

Michael J. Polito

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Education

- Ph.D. in Marine Biology** 5/2012
University of North Carolina Wilmington (UNCW)
Dissertation: “Examining Niche Partitioning and Dietary Change in Pygoscelis Penguins Using Stable Isotope Analysis”
- B.S. in Marine Biology** 12/2001
University of North Carolina Wilmington (UNCW)
Honors Thesis: “A 1,000-year Record of Adélie Penguin Diets in the Ross Sea, Antarctica”

Professional Appointments

- Devonshire Postdoctoral Scholar** 9/2012-present
Woods Hole Oceanographic Institution, Woods Hole, MA
- Adjunct Research Faculty** 5/2012-present
UNCW, Dept. of Biology and Marine Biology, Wilmington, NC
- Field Biologist / Educator** 2005-present
Oceanites, Inc. (www.oceanites.org), Antarctica
- Biologist / Field Team Leader / Database Manager** 2003-2006
NOAA, Southwest Fisheries Science Center, La Jolla, CA
- Biological Technician / Field Team Leader** 2003
USFWS, Alaska Maritime National Wildlife Refuge, Homer, AK
- Seabird / Songbird / Pinniped Research Assistant** 2002-2003
PRBO Conservation Science (www.prbo.org), Petaluma, CA

Awards

- National Science Foundation, Office of Polar Programs** (Pending) (\$526,677)
“Investigating Holocene Shifts in the Diets and Occupation History of Antarctic Penguins and their Prey”
- SeaWorld and Bush Gardens Conservation Fund** (Pending) (\$23,300)
“Where Do Penguins Go in the Winter? Linking GLS Tracking and Stable Isotope Studies”

Davis Conservation Foundation (Pending) Assessing Dietary Overlap with Fisheries in an Expanding Gray Seal Population”	(\$15,000)
Devonshire Postdoctoral Scholar Award, 2012 Woods Hole Oceanographic Institution	(\$90,750)
American Ornithologists’ Union Research Grant, 2011 “Oxidative Stress and Life History Trade-Offs in Penguins”	(\$2,493)
Sigma Xi Grants-in-Aid of Research, 2011 “Oxidative Stress and Sexual Signaling in Gentoo Penguins”	(\$400)
The Company of Biologist Direct Travel Grant, 2010 To attend the 2010 Stable Isotopes in Ecology Summer Course, University of Utah	(£250)
National Science Foundation, Office of Polar Programs, 2008-2013 “Stable Isotope Analyses of Pygoscelid Penguin Remains from Active and Abandoned Colonies in Antarctica” (Co-PI with S. Emslie and W. Patterson)	(\$503,195)
Dr. Ralph W. Brauer Fellowship, UNCW, 2007 “Tissue-specific Dietary Isotopic Fractionation in Captive <i>Pygoscelis</i> Penguins”	(\$1,000)
Dr. Ralph W. Brauer Fellowship, UNCW, 2006 “Characterizing the Stable Isotope Signature of <i>Pygoscelis</i> Penguin Prey Species”	(\$1,000)
Lacy C. and Doris L. Sidbury Graduate Fellowship, UNCW, 2006	(\$1,000)
National Science Foundation, Office of Polar Programs, Travel Grant, 2005 To attend the Scientific Committee on Antarctic Research Symposium, Brazil	(\$2,000)

Peer Reviewed Publications

- 1) **Polito M.J.**, Reise C.S., Trivelpiece W.Z., Patterson W.P., and Emslie S.D. 2013. Stable isotopes identify an ontogenetic niche expansion in Antarctic krill (*Euphausia superba*) from the South Shetland Islands, Antarctica. *Marine Biology – In Press*
- 2) Beaulieu, M., Thierry, A. M., González-Acuña, D., and **Polito, M. J.** 2013. Integrating oxidative ecology into conservation physiology. *Conservation Physiology* 1(1)
- 3) Emslie S.E., **Polito M.J.**, and Patterson W.P. 2013. Stable isotope analysis of ancient and modern gentoo penguin egg membrane supports the krill surplus hypothesis in Antarctica. *Antarctic Science* 25(2): 213-218
- 4) **Polito M.J.**, Clucas G.V., Hart T., and Trivelpiece W.Z. 2012. A simplified method of determining the sex of *Pygoscelis* penguins using bill measurements. *Marine Ornithology* 40:89-94

- 5) **Polito M.J.**, Koopman H.N., Able S., Walsh J., Goebel M.E. 2012. Physiological constraints and the influence of diet on fatty acids in the yolk of gentoo penguins, *Pygoscelis papua*. *Journal of Comparative Physiology B* 182:703-713
- 6) Hinke J.T., **Polito M.J.**, Reiss C.S., Trivelpiece S.G., and Trivelpiece W.Z. 2012. Flexible reproductive timing can buffer reproductive success of *Pygoscelis* penguins in the Antarctic Peninsula region. *Marine Ecology Progress Series* 454:91-104
- 7) Brasso R.L., **Polito M.J.**, Lynch H.J., Naveen R., and Emslie S.E. 2012. Penguin eggshells reflect homogeneity of mercury in the marine food web surrounding the Antarctic Peninsula. *Science of the Total Environment* 439:165-171
- 8) Naveen R., Lynch H.J., Forrest S., Mueller T., and **Polito M.J.** 2012. First, complete site-wide penguin survey at Deception Island, Antarctica reveals massive declines consistent with climate change. *Polar Biology* 35:1879-1888
- 9) Raya Rey A., **Polito M.J.**, Archuby D., and Coria N. 2012 Stable isotopes identify age and sex-specific dietary partitioning and foraging habitat segregation in Southern Giant Petrels breeding in Antarctica and southern Patagonia. *Marine Biology* 159:1317-1326
- 10) *Vasil C.A., **Polito M.J.**, Patterson W.P., and Emslie S.E. 2012. Wanted: dead or alive? Isotopic analysis ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) of *Pygoscelis* penguin chick tissues support opportunistic sampling. *Rapid Communications in Mass Spectrometry* 26:487-493
- 11) **Polito M.J.**, Trivelpiece W.Z., Karnovsky N.J., Ng E., Patterson W.P., and Emslie S.D. 2011. Integrating stomach content and stable isotope analyses to quantify the diets of pygoscelid penguins. *PLoS ONE*, 6(10):e26642
- 12) **Polito M.J.**, Lynch H.J., Naveen R., and Emslie S.D. 2011. Stable isotopes reveal regional heterogeneity in the pre-breeding distribution and diets of sympatrically breeding *Pygoscelis* penguins. *Marine Ecology Progress Series* 421:265-277
- 13) **Polito M.J.**, Abel S., Tobias C.R., and Emslie S.D. 2011. Dietary isotopic discrimination in gentoo penguin (*Pygoscelis papua*) feathers. *Polar Biology* 34:1057–1063
- 14) Brasso R.L., Abel S., and **Polito M.J.** 2011. Mercury allocation into egg tissues is independent of dietary exposure in gentoo penguins. *Archives of Environmental Contamination and Toxicology*, 62(3):494-501
- 15) Sander M., Garcia S.A., Carneiro A.P.B., Cristofoli S.I., and **Polito M.J.** 2011. Band recoveries and juvenile dispersal of Southern Giant-Petrels, *Macronectes giganteus* (Gmelin, 1789), marked as chicks in Antarctica by the Brazilian Antarctic program (1984/1993). *Marine Ornithology* 38:125-127
- 16) **Polito M.J.**, and Goebel M.E. 2010. Investigating the use of stable isotope analysis of milk to infer seasonal trends in the diets and foraging habitats of female Antarctic fur seals. *Journal of Experimental Marine Biology and Ecology* 395(1-2):1-9
- 17) **Polito M.J.**, Miller A.K., Trivelpiece S.G., and Trivelpiece W.Z. 2010. Maturation increases early reproductive investment in Adélie Penguins *Pygoscelis adeliae*. *Ibis* 152:38-47

- 18) Carneiro A.P.B., **Polito M.J.**, Sander M., and Trivelpiece W.Z. 2010. Abundance and Spatial Distribution of Sympatrically Breeding *Catharacta* Spp. (skuas) in Admiralty Bay, King George Island, Antarctica. *Polar Biology* 33(5):673-682
- 19) **Polito M.J.**, Fisher S., Tobias C.R., and Emslie S.D. 2009. Tissue-specific isotopic discrimination factors in gentoo penguin (*Pygoscelis papua*) egg components: Implications for dietary reconstructions using stable isotopes. *Journal of Experimental Marine Biology and Ecology* 372:106-112
- 20) *Strickland M.E., **Polito M.J.**, and Emslie S.D. 2008. Spatial and seasonal variation in Adélie penguin diets as inferred from stable isotope analysis of eggshell. *Journal of the North Carolina Academy of Science*, 124(3):65-71
- 21) **Polito M.J.**, and Trivelpiece W.Z. 2008. Transition to independence and evidence of extended parental care in the gentoo penguin (*Pygoscelis papua*). *Marine Biology*, 154(2): 231-240
- 22) Sander M., Balbão T.C., **Polito M.J.**, Costa E.S., and Carneiro A.P.B. 2007. Recent decrease in chinstrap penguin (*Pygoscelis antarctica*) populations at two of Admiralty Bay's Islets on King George Island, South Shetland Islands, Antarctica. *Polar Biology* 30(5):659-661
- 23) Emslie, S.D., Berkman P.A., Ainley D. G., Coats, L., and **Polito M.** 2003. Late-Holocene initiation of ice-free ecosystems in the Southern Ross Sea, Antarctica. *Marine Ecology Progress Series* 262:19-25
- 24) **Polito M.**, Emslie S.D., and Walker W. 2002. A 1,000-year record of Adélie penguin diets in the Southern Ross Sea, Antarctica. *Antarctic Science*, 14 (4):327–332

Technical Reports

- 1) **Polito M.J.**, and Drew, E.K. 2003. Results of Seabird Monitoring at St. Paul Island, Alaska in 2003: Summary Appendices. U.S. Fish and Wildl. Serv. Rep., AMNWR 03/11

Teaching: Academic Courses

Guest Lecturer – UNCW, Dept. of Biology and Marine Biology 2010-2011

- *Ecology (BIO 366)* - “Limnetic Systems: Productivity in Lakes and Streams”
- *Ecology (BIO 366)* - “Ocean Circulation, Upwelling and Primary Production”
- *Honors Survey of Biological Research (BIO 499)*: “Methods of Applied Field Ornithology”

Laboratory Instructor – UNCW, Dept. of Biology and Marine Biology 2006-2008

Marine Biology (BIOL 362) & *Principles of Biology (BIOL 201)*: Principle instructor for upper level Marine Biology laboratory courses (one semester, two 25-student sections) and introductory level biology laboratory (four semesters, two 25-student sections per semester).

Teaching: Community Outreach

Lecturer - Oceanites, Inc. 2005-present
Regularly lectures commercial tour ship visitors to Antarctica on multiple topics including: “Antarctic Seabirds”, “Life at Antarctic Research Stations”, “Marine Food Webs” and “Antarctic Penguins and Climate Change.” (www.oceanites.org)

Guest Lecturer / Curriculum Developer – New Hanover County Schools, NC 2008-2011
Developed and implemented presentations, interactive blogs and science curriculum for elementary school students with a focus on increasing the participation of underrepresented groups in science. (More information at: www.uncw.edu/penguins/education.html)

Teaching: Mentoring Experience

Undergraduate Research Mentor – UNCW 2006-2012
Mentored four undergraduate students in experimental design, data collection, analysis and the preparation of their Honors research papers and oral presentations. Two students to-date (*) have published their theses in peer-reviewed journals.

- 1) **Mary Strickland (2007)* – “Spatial and Seasonal Variation in Adélie Penguin Diets as Inferred from Stable Isotope Analysis of Eggshell”
- 2) *Kyle Welsh (2011)* – “Historic Diet and Mercury Availability in the Clapper Rail Inferred from North Carolina Museum Specimens”
- 3) **Christopher Vasil (2011)* – “Similarities in Stable Isotopes between Live and Deceased Adélie Penguins Support Opportunistic Sampling”
- 4) *Chelsea McDougall (2012)* – “Stable Isotope Analysis of Modern and Fossil Glacial Squid in the Antarctic Peninsula”

Mass Spectrometry Laboratory Assistant – UNCW 2008-2012
Worked at the UNCW Center for Marine Science training undergraduate, graduate and post-doctoral researchers in project design, sample preparation, analysis and interpretation of stable isotope data for their research programs.

Teaching: Workshops and Classes

Practicum in College Biology Teaching - UNCW 2008
Participated in course focused on the teaching of undergraduate-level biology courses. Included formal teaching experience and design of curricula, courses and assessments.

Teaching Assistant “Boot Camp” - UNCW 2007-2011
Helped to develop and organize an annual course for new graduate student teaching assistants. This included training in the preparation of syllabi, lessons and exams as well as effective teaching methods, communication skills and conflict resolution.

Analytical Expertise

Stable Isotope Mass Spectrometry

Expert in the operation, maintenance and repair of continuous-flow isotope ratio mass spectrometers (Thermo Delta V Plus) and peripheral devices (Costech ECS4010 elemental analyzer and Thermo Gas Bench II) and software (Isodat) for the analysis of nitrogen and carbon isotopes in solid samples, and carbon and oxygen isotopes in carbonates. Attended the *Stable Isotopes in Ecology Summer Course* at the University of Utah in 2010.

Fatty Acid Analysis

Experienced in the chemical lipid extraction, derivatization and analysis of fatty acids via gas chromatography (Varian CP-3800 gas chromatograph flame ionization detector).

Mercury Analysis

Experienced with the use and general maintenance of a Direct Mercury Analyzer (DMA-80, Milestone) for the analysis of total mercury in solid and liquid organic samples.

Geospatial, Statistical and Quantitative Software

- ArcGIS (ver. 9.2)
- SAS (ver. 9.1) and SPSS (ver. 16) for statistical analysis
- R (ver. 2.14) for statistical analysis, ecological modeling and Bayesian mixing model analyses for dietary, trophic and food-web studies using stable isotope data
- PRIMER (ver. 6) for non-parametric analysis of multivariate ecological and fatty acid data

Selected First Author Conference Presentations

Polito M.J., Brasso R.L., Trivelpiece W.Z., Patterson W.P., and Emslie S.E. 2012. Divergent foraging strategies influence mercury exposure in sympatrically breeding *Pygoscelis* penguins. *Scientific Committee on Antarctic Research (SCAR) Open Science Conference, Portland, OR, USA*

Polito M.J., Reise C.S., Trivelpiece W.Z., Patterson W.P., and Emslie S.D. 2012. Does Size Matter? Ontogenetic niche expansion Antarctic krill (*Euphausia superba*). *SCAR Open Science Conference, Portland, OR, USA*

Polito M.J., Koopman H.N., Able S., Walsh J., and Goebel M.E. 2010. The influence of diet on fatty acids in the yolk of gentoo penguins, *Pygoscelis papua*. *1st World Seabird Conference, Victoria, Canada and 7th International Penguin Conference, Boston, MA, USA*

Polito M.J., Lynch H.J., Naveen R., and Emslie S.D. 2010. Stable isotopes reveal regional heterogeneity in the pre-breeding distribution and diets of sympatrically breeding *Pygoscelis* penguins. *1st World Seabird Conference, Victoria, Canada / 7th International Penguin Conference, Boston, MA, USA*

Polito M.J., Trivelpiece S.G., Trivelpiece W.Z., and Emslie S.D. 2009. Inter-annual variation in the pre-breeding diets of the Adélie penguin (*Pygoscelis adeliae*) as estimated from stable isotope analysis of eggshell. *SCAR Biology Symposium, Sapporo, Japan*

Polito M.J., and Trivelpiece W.Z. 2008. Effects of female age, breeding experience and laying date on clutch and egg size in the Adélie penguin (*Pygoscelis adeliae*). *Duke University Marine Lab Graduate Student Research Symposium, Duke University Marine Lab, Beaufort, NC, USA*

Polito M.J., Strickland M.E., and Emslie, S.D. 2007. Temporal variation in resource utilization by *Pygoscelis* penguins as inferred from stable isotope analysis. *Waterbirds Society Meeting, Barcelona, Spain*

Polito M.J., Burgo Braga R., Dani N., and Trivelpiece W.Z. . 2005. Digital spatial data collection of penguin colonies on the western shore of Admiralty Bay (ASPA 128), King George Island, Antarctic Peninsula. *SCAR Biology Symposium, Curitiba, Brazil*

Polito M., Emslie S.D., and Walker, W. 2002. A 1,000-year record of Adélie penguin diets in the Southern Ross Sea, Antarctica. *The Pacific Seabird Group Symposium, Parksville, Canada*

Polito M., Emslie S.D., and Walker, W. 2001. Diet of Adélie penguins at Ross Island, Antarctica. *SCAR Biology Symposium, Amsterdam, The Netherlands*

Professional Services

Invited Reviewer: Canadian Journal of Zoology, Deep Sea Research II, Ibis, Journal of Comparative Physiology - B, Journal of Field Ornithology, Marine Biology, Marine Biology Research, Neotropical Biology & Conservation, Nature (reader panel), Polar Biology, Proceeding of the Royal Society - B, PLoS One, Marine Ecology Progress Series, Rapid Communications in Mass Spectrometry

Active Member: American Geophysical Union, American Ornithologists' Union, Association of Polar Early Career Scientists

Committee and Representative Positions:

Postdoc Representative - Diversity Committee, Woods Hole Oceanographic Institution (2012-13)

Treasurer - Woods Hole Oceanographic Institution Postdoctoral Association (2012-13)

Session Chair - Scientific Committee on Antarctic Research Open Science Conference (2012)

President - UNCW Graduate Student Association (2010-11)

Representative - UNCW Biology & Marine Biology Graduate Advisory Committee (2008)