Adaptive Characterization of Near and Far field Elements in the Soundscape*, J. Acoust. Soc. Am., 123, 5, p. 3680. (poster)
- Barclay, D.R. and Buckingham, M., (2007) *The effect of grain shape on the porosity of marine sediments*, J. Acoust. Soc. Am., 122, 5, p. 2940.
- Barclay D.R. and Buckingham, M.J., (2006), *Doppler spreading of aircraft harmonics in a shallow-water channel off Kauai*, J. Acoust. Soc. Am., 120, 5, p. 3181.

Awarded Research Funding

2016 – 2021	NSERC Discovery grant, <i>Measuring and modeling ambient noise in three-dimensional ocean environments</i> , P.I.	\$30k/yr
2016	NSERC Engage grant, <i>Development of a low-frequency high-flow acoustic sensing array for turbulent ocean conditions</i> , P.I.	\$25k
2016	Canadian Foundation for Innovation, <i>MERIDIAN: Marine Environmental Research Infrastructure for Data Integration and Application Network</i> , member of core-scientific team.	\$5M
2015	Office of Naval Research (USA), Code 32, Ocean Acoustics, <i>Three dimensional ocean noise modeling</i> , P.I.	\$95k
2015	Canadian Foundation for Innovation, <i>Autonomous deep ocean profilers</i> , P.I.	\$300k

Professional Activities

Associate Editor (Acoustical Oceanography), Journal of the Acoustical Society of America, Express Letters.

Technical Committee Member, special session organizer, session chair, Acoustical Oceanography, Acoustical Society of America.

Reviewer for the Journal of the Acoustical Society of America, Journal of the Acoustical Society of America-Express Letters, Applied Acoustics, Acoustics Australia, Sensors, and the Journal of Geophysical Research, Oceans.

Proposal reviewer for the Schmidt Ocean Institute.

Institutional Activities

Curriculum committee member, Department of Oceanography