

# Adrean Webb

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CONTACT INFORMATION      Kyoto University      *Phone:* (+81) 0774-38-4141  
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Gokasho, Uji, Kyoto, 611-0011, Japan

RESEARCH INTERESTS      Mathematical modeling of geophysical flow and turbulence, nonlinear waves, numerical analysis, asymptotic analysis, and climate change.

EDUCATION      **Ph.D. Applied Mathematics**, University of Colorado Boulder, **Aug 2013**. Advisor: B. Fox-Kemper. Committee: M. Ablowitz, B. Fornberg, N. Flyer, K. Julien, and P. Sullivan. Dissertation Title: Stokes Drift and Meshless Wave Modeling.  
**M.S. Applied Mathematics**, University of New Hampshire, **May 2007**. Advisor: M. Shubov. Thesis Title: Mathematics of Carbon Nanotube Vibrations: An Eigenvalue Problem.  
**B.S. Physics**, University of Oklahoma, **May 1998**. *Attended Kings College (Aberdeen, Scotland) and Ritsumeikan University (Kyoto, Japan) in 1997 and 1995.*

RESEARCH EXPERIENCE      **Project Assistant Professor:** Disaster Prevention Research Institute (DPRI), Maritime Disaster Section, Kyoto University (Kyoto, Japan), **Sep 2017–present**. *A Tougou project to investigate waves and storm surges in a coupled climate system on long time scales.*

**Project Researcher:** Department of Ocean Technology, Policy, and Environment, The University of Tokyo (Kashiwa, Japan) under T. Waseda, **Oct 2014–Aug 2017**. *A NEDO project to estimate the available wave energy resources for Japan and an ArCS project to forecast the Arctic wave field.*

**Postdoctoral Research Scientist:** Department of Ocean Sciences, Tokyo University of Marine Sciences and Technology (Tokyo, Japan) under H. Yamazaki, **Aug 2013–Sep 2014**. *A multi-project appointment to model estuarine dynamics in Iwate, Japan.*

**Research Assistant:** Cooperative Institute for Research in the Environmental Sciences (CIRES), University of Colorado Boulder under B. Fox-Kemper, **Jan 2009–Dec 2012**. *A NASA grant to model Langmuir turbulence on a global scale.*

**Research Assistant:** National Center for Atmospheric Research (Boulder, CO), **Jul 2010**. *Designed a student lab to use the MIT Integrated Global System Model for the IMAGE Theme of the Year, Summer Graduate School on Mathematics of Climate Change.*

**Visiting Scholar:** Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, **Mar–Jun 2010**. *Three-month program on model and data hierarchies for simulating and understanding climate.*

**Research Assistant:** CIRES, University of Colorado Boulder under B. Fox-Kemper, **May–Dec 2008**. *A CIRES Innovative Research Grant to estimate the importance of Langmuir turbulence in global ocean models.*

REFEREED JOURNAL PUBLICATIONS      [R.1] T. Nose, A. Webb, and T. Waseda, 2018. Predictability of storm wave heights in the ice-free Beaufort Sea. *Ocean Dynamics*, (2018):1–20. URL <https://doi.org/10.1007/s10236-018-1194-0>.

[R.2] Y. Kita, T. Waseda, and A. Webb, 2018. Development of waves under explosive cyclones in the Northwestern Pacific. *Ocean Dynamics*, (2018):1–16. URL

<https://doi.org/10.1007/s10236-018-1195-z>.

[R.3] T. **Waseda**, A. **Webb**, K. **Sato**, J. **Inoue**, A. **Kohout**, B. **Penrose**, and S. **Penrose**, 2018. Correlated Increase of High Ocean Waves and Winds in the Ice-Free Waters of the Arctic Ocean. *Scientific Reports*, **8**(4489):1–9. URL <https://doi.org/10.1038/s41598-018-22500-9>.

[R.4] K. **Sasmal**, E. **Masunaga**, A. **Webb**, O. **Fringer**, E. **Gross**, M. **Rayson**, and H. **Yamazaki**, 2018. A three dimensional numerical study of river plume mixing processes in Otsuchi Bay, Japan. *Journal of Oceanography*, **74**(2):169–186. URL <https://doi.org/10.1007/s10872-017-0446-9>.

[R.5] L. **Qing**, B. **Fox-Kemper**, Ø. **Breivik**, and A. **Webb**, 2017. Statistical models of global Langmuir mixing. *Ocean Modelling*, **113**:95–114. URL <http://dx.doi.org/10.1016/j.ocemod.2017.03.016>.

[R.6] T. **Waseda**, A. **Webb**, K. **Kiyomatsu**, W. **Fujimoto**, Y. **Miyazawa**, S. **Varlamov**, K. **Horiuchi**, T. **Fujiwara**, T. **Taniguchi**, K. **Matsuda**, and J. **Yoshikawa**, 2016. Marine energy resource assessment at reconnaissance to feasibility study stages; wave power, ocean and tidal current power, and ocean temperature power (in Japanese). *Journal of the Japan Society of Naval Architects and Ocean Engineers*, **23**:189–198. URL <http://doi.org/10.2534/jjasnaoe.23.189>.

[R.7] A. **Webb** and B. **Fox-Kemper**, 2015. Impacts of wave spreading and multi-directional waves on estimating Stokes drift. *Ocean Modelling*, **96**:49–64. URL <http://dx.doi.org/10.1016/j.ocemod.2014.12.007>.

[R.8] Q. **Li**, A. **Webb**, B. **Fox-Kemper**, A. **Craig**, G. **Danabasoglu**, W.G. **Large**, and M. **Vertenstein**, 2015. Langmuir mixing effects on global climate: WAVEWATCH III in CESM. *Ocean Modelling*, **103**:145–160. URL <http://dx.doi.org/10.1016/j.ocemod.2015.07.020>.

[R.9] S. **Haney**, B. **Fox-Kemper**, K. **Julien**, and A. **Webb**, 2015. Symmetric and Geostrophic Instabilities in the Wave-Forced Ocean Mixed Layer. *Journal of Physical Oceanography*, **45**(12):3033–3056. URL <http://dx.doi.org/10.1175/JPO-D-15-0044.1>.

[R.10] A. **Webb** and B. **Fox-Kemper**, 2011. Wave spectral moments and Stokes drift estimation. *Ocean Modelling*, **40**(3):273–288. URL <http://dx.doi.org/10.1016/j.ocemod.2011.08.007>.

REFEREED  
CONFERENCE  
PUBLICATIONS

[C.1] A. **Webb**, T. **Shimura**, and N. **Mori**, 2018. A High-Resolution Future Wave Climate Projection for the Coastal Northwestern Atlantic. *The 65th Coastal Engineering Lectures*, **74**(2). URL <http://arxiv.org/abs/1807.02958>.

[C.2] T. **Waseda**, T. **Nose**, and A. **Webb**, 2018. Comparison of long-term trends of the largest waves in the ice-free Arctic waters from different reanalysis products. *Proceedings of the ASME 2018 37th International Conference on Ocean, Offshore and Arctic Engineering (OMAE2018)*, in press.

[C.3] T. **Waseda**, A. **Webb**, K. **Sato**, J. **Inoue**, A. **Kohout**, B. **Penrose**, and S. **Penrose**, 2017. Arctic Wave Observation by Drifting Type Wave Buoys in 2016. *The 27th International Ocean and Polar Engineering Conference, International Society of Offshore and Polar Engineers*. URL <https://www.onepetro.org/conference-paper/ISOPE-I-17-569>.

[C.4] A. **Webb**, T. **Waseda**, W. **Fujimoto**, K. **Horiuchi**, K. **Kiyomatsu**, K. **Matsuda**, Y. **Miyazawa**, S. **Varlamov**, and J. **Yoshikawa**, 2016. A High-Resolution, Wave and Current Resource Assessment of Japan: The Web GIS Dataset. *Proceedings of the 3rd Asian Wave and Tidal Energy Conference (AWTEC 2016)*. URL <http://tinyurl.com/AAWEBB002>.

OTHER  
PUBLICATIONS

[O.1] Q. **Li**, B. **Fox-Kemper**, and A. **Webb**, 2017. WAVEWATCH III in CESM

and Langmuir mixing. *POP2 Reference Manual Addendum*, LANL Tech Note LAUR-10-018253, in press. URL <http://tinyurl.com/AAWEBB003>.

[O.2] A. **Webb**, 2013. Stokes Drift and Meshless Wave Modeling. *Ph.D. Thesis*, University of Colorado Boulder, 251 pages. URL <http://tinyurl.com/AAWEBB001>.

SUBMITTED  
PUBLICATIONS

[S.1] W. **Fujimoto**, T. **Waseda**, and A. **Webb**, 2018. Impact of the four-wave quasi-resonance to freak wave shapes in the ocean. *Ocean Dynamics*.

[S.2] M.S. **Long**, W.C. **Keene**, J. **Zhang**, B. **Reichl**, Y. **Shi**, T. **Hara**, J.S. **Reid**, B. **Fox-Kemper**, A.P. **Craig**, D.J. **Erickson**, I. **Ginis**, and A. **Webb**, 2015. Evaluation of Primary Marine Aerosol Production in the Community Atmosphere Model (CAM) Using A Prognostic Wind-Wave Model. *Journal of Geophysical Research: Atmospheres*.

PUBLICATIONS IN  
PROGRESS

[P.1] A. **Webb**, N. **Flyer**, and B. **Fox-Kemper**, 2018. RBF-FD method for a multiple scale system: global ocean surface waves. *Journal of Computational Physics*.

[P.2] A. **Webb**, T. **Waseda**, and K. **Kiyomatsu**, 2018. A High-Resolution, Long-Term Wave Resource Assessment of Japan with Wave-Current Effects. *Applied Energy*.

HONORS AND  
AWARDS

**Outstanding Young Scientist Award: First Place**, 7th International Workshop on Modeling the Ocean (Canberra, Australia), **Jun 2015**.

**Best Presentation Award: Third Place**, 7th International Workshop on Modeling the Ocean (Canberra, Australia), **Jun 2015**.

**Outstanding Student Presentation Award**, 2012 Ocean Sciences Meeting (Salt Lake City, UT), **Feb 2012**.

GRANTS

**ICERM Travel**, ICERM Workshop on Localized Kernel-Based Meshless Methods for Partial Differential Equations (Providence, RI), **Aug 2017**.

**NSF Travel**, IPAM Workshop on Geophysical and Astrophysical Turbulence (Los Angeles, CA), **Oct 2014**.

**CIRES, SIAM, and Departmental Travel**, SIAM Conference on Mathematical and Computational Issues in the Geosciences (Padova, Italy), **Jun 2013**.

**NSF Travel**, IPAM Climate Modeling Reunion Conference (Lake Arrowhead, CA), **Dec 2012**.

**Department Travel**, European Centre for Medium-Range Weather Forecasts Workshop on Ocean Waves (Reading, England), **Jun 2012**.

**NSF Travel**, IUGG Conference on Mathematical Geophysics (Edinburgh, Scotland), **Jun 2012**.

**NSF Travel**, IPAM Climate Modeling Reunion Conference (Lake Arrowhead, CA), **Dec 2011**.

**Department Travel**, 12th International Workshop on Wave Hindcasting and Forecasting (Waikoloa, HI), **Nov 2011**.

**NSF Funding**, Model and Data Hierarchies for Simulating and Understanding Climate, IPAM (Los Angeles, CA), **Mar–Jun 2010**.

**NSF Travel**, 1st PRIMA Congress: Special Session on the Mathematics of Climate Change (Sydney, Australia), **Jul 2009**.

**NSF Travel**, SIAM Conference on Mathematical and Computational Issues in the Geosciences (Leipzig, Germany), **Jun 2009**.

**NSF Funding**, Climate Change Summer School, Mathematical Sciences Research Institute (Berkeley, CA), **Jul–Aug 2008**.

**NSF Travel**, SIAM Minisymposia on Climate Change, Joint Mathematics Meeting (San Diego, CA), **Jan 2008**.

SOFTWARE AND  
TOOLBOXES

**Stokes Drift MATLAB Toolbox**: A complete set of Stokes drift functions for calculating depth-dependent and depth-integrated approximations. URL <http://www.mathworks.com/matlabcentral/fileexchange/48678-stokes-drift-for-directional-random-seas>.

SERVICE  
EXPERIENCE

**Seminar Coordinator**: Long Program, IPAM (Los Angeles, CA), **Mar–May 2010**. *Organized weekly informal seminars for visiting scholars.*

REFEREE WORK

National Science Foundation Grant; Proceedings of the Royal Society A; Geophysical Research Letters; Ocean Modelling; Physics of Fluids; Coastal Engineering Journal; Journal of Waterway, Port, Coastal, and Ocean Engineering; Conference Proceedings (AWTEC2016).

PRESENTATIONS  
(SELECTED)

**Oral**: *A High-Resolution Wave Climate Projection for the Northwestern Atlantic and Coastal Eastern USA*. AOGS 15th Annual Meeting (Honolulu, HI), **Jun 2018**.

**Oral**: *A Regional Wave Climate Projection for the Coastal Northwestern Atlantic*. 2018 COWCLIP Workshop (Paris, France), **May 2018**.

**Oral (Invited)**: *A Meshless Approach to Spectral Wave Modeling*. Civil and Construction Engineering Seminar, Oregon State University (Corvallis, OR), **Feb 2018**.

**Oral**: *A High-Resolution Wave Climate Projection for the Coastal Northwestern Atlantic*. DPRI Annual Meeting 2018, Kyoto University (Kyoto, Japan), **Feb 2018**.

**Oral**: *A Meshless Approach to Spectral Wave Modeling*. Workshop on Mathematical Aspects and Applications of Nonlinear Wave Phenomena, Research Institute of Mathematical Sciences (Kyoto, Japan), **Oct 2017**.

**Poster**: *First steps toward a wave forecasting system for the Northern Sea Route*. International Workshop on Wave Hindcasting and Forecasting/Coastal Hazards Symposium (Liverpool, UK), **Sep 2017**.

**Oral (Invited)**: *A Meshless Numerical Approach to Spectral Wave Modeling*. ICERM Localized Kernel-Based Meshless Methods for Partial Differential Equations Workshop (Providence, RI), **Aug 2017**.

**Oral**: *Arctic wave field model analysis and observation in 2016*. 9th International Workshop on Modeling the Ocean (Seoul, Korea), **Jul 2017**.

**Oral**: *Ocean wave forecasting system for the Northern Sea Route*. Spring 2017 Meeting of JASNAOE (Tokyo, Japan), **May 2017**.

**Oral**: *Arctic wave field reanalysis and observation in 2016*. The 32nd International Symposium on Okhotsk Sea & Polar Oceans (Monbetsu, Japan), **Feb 2017**.

**Oral**: *A High-Resolution, Wave and Current Resource Assessment of Japan: The Web GIS Dataset*. AWTEC 2016 (Singapore), **Oct 2016**.

**Oral**: *A Wave and Current Resource Assessment of Japan: Web GIS Dataset*. Fall 2016 Meeting of the Oceanographic Society of Japan (Kagoshima, Japan), **Sep 2016**.

**Oral (Invited)**: *A Meshless Numerical Approach to Spectral Wave Modeling*. Workshop on Theoretical and Computational Methods of Nonlinear Water Waves, Waseda

University (Tokyo, Japan), **May 2016**.

**Oral:** *A 20-Year High-Resolution Wave Resource Assessment of Japan*. Spring 2016 Meeting of the Oceanographic Society of Japan (Tokyo, Japan), **Mar 2016**.

**Oral:** *A 20-Year High-Resolution Wave Resource Assessment of Japan with Wave-Current Interactions*. 2016 Ocean Sciences Meeting (New Orleans, LA), **Feb 2016**.

**Oral:** *Progress on a 20-Year High-Resolution Wave Resource Assessment of Japan*. International Workshop on Wave Hindcasting and Forecasting/Coastal Hazards Symposium (Key West, FL), **Nov 2015**.

**Oral:** *Impacts of wave spreading and multidirectional waves on estimating Stokes drift*. Joint Wave Seminar: JAMSTEC and The University of Tokyo (Tokyo, Japan), **Nov 2015**.

**Oral:** *Update on a 20-Year High-Resolution Wave Resource Assessment of Japan*. Fall 2015 Meeting of the Oceanographic Society of Japan (Ehime, Japan), **Sep 2015**.

**Oral (Invited):** *The role of wave-current interactions in marine renewable energy near Japan*. Disaster Prevention Research Institute, Kyoto University (Kyoto, Japan), **Jul 2015**.

**Oral:** *The role of wave-current interactions in marine renewable energy near Japan*. 7th International Workshop on Modeling the Ocean (Canberra, Australia), **Jun 2015**.

**Oral:** *Progress on a 20-Year High-Resolution Wave Resource Assessment of Japan*. Spring 2015 Meeting of the Oceanographic Society of Japan (Tokyo, Japan), **Mar 2015**.

**Oral (Invited):** *Meshless and Unstructured Wave Modeling*. Joint Wave Seminar: JAMSTEC and The University of Tokyo (Tokyo, Japan), **Apr 2014**.

**Oral:** *A Meshless Approach to Global Ocean Wave Modeling*. 2014 Ocean Sciences Meeting (Honolulu, HI), **Feb 2014**.

**Oral:** *Development of a Three-Dimensional SUNTANS Model of Ōtsuchi Bay, Japan*. Tokyo University of Marine Science and Technology (Tokyo, Japan), **Feb 2014**.

**Oral (Invited):** *A Meshless Approach to Global Ocean Wave Modeling*. Disaster Prevention Research Institute, Kyoto University (Kyoto, Japan), **Oct 2013**.

**Poster:** *A First Step Towards Modeling the Impact of the 2011 Tōhoku Earthquake and Tsunami on Internal Dynamics in Ōtsuchi Bay, Japan*. 6th CJK IMBER Symposium (Tokyo, Japan), **Oct 2013**.

**Oral:** *A Meshless Approach to Ocean Wave Modeling*. SIAM Conference on Mathematical and Computational Issues in the Geosciences (Padova, Italy), **Jun 2013**.

**Oral (Invited):** *A Meshless Approach to Ocean Wave Modeling*. Lawrence Berkeley National Laboratory (Berkeley, CA), **Apr 2013**.

**Oral:** *Waves and Langmuir Mixing in Climate Models*. CESM Ocean Model Working Group Meeting, NCAR (Boulder, CO), **Jan 2013**.

**Oral:** *An Unstructured Approach to Ocean Wave Modeling*. Frontiers in Computational Physics: Modeling the Earth System (Boulder, CO), **Dec 2012**.

**Oral:** *An Unstructured Approach to Ocean Wave-Generation Modeling*. IPAM Climate Modeling Reunion Conference (Lake Arrowhead, CA), **Dec 2012**.

**Poster:** *An Unstructured Approach to Surface Ocean Wave Modeling*. CIRES' 45th Anniversary Celebration, University of Colorado Boulder, **Sep 2012**.

**Poster:** *An Unstructured Approach to Surface Ocean Wave Modeling*. UGG Conference on Mathematical Geophysics (Edinburgh, Scotland), **Jun 2012**.

**Poster:** *Global Stokes Drift and Climate Wave Modeling*. CIRES Science Rendezvous, University of Colorado Boulder, **Apr 2012**.

**Oral:** *Global Stokes Drift and Climate Wave Modeling*. 2012 Ocean Sciences Meeting (Salt Lake City, UT), **Feb 2012**.

**Oral:** *Global Stokes Drift and Climate Wave Modeling*. CIRES Graduate Student Seminar Series, University of Colorado Boulder, **Feb 2012**.

**Oral:** *Global Stokes Drift and Climate Wave Modeling*. IPAM Climate Modeling Reunion Conference (Lake Arrowhead, CA), **Dec 2011**.

**Oral:** *Global Stokes Drift and Climate Wave Modeling*. Applied Mathematics Dynamical Systems Seminar, University of Colorado Boulder, **Dec 2011**.

**Poster:** *Global Stokes Drift and Climate Wave Modeling*. 12th International Workshop on Wave Hindcasting and Forecasting (Waikoloa, Hawaii), **Nov 2011**.

**Oral:** *Impacts of Wind-Wave Interaction on Climate*. Graduate Student SIAM Chapter, University of Colorado Boulder, **Apr 2011**.

**Oral:** *Preliminary Linear Stability Analysis of Langmuir Circulation with Aligned and Misaligned Wind-Wave Components*. IPAM Climate Modeling Culminating Workshop (Lake Arrowhead, CA), **Jun 2010**.

**Oral:** *Demonstrated Sensitivity to Langmuir Mixing in a Global Climate Model (CCSM)*. IPAM Long Program Seminar (Los Angeles, CA), **May 2010**.

**Oral:** *Demonstrated Sensitivity to Langmuir Mixing in a Global Climate Model (CCSM)*. 2010 Ocean Sciences Meeting (Portland, OR), **Feb 2010**.

**Oral:** *Wave Modeling and Langmuir Mixing*. CCSM Ocean Model Working Group, NCAR (Boulder, CO), **Dec 2009**.

**Poster:** *Windrows in global models: Does Langmuir mixing matter for climate?* ATOC Poster Conference, University of Colorado Boulder, **Nov 2009**.

**Poster:** *Global Model Sensitivity to Parameterizing Langmuir Circulation*. CIRES Science Rendezvous, University of Colorado Boulder, **Apr 2009**.

**Poster:** *Global Model Sensitivity to Parameterizing Langmuir Circulation*. ESSL Advisory Poster Session, NCAR (Boulder, CO), **Nov 2008**.

**Oral (Invited):** *Mathematical Analysis of the SIR Model*. Department of Health and Human Services (Concord, NH), **Apr 2007**.

#### TEACHING EXPERIENCE

**Teaching Assistant:** Department of Applied Mathematics, University of Colorado Boulder. Calculus II (**Spring 2013**).

**Instructor:** Department of Applied Mathematics, University of Colorado Boulder. Calculus II Workgroup (**Fall 2008**).

**Teaching Assistant:** Department of Applied Mathematics, University of Colorado Boulder. Calculus II (**Summer & Fall 2008**), Differential Equations (**Spring 2008**), Calculus III (**Fall 2007**).

**Instructor:** Department of Mathematics, University of New Hampshire. Calculus II (**Summer 2007**), online course in Pre-Calculus (**Summer 2006**), Pre-Calculus (**Spring 2006**).

**Teaching Assistant:** Department of Mathematics, University of New Hampshire. Calculus II (**Spring 2007**), Calculus I (**Fall 2006**), Finite Mathematics (**Fall 2005**).

**Instructor:** Kyoto City Board of Education (Kyoto, Japan), **Apr 2002–Mar 2005**. *Responsible for improving the English communicative skills of eight*

*junior high schools.*

**Instructor:** GEOS (Kansai & Chubu, Japan), **Apr 2000–Apr 2002.** *Regional English instructor at two private schools.*

PROFESSIONAL  
EXPERIENCE

**System Analyst:** MCI WorldCom/EDS Communications (Tulsa, OK), **Apr 1998–Apr 2000.** *Migrated mainframe software for business expansion into local markets.*

PROFESSIONAL  
ASSOCIATIONS

Society for Industrial and Applied Mathematics (**2007–present**); American Geophysical Union (**2009–present**); Oceanographic Society of Japan (**2015–2016**); Japan Society for Industrial and Applied Mathematics (**2016–2017**).

LANGUAGES

Japanese (JLPT N3 level certification), C, Fortran, Mathematica, Matlab, Python, UNIX.