

Curriculum Vitae[†]

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• Education

- 1992 BSc[hons] Applied Physics** Department of Physics, National University of Ireland, Galway
- 1998 PhD Oceanography** Department of Oceanography, National University of Ireland, Galway

• Professional Experience

- Nov. 2006–present** Adjunct Scientist, PO, Woods Hole Oceanographic Institution, Woods Hole, USA
- Apr. 2006–present** Assistant Professor, Old Dominion University, Norfolk
- Oct. 2005–Apr. 2006** Research Investigator, Woods Hole Oceanographic Institution, Woods Hole
- Apr. 2002–Sep. 2005** Postdoctoral Investigator, Woods Hole Oceanographic Institution, Woods Hole
- Jan. 2001–Apr. 2002** Postdoctoral Associate, NOAA/AOML–RSMAS, Miami
- Jan. 1999–Dec. 2000** Marie Curie Fellow, Nansen Environmental and Remote Sensing Center/Geophysical Institute, Bergen, Norway
- Sep. 1992–Jul. 1998** Lecturer, RTC Galway, Ireland
- Sep. 1992–Sep. 1993** Research Assistant, Department of Oceanography, National University of Ireland, Galway

• Teaching Experience

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|----------------|---------------------------------------|--|
| 2006/07 | Old Dominion University, Norfolk, USA | Oceanography field course |
| 1997/98 | RTC Galway | Physics |
| 1996/97 | RTC Galway | Computer Interfacing, Physics |
| 1995/96 | RTC Galway | Computer Interfacing, Physics, Programming |
| 1994/95 | RTC Galway | Electronics, Computer Interfacing |
| 1993/94 | RTC Galway | Programming, Computer Interfacing |
| 1992/93 | RTC Galway | Programming, Digital electronics |

• Awards

European Commission Marie Curie Fellowship

• Publications

[1] Stevens, C., **B. Ward**, C.S. Law, and M. Walkington, The Surface Mixing Layer During SAGE, Deep Sea Research, in prep., 2006.

[1] Harvey, Law, Smith, Hall, Abraham, Stevens, Hadfield, Ho, **Ward**, et al., The SOLAS Air-Sea Gas Exchange Experiment (SAGE) 2004, Deep Sea Research, in prep., 2006.

[†]Last updated: March 14, 2007

- [1] **Ward B.**, Air-Water Interfacial Laboratory Measurements, In “Transport at the Air Sea Interface — Measurements, Models and Parameterizations”, (eds. Garbe, C.S., Handler, R.A., Jhne, B.), Springer Verlag, submitted, 2006.
- [1] **Ward B.** and M.A. Donelan, Thermometric measurements of the molecular sublayer at the air-water interface, *Geophysical Research Letters*, 33, L07605, doi:10.1029/2005GL024769, 2006.
- [2] **Ward, B.**, Near-Surface Ocean Temperature, *Journal of Geophysical Research*, 111, doi:10.1029/2004JC002689, 2006.
- [3] C.L. McNeil, **B. Ward**, W.R. McGillis, M.D. DeGrandpre and L. Marcinowski, Fluxes of N₂, O₂, and CO₂ in Nearshore Waters off Martha’s Vineyard, *Continental Shelf Research*, sub judice, 2006.
- [4] McNeil, C.L., D.R., Katz, and **B. Ward**, W.R. McGillis, and B. D. Johnson, A method to estimate net community metabolism from profiles of dissolved O₂ and N₂, *Hydrobiologia*, accepted, 2006.
- [5] Jenkins, A.D., and **B. Ward**, A Simple Model for the Short-Time Evolution of Near-Surface Current and Temperature Profiles, *Deep-Sea Research II*, 52, 1202-1214, 2005.
- [6] Jenkins, A.D., and **B. Ward**, Reply to: Comment on the paper: A simple model for the short-time evolution of near-surface current and temperature profiles, *Deep-Sea Research II*, 52, 1218-1219, 2005.
- [7] **Ward, B.**, R. Wanninkhof, W. R. McGillis, A. T. Jessup, M. D. DeGrandpre, J. E. Hare, and J. B. Edson, Biases in the air-sea flux of CO₂ resulting from ocean surface temperature gradients, *Journal of Geophysical Research*, 109, C08S08, doi:10.1029/2003JC001800, 2004a.
- [8] **Ward, B.**, R. Wanninkhof, P.J. Minnett, and M. Head, SkinDeEP: A Profiling Instrument for Upper Decameter Sea Surface Measurements. *Journal of Atmospheric and Oceanic Technology*, 21, 207-222, 2004b.
- [9] Ho, D.T., C.J. Zappa, W.R. McGillis, L.F. Bliven, **B. Ward**, J.W.H. Dacey, P. Schlosser, and M.B. Hendricks, Influence of rain on air-sea gas exchange: Lessons from a model ocean, *Journal of Geophysical Research*, 109, C08S18, doi:10.1029/2003JC001806, 2004.
- [10] Hare, J.E., C.W. Fairall, W.R. McGillis, J.B. Edson, **B. Ward**, and R. Wanninkhof, Evaluation of the National Oceanic and Atmospheric Administration/Coupled-Ocean Atmospheric Response Experiment (NOAA/COARE) air-sea gas transfer parameterization using GasEx data, *Journal of Geophysical Research*, 109, C08S11, doi:10.1029/2003JC001831, 2004.
- [11] Donlon, C. J., P. J. Minnett, C. Gentemann, T. J. Nightingale, I. J. Barton, **B. Ward**, M. J. Murray, Toward Improved Validation of Satellite Sea Surface Skin Temperature Measurements for Climate Research, *Journal of Climate*, 15, 353-369, 2002.
- [12] **Ward, B.**, and P.J. Minnett, An autonomous profiler for near surface temperature measurements, in *Gas Transfer at Water Surfaces*. M. Donelan, W. Drennan, E. Saltzman, and R. Wanninkhof, Eds., AGU Geophysical monograph 127, 167-172, 2001.
- [13] **Ward B.**, and S. Redfern, A neural network model for predicting the bulk-skin temperature difference at the sea surface, *International Journal of Remote Sensing*, 20, 3533-3548, 1999.

[14] Bowyer, P. and **B. Ward**, Sea Surface Temperatures off the Irish Coast, in Irish Marine Science 1995. B.F. Keegan and R. O'Connor, Eds., 455-464, 1996.

• **Conference**

[15] **Ward B.**, C. Gentemann, and R. Wanninkhof, The Diurnal Warm Layer and its Implication for the Air-Sea Flux of Carbon Dioxide EOS Transactions AGU, 87, (36), Ocean Sciences Meeting Supplement, Abstract OS35G-16, 2006.

[15] Wick, G.A. and **B. Ward**, Validation of Near-Surface Diurnal Warming Simulations with High-Resolution Profile Measurements EOS Transactions AGU, 87, (36), Ocean Sciences Meeting Supplement, Abstract OS15E-09, 2006.

[15] **Ward, B.** and K. Currie, Estimates of the skin effect on air-sea flux of CO₂, Seventh International Carbon Dioxide Conference, Boulder, Colorado, USA, September 2005.

[15] **Ward, B.**, G. Szczodrak, P.J. Minnett, M.A. Donelan, and B. Haus, The Skin Effect: Measurements in a Wind-Wave Tank and its Role in Air-Sea Gas Transfer, 37th International Liège Colloquium on Gas Transfer at Water Surfaces, May, Liège, Belgium, 2005.

[16] **Ward, B.**, ASIP: Air-Sea Interaction Profiler, 37th International Liège Colloquium on Gas Transfer at Water Surfaces, May, Liège, Belgium, 2005.

[17] McNeil, C.L., B. Ward, W.R. McGillis, M.D. DeGrandpre and L. Marcinowski, Fluxes of N₂, O₂, and CO₂ in nearshore waters off Marthas Vineyard, 37th International Liège Colloquium on Gas Transfer at Water Surfaces, May, Liège, Belgium, 2005.

[18] Jenkins, A.D., and **Ward, B.**, Measured and modelled profiles of near surface temperature, EGU05, April, Vienna, Austria, 2005.

[19] Harvey, M., C. Law, J. Hall, M. Smith, E. Abraham, S. Archer, K. Currie, M. Ellwood, D. Ho, G. Jones, P. Minnett, J. Peloquin, H. Swan, R. Thompson, P. Boyd, M. Bender, J. Cainey, D. Devries, J. Gras M. Hadfield, P. Hill, D. Katz, J. Kuparinen, B. Macaskill, D. Mackie, C. McNeil, W. Main, A. Marriner, J. McGregor, S. Nodder, S. Pickmere, B. Popp, M. Ruer, K. Safi, H. Sievering, C. Stevens, M. Walkington, **B. Ward**, S. Wright, L. Ziolkowski, The SOLAS Air-sea Gas Exchange (SAGE) 2004 Experiment and Effects of Iron Fertilisation on Gas Exchange, SOLAS open science conference, October, Halifax, Canada, 2004.

[20] **Ward B.**, P.J. Minnett, and M.A. Donelan, Skin-Layer Profiles in a Wind-Wave Tank Under Various Heat Flux Regimes, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS41I-06, 2004c.

[21] **Ward B.**, C. McNeil, W.R. McGillis, and M.D. Degrandpre, Air-Sea gas exchange measurements of oxygen, nitrogen, and carbon dioxide in a coastal environment, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS32H-04, 2004d.

[22] **Ward, B.**, R. Wanninkhof, P.J. Minnett, W.R. McGillis, and A.T. Jessup, Direct observations of the effect of the skin temperature on regional air-sea flux of CO₂, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS31A-13, 2004e.

[23] **Ward, B.**, P. Strutton, P.J. Minnett, I. Nardello, and L. Lazzara, Study of near surface radiant

heating from irradiance and temperature profiles in the Mediterranean, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS21C-02, 2004f.

[24] **Ward, B.**, and P.J. Minnett, Observations of Cool Skin and Warm Layer Temperatures in the Gulf of California, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS21L-03, 2004g.

[25] McGillis, W.R., J.B. Edson, C.J. Zappa, **B. Ward**, E.A. Terray, J.E. Hare, C.W. Fairall, W. Drennan, M.A. Donelan, M.D. DeGrandpre, A.T. Jessup, R. Wanninkhof, R.A. Feely, G.C. Johnson, C.L. Sabine, Diurnal Air-Sea Carbon Dioxide Fluxes in the Equatorial Pacific, EOS Transactions AGU, 84, (52), Ocean Sciences Meeting Supplement, Abstract OS32H-03, 2004.

[26] A.D. Jenkins and **B. Ward**, A simple model for the short-time evolution of near-surface current, temperature, and mass concentration profiles, Warnemünde Turbulence Days, Warnemünde, 2003.

[27] Ho, D.T., C. Zappa, W.R. McGillis, L.F. Bliven, **B. Ward**, J.W.H. Dacey, P. Schlosser, and M.B. Hendricks, Influence of Rain on Air-Sea Gas Exchange: Lessons from a Model Ocean, EGS-AGU-EUG Joint Assembly, Nice, France, 2003.

[28] Smith, M., C. Stevens, **B. Ward**, and J. McGregor, Near Surface Measurements of Oceanic Turbulent Energy Dissipation Rates, EGS-AGU-EUG Joint Assembly, Nice, France, 2003.

[29] **Ward, B.**, Temperature-Related Biases on the Air-Sea Flux of CO₂, 13th Irish Environmental Researchers Colloquium, Galway, Ireland, 2003.

[30] Hare, J.E., C.W. Fairall, W.R. McGillis, and **B. Ward**, Temperature Sensitivity of a Micrometeorologically-Based Air-Sea Gas Transfer Parameterization, AMS Annual Air-Sea Interaction Conference, 2002.

[31] **Ward, B.**, R. Wanninkhof, A.T. Jessup, M. DeGrandpre, and W.R. McGillis: Air-Sea Interfacial $p\text{CO}_2$ from High-Resolution Temperature Profiles and Skin Temperature Measurements. Ocean Sciences Meeting, Honolulu, 2002.

[32] Minnett, P.J., and **Ward, B.**, Measurement of Near-Surface Ocean Temperature Variability — Consequences on the Validation of AATSR on ENVISAT, Proceedings of the ERS ENVISAT Symposium, Gothenburg, Sweden, ESA SP-461, 2000.

[33] **Ward, B.**, and P.J. Minnett, An Autonomous Profiler for Near-Surface Temperature Measurements, Gas Transfer at Water Surfaces 4th International Symposium, Miami, USA, 2000.

[34] **Ward, B.**, High resolution profiles of sea surface temperature, Geophysical Research Abstracts, European Geophysical Society 25th General Assembly, Nice, France, 2000.

• **Funding to date**

‡ B. Ward [in collaboration with Wei-Jun Cai (UGA)]: Determination of Ocean Surface Processes from Measurements with the AirSea Interaction Profiler (ASIP) during the GasExIII Experiment	NSF	Aug15 2007–Jul31 2010	\$490,396
§ B. Ward [in collaboration with W.M. Drennan (RSMAS)]: Collaborative Research: Near-Surface Controls of Air-Sea CO ₂ Exchange: A Contribution to the UK-SOLAS “Deep Ocean Gas Exchange Experiment”	NSF	Oct01 2006–Sep30 2009	\$179,519
§ R.W. Schmitt & B. Ward : Development of a new generation of diamond-coated thermometers to extend small-scale oceanic measurements of temperature	WHOI	Sep15 2006–Aug31 2009	\$206,882
§ B. Ward & R.A. Weller: Measurements of the Diurnal Warm Layer and Biologically-Induced Heating during the CIRENE Campaign	NSF	Jan01 2006–Dec31 2009	\$387,847
¶ B. Ward : The Role of the Oceanic Thermal Skin as a Modifier of CO ₂ Uptake	WHOI	Aug01 2004–Jul31 2006	\$34,705
¶ B. Ward [in collaboration with G.A. Wick (NOAA/ETL)]: Multi-sensor Improved Sea-Surface Temperature (MISST) for GODAE	NOPP	Jan01 2004–Mar31 2006	\$70,000
¶ B. Ward [in collaboration with P.J. Minnett (RSMAS)]: Collaborative Research: The Influence of Surface Gradients on Gas Exchange During the SOLAS-ANZ Experiment	NSF	Oct01 2003–Sep30 2006	\$174,994
¶ B. Ward & W.R. McGillis: Measurements of Controlling Factors for Air-Sea Fluxes with High-Resolution Ocean Surface Sensors	NSF	Apr01 2003–Sep30 2006	\$369,683
¶ B. Ward & W.R. McGillis: Microphysics of Air-Sea Exchange	ONR	Oct01 2002–Mar31 2005	\$56,326
¶J.W.H. Dacey & B. Ward : Autonomous Measurements of Dimethylsulfide in a Coastal Environment	WHOI	Jun01 2003–May31 2004	\$49,748
¶E.A. Terray & B. Ward : MEMS Optical Velocity Sensors for Ocean Boundary Layer Studies	WHOI	Dec01 2002–Nov30 2004	\$32,208
¶A.D. Jenkins & B. Ward : Measurement and Modelling of Controlling Factors for Air-Sea Fluxes	NFR	Dec01 1998–Nov30 2001	NOK 1,270,000
¶ B. Ward : Thermometric and Radiometric Measurements of Sea Surface Temperature and their Application to a Neural Network-Based Parametrisation of the Bulk-Skin Temperature Difference	EC	Jan01 1999–Dec31 2000	ECU 104,060

‡Pending §Current ¶Completed

- **Invited Seminars**

The Molecular Boundary Layer and Improving Estimates of Air–Sea Heat Flux, University of Delaware, Newark, October 2006.

Thermometric Measurements of the Molecular Sublayer at the Air–Water Interface, International Workshop on Transport at the Air Sea Interface, Heidelberg, Germany, September 2006.

Near Surface and Interfacial Ocean Processes Influencing Air–Sea Exchange, Old Dominion University, Norfolk, September 2005.

Cool-skin and Warm-Layer Effects on Air-Sea Heat Flux, NOAA Environmental and Technology Laboratory, Boulder, July 2005.

Thermometric Measurements of the Molecular Sublayer at the Air–Water Interface in a Wind-Wave Tank, School of Earth and Ocean Sciences, University of Victoria, Canada, March 2005.

The Influence of the Diurnal Warm Layer on Air-Sea Heat Fluxes. Laboratoire d’Océanographie Dynamique et de Climatologie, Paris, December 2004.

The Influence of Ocean Surface Temperature on Atmosphere-Ocean Heat and Gas Exchange. Department of Environmental, Earth, and Atmospheric Sciences, University of Massachusetts Lowell, November 2004.

Interfacial Processes Influencing Air-Water Heat and Gas Exchange. Department of Physics, University of Connecticut, July 2004.

Near Surface Measurements with an Autonomous Profiler during Air-Sea Exchange Studies. Department of Marine Sciences, University of Connecticut, July 2004.

Interfacial and Near Surface Processes Influencing Air-Sea Interaction. Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, February 2004.

Study of Near Surface Radiant Heating from Irradiance and Temperature Profiles in the Mediterranean. Coastal Ocean Fluid Dynamics Laboratory, Woods Hole Oceanographic Institution, November 2003.

In-situ ocean surface measurements with the SkinDeEP high-resolution profiler. NASA Jet Propulsion Laboratory, September 2003.

Observations of skin temperatures and diurnal warming. Coastal Ocean Fluid Dynamics Laboratory, Woods Hole Oceanographic Institution, November 2003.

Biases in Air-Sea Flux of CO₂ Resulting from Ocean Surface Temperature Gradients. Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, November 2002.

GasEx–2001: An Overview, Some Results, and Moving On. National Institute of Water and Atmospheric Research, New Zealand, May 2002.

An overview of the bulk skin temperature difference at the sea surface and presentation of some measurements from a high resolution temperature profiler. Geophysical Institute, Bergen, Norway, February, 2000.

• Professional Membership and Committee Involvement

Oceanography Society
 American Geophysical Union
 American Meteorological Society
 European Geophysical Society

• Meetings and Workshops Attended

Mar 2006 SOLAS International Conference, Xiamen, China
Sep 2006 International Workshop on Transport at the Air Sea Interface (by invitation only), Heidelberg, Germany
Feb 2006 Ocean Sciences Meeting, Honolulu, USA
Feb 2006 Cirene Planning Meeting, LODYC, Paris, France
Sep 2005 Seventh International Carbon Dioxide Conference, Boulder, USA
May 2005 37th International Liège Colloquium on Gas Transfer at Water Surfaces, Liège, Belgium
Apr 2005 SAGE Data Workshop, Wellington, New Zealand
Dec 2004 Cirene cruise planning meeting, LODYC, Paris, France
Jan 2004 Ocean Sciences Meeting, Portland, USA
Jul 2003 The Next Generation of In-Situ Biological and Chemical Sensors in the Ocean, Woods Hole, USA
Jul 2003 SOLAS International Summer School, Cargese, Corsica, France
Jan 2003 13th Irish Environmental Researchers Colloquium, Galway, Ireland
Feb 2002 Ocean Sciences Meeting, Honolulu, USA
Oct 2001 GasEx-2001 Data Workshop, Seattle, USA
May 2001 Office of Naval Research Workshop on Coupled Boundary Layer on Air-Sea Transfer for Low to Moderate Winds, Woods Hole, USA
May 2001 US Surface Ocean Lower Atmosphere Study Open Science Conference, Washington D.C., USA
Dec 2000 Norwegian Surface Ocean Lower Atmosphere Study Workshop, Bergen, Norway
Nov 2000 Sea surface temperature Global Ocean Data Assimilation Experiment (GODAE) Workshop, ISPRA, Italy
Aug 2000 GasEx-2001 Cruise Planning Meeting, Seattle, USA
Jun 2000 Fourth International Symposium on Gas Transfer, Miami, USA
Apr 2000 25th General Assembly, European Geophysical Society, Nice, France
Mar 2000 Ocean radar sensing workshop, Nansen Center, Bergen, Norway
Oct 1997 Combined Action to study the Oceans Thermal Skin (CASOTS), 2nd Workshop, ISPRA, Italy
Sep 1997 Sensors and their Application VIII, Glasgow, Scotland
Jun 1996 Combined Action to study the Oceans Thermal Skin (CASOTS), 1st Workshop, SOC, Southampton, UK
Sep 1995 Advanced European Training Course on Remote Sensing for Marine Applications, Enschede, The Netherlands

- **Experimental Activities**

Jan/

Feb 2007 CIRENE cruise in the Indian Ocean on the R/V Surôit

Mar 2004 SOLAS Air–Sea Gas Exchange (SAGE) cruise in the Southern Ocean on the R/V Tangaroa

Feb 2004 51–node thermistor chain at the Air–Sea Interaction Tower

May 2003 NORBAL–5 Mediterranean cruise on the R/V Urania

Feb 2003 Flume measurements with MEMS velocity sensors

Jun 2002 Mini Intensive Gas Exchange Experiment (MIGEX) at Martha’s Vineyard Observatory

May 2002 Turbulence experiment in Evans Bay, Wellington, New Zealand

Mar 2002 Rain/gas exchange experiment at the Biosphere2 Facility in Arizona

Dec 2001 Cool Skin Experiment at the Air–Sea Interaction Saltwater Tank facility at RSMAS

Feb 2001 GasEx–2001 Equatorial Pacific gas exchange campaign

Feb 2000 EuroROSE radar current measurement experiment

Oct 1999 MOCE–5 cruise in the Gulf of California on the R/V Melville

Aug 1996 Radiometric measurements in the Barents Sea on the R/V Håkon Mosby

Oct 1996 Radiometric measurements during the ASGAMAGE–B campaign on the R/P Meetpost Noordwijk in the North Sea

May 1996 Radiometric measurements during the ASGAMAGE–A campaign on the R/P Meetpost Noordwijk in the North Sea