

**Katye E. Altieri, Ph.D.**

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**APPOINTMENTS**

<b>Lecturer</b> Department of Oceanography, University of Cape Town	Jan. 2017 – Present
<b>Senior Research Officer</b> Energy Research Centre, University of Cape Town	2014 – 2016
<b>Associate Research Scholar</b> Department of Geosciences, Princeton University	2011 – 2013
<b>Visiting Research Fellow</b> Environmental Change Initiative, Brown University	2012 – 2013
<b>NOAA Climate and Global Change Postdoctoral Fellow</b> Department of Geosciences, Princeton University, Advisor: Daniel Sigman Department of Geological Sciences, Brown University, Co-Advisor: Meredith Hastings	2009 – 2011

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**EDUCATION**

Master in Public Policy, Princeton University	2014
Ph.D. Oceanography, Rutgers University      Advisors: Sybil Seitzinger and Barbara Turpin	2009
B.S. Chemistry, The College of New Jersey	2004

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**PUBLICATIONS**      h-index = 15      §peer-reviewed book chapter      \*student first author

23. Baker, A. R., Kanakidou, M., **Altieri, K. E.**, Daskalakis, N., Okin, G. S., Myriokefalitakis, S., Dentener, F., Uematsu, M., Sarin, M. M., Duce, R. A., Galloway, J. N., Keene, W. C., Singh, A., Zamora, L., Lamarque, J.-F., Hsu, S.-C., Rohekar, S. S., and Prospero, J. M. Observation- and model-based estimates of particulate dry nitrogen deposition to the oceans, *Atmospheric Chemistry and Physics*, 2017, vol. 17, 8189-8210
22. Jickells, T.D., Buitenhuis, E., **Altieri, K.**, Baker, A.R., Capone, D., Duce, R.A., Dentener, F., Fennel, K., Kanakidou, M., LaRoche, J., Lee, K., Liss, P., Middelburg, J. J., Moore, J.K., Okin, G., Oeschler, A., Sarin, M., Seitzinger, S., Sharples, J., Singh, A., Suntharalingam, P., Uematsu, M., Zamora, L.M. A re-evaluation of the magnitude and impacts of anthropogenic atmospheric nitrogen inputs on the ocean, *Global Biogeochemical Cycles*, 2017, vol. 31, doi:10.1002/2016GB005586
21. **Altieri, K.E.**, Fawcett, S.E., Peters, A., Sigman, D.M., Hastings, M.G. Marine biogenic source of atmospheric organic nitrogen in the subtropical North Atlantic. *Proceedings of the National Academy of Sciences*, 2016, vol. 113(4), 925-930  
"Humans adding less nitrogen to oceans than models predict." *ScienceDaily*. 6 January 2016.  
Kelleher, S. (2016), Human activities account for less than a third of ocean nitrogen, *Eos*, 97, doi:10.1029/2016EO043963. 20 January 2016.
20. §Winkler, H., **Altieri, K.**, Clarke, S., Garland, R.M., Kornelius, G. and Meas, M. 2016. Air Quality and Greenhouse Gas Emissions. In Scholes, R., Lochner, P., Schreiner, G., Snyman-Van der Walt, L. and de Jager, M. (eds.). 2016. Shale Gas Development in the Central Karoo: A Scientific Assessment of the Opportunities and Risks. CSIR/IU/021MH/EXP/2016/003/A, ISBN 978-0-7988-5631-7, Pretoria: CSIR. Available at <http://seasgd.csisr.co.za/scientific-assessment-chapters/>
19. **Altieri, K.E.**, Trollip, H., Caetano, T., Hughes, A., Merven, B., Winkler, H. Achieving development and mitigation objectives through a decarbonization development pathway in South Africa. *Climate Policy*, 2016, vol. 16(1), S78-S91

18. Keen, S. and **Altieri, K.** The health benefits of attaining and strengthening air quality standards in Cape Town. *Clean Air Journal*, 2016, vol. 26 (2), 22-27
17. **Altieri, K.E.** and Stone, A. Prospective air pollutant emissions inventory for the development and production of unconventional natural gas in the Karoo basin, South Africa. *Atmospheric Environment*, 2016, vol. 129, 34-42
16. **Altieri, K.E.**, Hastings, M.G., Peters, A.J., Oleynik, S., Sigman D.M. Isotopic evidence for a marine ammonium source in rainwater at Bermuda. *Global Biogeochemical Cycles*, 2014, vol. 28, 1066-1080
15. **Altieri, K.E.**, Hastings, M.G., Gobel, A.R., Peters, A.J., Sigman, D.M. Isotopic composition of rainwater nitrate at Bermuda: The influence of air mass source and chemistry in the marine boundary layer. *Journal of Geophysical Research-Atmospheres*, 2013, vol. 118, 1-13
14. \*Gobel, A.R., **Altieri, K.E.**, Peters, A.J., Hastings, M.G., Sigman, D.M. Insights into anthropogenic nitrogen deposition to the North Atlantic investigated using the isotopic composition of aerosol and rainwater nitrate. *Geophysical Research Letters*, 2013, vol. 40 (22), 5977-5982
13. Kirkland, J., Lim, Y., Tan, Y., **Altieri, K.**, Turpin, B. Glyoxal SOA chemistry: Effects of dilute nitrate and ammonium and support for organic radical-radical oligomer formation. *Environmental Chemistry*, 2013, vol. 10(3), 158-166
12. **Altieri, K.E.**, Hastings, M.G., Peters, A.J., Sigman, D.M. Molecular characterization of water soluble organic nitrogen in marine rainwater by ultra-high resolution electrospray ionization mass spectrometry. *Atmospheric Chemistry and Physics*, 2012, vol.12, 3557-3571
11. Tan, Y., Lim, Y.B., **Altieri, K.E.**, Seitzinger, S.P., Turpin, B.J. Mechanisms leading to oligomers and SOA through aqueous photooxidation: insights from OH radical oxidation of acetic acid and methylglyoxal. *Atmospheric Chemistry and Physics*, 2012, vol.12, 801-813
10. Kroll, J.H., Donahue, N.M., Jimenez, J.L., Kessler, S.H., Canagaratna, M.R., Wilson, K.R., **Altieri, K.E.**, Mazzoleni, L.R., Wozniak, A.S., Bluhm, H., Mysak, E.R., Smith, J.D., Kolb, C.E., Worsnop, D.R. Carbon oxidation state as a metric for describing the chemistry of organic aerosol. *Nature Chemistry*, 2011, vol. 3, 133-139
9. **Altieri, K.E.**, Turpin, B.J., Seitzinger, S.P. Composition of dissolved organic nitrogen in continental precipitation investigated by ultra-high resolution FT-ICR mass spectrometry. *Environmental Science & Technology*, 2009, vol. 43(18), 6950-6955
8. **Altieri, K.E.**, Turpin, B.J., Seitzinger, S.P. Oligomers, organosulfates, and nitrooxy organosulfates in rainwater identified by ultra-high resolution electrospray ionization FT-ICR mass spectrometry. *Atmospheric Chemistry and Physics*, 2009, vol. 9, 2533-2542
7. Carlton, A.G., Turpin, B.J., **Altieri, K.E.**, Seitzinger, S.P., Mathur, R., Roselle, S.J., Weber, R.J. CMAQ model performance enhanced when in-cloud secondary organic aerosol (SOA) is included: Comparisons of organic carbon predictions with measurements. *Environmental Science & Technology*, 2008, vol. 42, 8798-8802
6. Duce, R.A., LaRoche, J., **Altieri, K.**, Arrigo, K., Baker, A., Capone, D., Cornell, S., Dentener, F., Galloway, J., Ganeshram, R., Geider, R., Jickells, T., Kuypers, M., Langlois, R., Liss, P., Liu, S.M., Middelburg, J., Moore, C.M., Nickovic, S., Oschlies, A., Pedersen, T., Prospero, J., Seitzinger, S., Sorensen, L.L., Uematsu, M., Ulloa, O., Voss, M., Ward, B., Zamora, L. Impacts of atmospheric anthropogenic nitrogen on the open ocean. *Science*, 2008, vol. 320(5878), 893-897
5. Ervens, B., Carlton, A.G., Turpin, B.J., **Altieri, K.E.**, Kreidenweis, S., Feingold, G. Secondary organic aerosol yields from cloud-processing of isoprene oxidation products. *Geophysical Research Letters*, 2008, vol. 35, L02816 Editor's Highlight Article and *Science Daily* News Feature: Cloud Chemistry Concocts Aerosols.

4. **Altieri, K.E.**, Seitzinger, S.P., Carlton, A.G., Turpin, B.J., Klein, G.C., Marshall, A.G. Oligomers formed through in-cloud methylglyoxal reactions: Chemical composition, properties, and mechanisms investigated by ultra-high resolution FT-ICR mass spectrometry. *Atmospheric Environment*, 2008, vol. 42(7), 1476-1490
3. Carlton, A.G., Turpin, B.J., **Altieri, K.E.**, Reff, A., Lim, H.J., Seitzinger, S.P. Atmospheric oxalic acid and SOA production from glyoxal: Results of aqueous photo-oxidation experiments. *Atmospheric Environment*, 2007, vol. 41(35), 7588-7602
2. **Altieri, K.E.**, Carlton, A.G., Turpin, B.J., Seitzinger, S.P. Evidence for oligomer formation in clouds: Reactions of isoprene oxidation products. *Environmental Science & Technology*, 2006, vol. 40, 4956-4960
1. Carlton A.G., Lim, H.J., **Altieri, K.E.**, Seitzinger, S.P., Turpin, B.J. Link between isoprene and secondary organic aerosol (SOA): Pyruvic acid oxidation yields low volatility organic acids in clouds. *Geophysical Research Letters*, 2006, vol. 33, L06822

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## RESEARCH GRANTS

NRF South African National Antarctic Programme, “Biogeochemical controls on the sources and chemical composition of Southern Ocean marine aerosols,” Lead PI, 2018 – 2020

NRF Competitive Programme for Rated Researchers, “Investigation of the sources and interactions of reduced nitrogen species in the remote marine atmosphere,” Lead PI, 2018 – 2020

NRF ACCESS, “The role of phytoplankton in albedo and global climate: The coupled ocean–atmosphere Benguela System,” Co-PI, 2018 – 2020

University of Cape Town, Claude Leon Merit Award, 2017

NRF Special Recognition Award, 2016

University of Cape Town, URC Discretionary, 2016

University of Cape Town, URC Short Research Visits, 2016

University of Cape Town, URC Conference Travel, 2016

NRF Incentive Funding for Rated Researchers, 2016-2020

London School of Economics, International Growth Centre, “Health Costs of Energy Related Air Pollution in South Africa,” Lead PI, 2015-2016

U.S. National Science Foundation, “Collaborative Research: Isotopic and Compositional Investigation of the Sources and Interactions of Reactive N in the Marine Atmosphere at Bermuda,” 2010-2013

Seibel Energy Grand Challenge Program, “Sources of Ammonium in Coastal Rainwater and Potential Connections with Air-Sea Exchange,” 2011, “Photochemical Alteration of Dissolved Organic Nitrogen in the Surface Ocean of the North Atlantic,” 2010, “Rainwater Collection and Analysis in Bermuda,” 2009

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## HONORS, AWARDS, RECOGNITION

Claude Leon Merit Award, 2017

Most Outstanding Paper Presentation, National Association for Clean Air Conference, 2016

P-Rating, South African National Research Foundation President’s Award, 2015

Invited Participant, UN Group of Experts on the Scientific Aspects of Marine Environmental Protection, Working Group 38, The Atmospheric Input of Chemicals to the Ocean, University of East Anglia, 2013

Invited Participant, Dissertation Initiative for the Advancement of Climate Change Research, Colorado Springs, CO, 2011

Outstanding Student Talk Award, American Geophysical Union/American Society of Limnology and Oceanography, Ocean Sciences Meeting, 2008

Peter B. Wagner Memorial Award for Women in Atmospheric Sciences, 2008

Outstanding Student Paper Award, American Geophysical Union Fall Meeting, 2007

Invited Participant, International Workshop on Anthropogenic Nitrogen Impacts on the Open Ocean, International Nitrogen Initiative, University of East Anglia, 2006

Best Poster Award, Invited Participant, Surface Ocean Lower Atmosphere Study International Summer School, Corsica, 2005

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**TEACHING**                   \*postgraduate course   #course convenor

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University of Cape Town Faculty of Science

#*Principles of Oceanography* (60 – 80 students), *Marine Systems* (40 – 60 students), *Atmospheric Science* (80 students), \**Honours Marine and Atmosphere Biogeochemistry Module + Fieldtrip* (10 students),

\**Applied Ocean Sciences Masters Biogeochemistry Module* (10 students)

African Climate & Development Initiative, \**Climate Change Adaptation and Mitigation* (25 students)

University of Cape Town Faculty of Engineering and the Built Environment

Department of Mechanical Engineering, \**Energy and Climate Change*

Princeton University:

Guest Lecturer, *Fundamentals of Environmental Studies: Climate, Air Pollution, Toxics, and Water*, 2011,

*Physics of Earth: The Habitable Planet*, 2012, 2013

Rutgers University:

Guest Lecturer, \**Atmospheric Chemistry*, 2011, \**History of Earth Systems*, 2008, \**Chemical Oceanography*, 2008

Assistant Instructor, *Ocean Science Inquiry*, 2009

Teaching Assistant, *Introduction to Oceanography*, 2008, 2007, *Oceanographic Methods and Data Analysis*, 2007

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**SUPERVISION**

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University of Cape Town Current Students:

Faith February, Ph.D., Department of Oceanography

Mishka Rawatlal, M.Sc., Department of Oceanography

Benita Maritz, M.Sc., Department of Oceanography

Anna Ras, M.Sc. Eng., Energy Research Centre (Co-Supervisor)

Shantelle Smith, M.Sc., Department of Oceanography

Kurt Spence, M.Sc., Department of Oceanography

Previous Students:

Supervisor, Shantelle Smith, Honours, Department of Oceanography, University of Cape Town, 2017

Supervisor, Kurt Spence, Honours, Department of Oceanography, University of Cape Town, 2017

Supervisor, Yonela Tukwayo, M.Com. Development Finance, University of Cape Town, 2016

Mentor, Gamu Mutezo, Graduate Intern, M.Sc. University of Cape Town, 2015

Supervisor, Amy Gobel, Junior Project 2010, Senior Thesis/Honours, Princeton University, 2012

Mentor, Princeton Energy Grand Challenge Internships, Tyler Tamasi, 2012, Max Jacobson, 2011, Rosie Zhang, 2011, Amy Gobel, 2010

Mentor, U.S. National Science Foundation Research Experience for Undergraduates, Research Internship in Ocean Sciences, Phyllis Ko, 2008

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**INVITED SEMINARS**

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How does feeding 7.5 billion people impact the ocean? Population growth, air pollution, and the oceanic CO<sub>2</sub> sink, Science Faculty Special Research Seminar, University of Cape Town, 2017

Nitrogen Cycling in the Surface Ocean – Lower Atmosphere: How does air pollution impact the ocean CO<sub>2</sub> sink?, Stellenbosch University, 2016

Does Air Pollution Fertilize the Open Ocean?, South African Network for Coastal and Oceanic Research, University of Cape Town, 2016

Rethinking the Marine Bio-Atmospheric Nitrogen Cycle: The subtropical ocean as a source of N to the marine atmosphere, Woods Hole Oceanographic Institution – Massachusetts Institute of Technology, 2013

The Marine Bio-Atmospheric N-Cycle: New Insights from Stable Isotopes and Ultra-High Resolution Mass Spectrometry, Sonoma State University, 2011

The Composition of Atmospheric Dissolved Organic Matter: Caffeine, Cigarettes and Drugs, Bermuda Institute of Ocean Sciences, St. Georges, Bermuda, 2010

Links Between Complex Dissolved Organic Matter in Clouds, Aerosols, and Rainwater, Brown University, Providence, RI, 2010

Links Between Complex Dissolved Organic Matter in Aerosols and Precipitation, Princeton University, Princeton, NJ, 2009

The Composition of Oligomers Formed Through In-Cloud Methylglyoxal Reactions, The Desert Research Institute, Reno, NV, 2008

The Composition of Dissolved Organic Matter in Rainwater, Environmental Protection Agency Office of Research and Development, Research Triangle Park, NC, 2008

Complex Dissolved Organic Matter in Clouds, Aerosols, and Rainwater, Los Alamos National Laboratory, Los Alamos, NM, 2008

In-Cloud Photochemistry Produces Complex DOM, Environmental Geology and Geochemistry Seminar Series, Princeton University, Princeton, NJ, 2008

Formation of Oligomers in Cloud Processing: Reactions of Isoprene Oxidation Products, International Summer School on Surface Ocean Lower Atmosphere Study, Cargese, France, 2005

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#### **SELECTED CONFERENCE CONTRIBUTIONS** † peer-reviewed, presenter

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†Altieri, K.E. and Keen, S.J., “BenMAP as a tool for analyzing the health benefits of reductions in ambient air pollution in South Africa,” Oral presentation at the National Association for Clean Air Conference, Nelspruit, South Africa, 2016

\*Most Outstanding Paper Presentation Award

Altieri, K.E. and Keen, S.J., “Health impacts of energy-related air pollution in South Africa,” International Global Atmospheric Chemistry Conference, Breckenridge, CO, 2016

Jickells, T., Altieri, K., Capone, D., Buitenhuis, E., Duce, R., Dentener, F., Fennel, K., Galloway, J., Kanakidou, M., LaRoche, J., Lee, K., Liss, P., Middleburg, J., Moore, K., Nickovic, S., Okin, G., Oschlies, A., Prospero, J., Sarin, M., Seitzinger, S., Scharples, J., Suntharalingam, P., Uematsu, M., Zamora, L., “Atmospheric nitrogen inputs to the ocean and their impact,” Geophysical Research Abstracts, Vol. 18, EGU2016-16287, Oral presentation at the EGU General Assembly, Vienna, Austria, 2016

Baker, A. and the GESAMP WG38 Group Team, “Atmospheric nitrogen deposition to the oceans: Observation- and model-based estimates,” Geophysical Research Abstracts, Vol. 18, EGU2016-16328, Poster presentation at the EGU General Assembly, Vienna, Austria, 2016

†Altieri, K.E. and Stone, A., “Air pollutant emissions inventory for NO<sub>x</sub> from the development of unconventional natural gas wells in the Karoo basin, South Africa,” Oral presentation at the National Association for Clean Air Conference, Bloemfontein, South Africa, 2015

Altieri, K.E., Hastings, M.G., Peters, A.J., Sigman, D.M., It’s Not All Pollution: New Insights into the Ocean as a Source of Atmospheric N in the North Atlantic Region, Poster presentation at the American Geophysical Union Ocean Sciences Meeting, Honolulu, HI, 2014

Altieri, K.E., Hastings, M.G., Peters, A.J., Sigman, D.M., The Marine Bio-Atmospheric Nitrogen Cycle: New Insights from Stable Isotopes and Ultra-High Resolution Mass Spectrometry, Poster presentation at the Association for the Study of Limnology and Oceanography Aquatic Sciences Meeting, New Orleans, LA, 2013

Altieri, K.E., Hastings, M.G., Peters, A.J., Sigman, D.M., “The Isotopic Composition of Ammonium in Marine Rainwater,” Platform presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, 2012

Altieri, K.E., Hastings, M.G., Peters, A.J., Sigman, D.M., “The Marine Bio-Atmospheric Nitrogen Cycle: New Insights from Stable Isotopes and Ultra-High Resolution Mass Spectrometry,” Poster presentation at the International Geosphere-Biosphere Programme Planet Under Pressure Meeting, London, England, 2012

Altieri, K.E., Hastings, M.G., Peters, A., Sigman, D.M., “The Chemical Composition of Organic Nitrogen in the Marine Atmosphere,” Platform presentation at the American Society of Limnology and Oceanography Aquatic Sciences Meeting, San Juan, Puerto Rico, 2011

Altieri, K.E., Hastings, M.G., Peters, A., Sigman, D.M., “The Chemical Composition of Organic Nitrogen in Marine Rainwater and Aerosols,” Platform presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, 2010

Altieri, K.E., Hastings, M.G., Peters, A., Sigman, D.M., “The Chemical Composition of Organic Nitrogen in Marine Rainwater and Aerosols,” Platform presentation at the Atmospheric Chemical Mechanisms Conference, Davis, CA, 2010

Altieri, K.E., Hastings, M., Peters, A., Seitzinger, S., Sigman, D., Turpin, B., “The Composition of Organic Nitrogen in Rainwater,” Poster presentation at the 9th NOAA Climate and Global Change Summer Institute, Steamboat Springs, CO, 2010

Altieri, K.E., Turpin, B.J., Seitzinger, S.P., "Oligomers, Organosulfates, and Nitrooxy organosulfates Identified in Rainwater by Ultra-high Resolution FT-ICR MS," Platform presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, 2008

Altieri, K.E., Perri, M.J., Turpin, B.J., Seitzinger, S.P., “In-Cloud Photochemistry Produces Complex DOM,” Platform presentation at the American Geophysical Union/American Society of Limnology and Oceanography, Ocean Sciences Conference, Orlando, FL, 2008

Altieri, K.E., Seitzinger, S.P., Carlton, A.G., Turpin, B.J., Klein, G.C., Marshall, A.G., “Chemical Characterization of Secondary Organic Aerosol Formed Through Cloud Processing of Methylglyoxal,” Poster presentation at the American Geophysical Union Fall Meeting, San Francisco, CA, 2007

Altieri, K., Carlton, A.G., Tan, Y., Seitzinger, S., Turpin, B.J., “Secondary Organic Aerosol Formation through Cloud Processing: Acids and Oligomers from Aqueous Methylglyoxal Photooxidation,” Platform presentation at the American Association for Aerosol Research Annual Conference, Reno, NV, 2007

Altieri, K.E., Carlton, A.G., Turpin, B.J., Seitzinger, S.P., “Making Macromolecules in Clouds,” Platform presentation at the American Geophysical Union/American Society of Limnology and Oceanography Ocean Sciences Conference, Honolulu, HI, 2006

Altieri, K.E., Carlton, A.G., Turpin, B.J., Seitzinger, S.P., “Oligomer Formation in Secondary Organic Aerosol Aqueous Phase Reactions,” Poster presentation at the American Association for Aerosol Research Conference, Austin, TX, 2005

## **SOCIAL RESPONSIVENESS**

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Convenor and Lecturer, SEAMester: South Africa’s Class Afloat II, 2017

Invited lecture, ACCESS Habitable Planet Workshop, 2017

Panel Member, NRF 3<sup>rd</sup> National Conference on Global Change, Side Event: Could solar radiation geoengineering buy time to a low carbon future?, 2016

Lead Author, Deep Decarbonization Pathways Project, South Africa Country Report, German Ministry of Environment, 2015

MAPS Policy Brief for UNFCCC COP 21, 2015

World Bank Thirsty Energy South African Case Study, 2015

South Africa 2050 Pathways Calculator, United Kingdom Department for International Development, 2015

Public seminar, University of the Third Age, Hermanus, South Africa, Drivers of greenhouse gas emissions and opportunities for mitigation, 2015

South Africa 2050 Pathways Calculator Workshop for NGO and Governmental Stakeholders, 2015

Presentation to South African Parliamentary Committee on Environmental Affairs on South Africa’s Intended Nationally Determined Contribution to the UNFCCC COP 21, 2015

External Expert, Western Cape Health Impact Assessment Project, 2015

## **MANAGEMENT, LEADERSHIP AND ADMINISTRATION**

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Scientific Steering Committee Member, Surface Ocean Lower Atmosphere Study, 2018-Present

Group Leader, ERC Energy, Environment & Climate Change group, 2015-2016

Steering Committee Member, African Climate & Development Initiative, 2015-Present

ERC Representative, Faculty of Engineering and the Built Environment, Postgraduate Planning and Administration Committee, 2016

Energy Research Centre Curriculum Development Committee, 2016

Session Co-Chair, Association for the Study of Limnology and Oceanography Aquatic Sciences Meeting 2013, Shedding light on the ‘black box’ of dissolved organic nitrogen: Insights into the sources, sinks, cycling, and composition of aquatic DON

Session Co-Chair, American Geophysical Union Fall Meeting 2010, The bio-atmospheric N cycle: N emissions, transformations, deposition, and terrestrial and aquatic ecosystem impacts

Reviewer – *Atmospheric Environment, Atmospheric Chemistry and Physics, Environmental Science & Technology, Journal of Geophysical Research, Journal of Atmospheric Chemistry, Global Biogeochemical Cycles, Journal of Energy in Southern Africa, Global Environmental Change, Proceedings of the National Academy of Sciences*