

Kristin M. O'Brien
Curriculum Vitae
Department of Biology and Wildlife
Institute of Arctic Biology
University of Alaska
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EDUCATION

Duke University, North Carolina	Zoology	B.S., 1990
University of Maine, Orono	Zoology	Ph.D, 1999

PROFESSIONAL EXPERIENCE

2018- present	Professor of Biology	University of Alaska, Fairbanks
2010- present	Associate Professor of Biology	University of Alaska, Fairbanks
2004- 2010	Assistant Professor of Biology	University of Alaska, Fairbanks
2004- present	Affiliate Associate Professor of Chemistry and Biochemistry	University of Alaska, Fairbanks
2008- 2010	External Faculty Member School of Marine Sciences	University of Maine, Orono
2003	Instructor in Biology	Metropolitan St. College, Denver
1999-2003	N.I.H. NRSA Postdoctoral Fellow	University of Colorado, Boulder

RESEARCH INTERESTS

Adaptation and acclimation of fishes to cold temperature: mitochondrial function; metabolic remodeling; hypoxia sensing; phenotypic plasticity of Antarctic fishes

RESEARCH GRANTS

2018-2021	An energy-sensitive pathway of cold-induced metabolic remodeling in threespine stickleback, P.I., <i>National Science Foundation</i> , \$689,579.
2017-2018	The effect of polyglutamine and glutamic acid repeats on HIF-1 function. P.I., <i>Alaska INBRE Pilot Grant</i> , \$75,000.
2014-2019	Collaborative research: The physiological and biochemical underpinnings of thermal tolerance in Antarctic notothenioid fishes, P.I., <i>National Science Foundation</i> , \$543,642.
2011-2014	Collaborative research: Redox balance in Antarctic notothenioid fishes: Do icefish have an advantage? P.I., <i>National Science Foundation</i> , \$404,970.
2008-2011:	Collaborative research: Linkages among thermal tolerance and mitochondrial form and function in notothenioid fishes, P.I., <i>National Science Foundation</i> , \$556,600.

- 2007-2012: CAREER: The molecular mechanisms of cold-induced mitochondrial biogenesis, P.I., *National Science Foundation*, \$887,946.
- 2006-2007: The mitochondrion as a temperature sensor: molecular mechanisms regulating cold-induced mitochondrial biogenesis in the oxidative muscle of *Gasterosteus aculeatus*, P.I., *AK EPSCoR*, \$50,000.
- 2005-2008: Collaborative research: differential expression of oxygen-binding proteins in Antarctic fishes affects nitric oxide-mediated pathways of angiogenesis and mitochondrial biogenesis, Co-P.I., *National Science Foundation*, \$204,171.
- 2005-2007: Cellular protection against nitrosative stress, P.I., *American Heart Association*, \$130,785.

FELLOWSHIPS

- 2000-2003: Mitochondrial Adaptation to Hypoxia, *National Institutes of Health* National Research Service Award.
- 1998: *Association of Graduate Students* Research Award, University of Maine.
- 1996-1998: *Sea Grant Center for Marine Studies* Graduate Fellowship, University of Maine.
- 1996: *American Heart Association* Graduate Student Summer Fellowship, University of Maine.

TEACHING GRANTS

- 2008: Intramural award from the UAF Provost, Support for a laboratory in cell biology, \$16,000.
- 2008: *GCAT* and the *National Science Foundation*, Equipment grant for teaching microarray technology in cell biology, \$15,000.
- 2007: *UAF Technology Advisory Board*, Enhancing the laboratory for cell biology, \$21,857.
- 2005: Intramural award from the UAF Provost, Support for developing a laboratory in cell biology, \$40,000.

PUBLICATIONS (* graduate student, † undergraduate student)

Egginton, S.E., Axelsson, M., Crockett, E.L., O'Brien, K.M., and A.P. Farrell. Nature's knockouts: Maximum in situ cardiac performance at ambient and elevated temperatures in Antarctic fishes lacking haemoglobin and myoglobin. Accepted, *Conserv. Physiol.*

41. Biederman, A.M.*, Kuhn, D.E., **O'Brien, K.M.**, and E.L. Crockett. (2019). Mitochondrial

- membranes in cardiac muscle from Antarctic notothenioid fishes vary in phospholipid composition and membrane fluidity. In press, *Comp Biochem. Physiol. B* 235:46-53
40. Biederman, A.M., Kuhn, D.E., **O'Brien, K.M.**, and E.L. Crockett. (2019). Physical, chemical, and functional properties of neuronal membranes vary between species of Antarctic notothenioids differing in thermal tolerance. *J. Comp Physiol. Biochem.* 189(2) 213-222.
 39. Joyce, W., Axelsson, M., Egginton, S.E., Farrell, A.P., Crockett, E.L., and **K.M. O'Brien**. (2019). The effects of thermal acclimation on cardio-respiratory performance in an Antarctic fish (*Notothenia coriiceps*). *Conserv. Physiol.* 6(1)
 38. Joyce, W., Egginton, S., Farrell, A. P., Crockett, E.L., **O'Brien, K.M.**, and M. Axelsson. (2018). Exploring nature's natural knockouts: In vivo cardiorespiratory performance of Antarctic fishes during acute warming. *J. Exp. Biol.* 221.
 37. **O'Brien, K.M.**, Rix, A.S.* , Egginton, S., Farrell, A.P., Crockett, E.L., Schlauch, K., Woolsey, R., Hoffman, M., and S.E. Merriman[†]. (2018). Mitochondrial metabolism may contribute to differences in thermal tolerance of red- and white-blooded Antarctic notothenioid fishes. *J. Exp. Biol.* 221.
 36. **O'Brien, K.M.**, Crockett, E.L., Philip, J., Oldham, C.A.* , Hoffman, M., Kuhn, D.E., Barry, R., and J. McLaughlin[†]. (2018). The loss of hemoglobin and myoglobin does not confer an advantage in management of oxidative stress in Antarctic icefishes. *J. Exp. Biol.* 221.
 35. Rix, A.S.* , Grove, T.J., and **K.M. O'Brien**. (2017). Hypoxia-inducible factor-1 α in Antarctic fishes contains a polyglutamine and glutamic acid insert that varies in length with phylogeny. *Polar Biol.* 40(12) 2537-2545.
 34. Ainley, D.A., Crockett, E., Eastman, J.E., Fraser, W., Nur, N., **O'Brien, K.**, Salas, L., Siniff, D. (2017). How overfishing a large piscine mesopredator explains growth in Ross Sea penguin populations: a framework to better understand impacts of a controversial fishery. *Ecolog. Model.*
 33. Keenan, K.A.* , Grove, T.J., Oldham, C. A.* , and **K.M. O'Brien** (2017). Characterization of glycerol-3-phosphate acyltransferase in notothenioid fishes. *Comp. Biochem. Physiol. Part B* 204: 9-26.
 32. Keenan, K.* , Hoffman, M., Dullen K.[†], and **K.M. O'Brien** (2017). Molecular drivers of membrane proliferation in response to cold acclimation in threespine stickleback. *Comp. Biochem. Physiol. Part A.* 203: 109-114.
 31. **O'Brien, K.M.** (2016). New lessons from an old fish: what Antarctic icefishes may reveal about the functions of oxygen-binding proteins *Integr Comp Biol.* 56: 531-41.
 30. Kuhn, D.E., **O'Brien, K.M.**, and E. L. Crockett (2016). Expansion of capacities for iron

- transport and sequestration reflects plasma volumes and heart mass among white-blooded notothenioids. *Am J Physiol Regul Integr Comp Physiol*. 311: R649- R657
29. Devor, D.P. *, Kuhn, D.E., **O'Brien, K.M.**, and E.L. Crockett (2016). Hyperoxia does not extend critical thermal maxima (CTMax) in white- or red-blooded Antarctic notothenioid fishes. *Physiol. Zool.* 89: 1-9.
 28. Teigen, L.E*., Orczewska, J.I*., McLaughlin, J. †, and **K.M. O'Brien** (2015). Cold acclimation increases levels of some heat shock proteins and sirtuin isoforms in threespine stickleback. *Comp. Biochem. Physiol. Part A*. 188: 139-148.
 27. Lewis, J.M., Grove, T.J., and **K.M. O'Brien** (2015). Energetic costs of protein synthesis do not differ between red- and white- blooded Antarctic notothenioid fishes. *Comp. Biochem. Physiol. Part A*. 187: 177-183.
 26. **O'Brien, K.M.**, Mueller, I.A.*., Orczewska, J.I.*., Dullen, K.R.†, and M. Ortego† (2014). Hearts of some Antarctic fishes lack mitochondrial creatine kinase. *Comp. Biochem. Physiol. Part A*. 178: 30-36.
 25. Mueller, I.A.*., Hoffmann, M., Dullen, K†., and **K.M. O'Brien** (2014). Moderate elevations in temperature do not increase oxidative stress in oxidative muscles of Antarctic notothenioid fishes. *Polar Biol.* 37: 311-320.
 24. **O'Brien, K.M.** and E.L. Crockett (2013). The promise and perils of Antarctic fishes. *EMBO Rep.* 14: 17-24.
 23. Woo, D.K., Jung, Y.W., **O'Brien, K.M.**, and R.O. Poyton (2013). Molecular characterization of a mitochondrial mutant carrying point mutations in the 3' untranslated region of COX3 mRNA from *Saccharomyces cerevisiae*. *Animal Cell Sys* 17: 80-87.
 22. Mueller, I.A.*., Devor, D.P., Grim, J.M., Beers, J.M., Crockett, E.L., and **K.M. O'Brien** (2012). Exposure to critical thermal maxima causes oxidative stress in hearts of white- but not red-blooded Antarctic notothenioid fishes. *J. Exp. Biol.* 215: 4655-3664.
 21. Mueller, I.A*., and **K.M. O'Brien** (2011). Nitric oxide synthase is not expressed, nor up-regulated in response to cold acclimation in liver or muscle of threespine stickleback (*Gasterosteus aculeatus*). *Nitric Oxide*. 25: 416-422.
 20. Mueller*, I.M., Grim, J., Beers, J., Crockett, E.L., and **K.M. O'Brien** (2011). Interrelationship between mitochondrial function and susceptibility to oxidative stress in red- and white-blooded Antarctic notothenioid fishes. *J. Exp. Biol.* 214: 3732-3741
 19. Kammer*, A.R., Orczewska*, J.I., and **K.M. O'Brien** (2011). Oxidative stress is transient and tissue-specific during cold acclimation of threespine stickleback. *J. Exp. Biol.* 214: 1248-1256

18. **O'Brien, K.M.** (2011). Mitochondrial biogenesis in cold-bodied fishes. *J. Exp. Biol.* 214: 275-285.
17. **O'Brien, K.M.**, and I. Mueller* (2010). The unique mitochondrial form and function of Antarctic channichthyid icefishes. *Integ. Comp. Physiol.* 50(6):993-1008.
16. Orczewska*, J.I., Hartleben*, G., and **K.M. O'Brien**. (2010). The molecular basis of aerobic metabolic remodeling differs between oxidative muscle and liver in threespine sticklebacks in response to cold acclimation. *Am J Physiol Regul Integr Comp Physiol* 299: R352-64.
15. Urschel*, M., and **K.M. O'Brien**. (2009). Mitochondrial function in Antarctic notothenioid fishes that differ in the expression of oxygen-binding proteins. *Polar Biol.* 32: 1323-1330.
14. Urschel*, M., and **K.M. O'Brien**. (2008). High mitochondrial densities in hearts of Antarctic icefishes are maintained by an increase in mitochondrial size, rather than mitochondrial biogenesis. *J. Exp. Biol.* 211:2638-2646.
13. Sidell, B.D., and **K.M. O'Brien**. (2006). When bad things happen to good fish: the loss of hemoglobin and myoglobin expression in Antarctic icefishes. *J. Exp. Biol.* 209: 1791-1802.
12. Cassanova, N., **O'Brien, K.M.**, Stahl, B., McClure, T., and R. O. Poyton. (2005). Yeast flavohemoglobin, a nitric oxide oxidoreductase, is located in both the cytosol and mitochondrial matrix: Effects of respiration, anoxia, and the mitochondrial genome on its intracellular level and distribution. *J. Biol. Chem.* 280: 7645-7653.
11. **O'Brien, K.M.**, Dirmeier, R., Engle, M., and R.O. Poyton. (2004). Mitochondrial protein oxidation in yeast mutants lacking Mn or CuZn superoxide dismutase: Evidence that MnSOD and CuZnSOD have both unique and overlapping functions in protecting mitochondrial proteins from oxidative damage. *J. Biol. Chem.* 279: 51817-51827.
10. Dirmeier, R., **O'Brien, K.M.**, Engle, M., Dodd, A., Spears, E., and R.O. Poyton. (2004). Measurement of oxidative stress in cells exposed to hypoxia and other changes in oxygen concentration. *Meth. Enzymol.* 381:589-603.
9. Poyton, R.O., Dirmeier, R., **O'Brien, K.M.**, David, P., and A. Dodd. (2004). Experimental strategies for analyzing oxygen sensing in yeast. *Meth. Enzymol.* 381: 644-662.
8. Poyton, R.O., Dirmeier, R., **O'Brien, K.M.**, and E. Spears. (2003). A role for the mitochondrion and reactive oxygen species in oxygen sensing and adaptation to hypoxia in yeast. In: *Oxygen Sensing: Responses and Adaptation to Hypoxia*. Editors: Lahiri, S., Semenza, G., and N. Prabhakar. Marcel Dekker Inc., N.Y., Basel.

7. **O'Brien, K.M.**, Skilbeck, C., Sidell, B.D., and S. Egginton. (2003). Muscle fine structure may maintain the function of oxidative muscle fibres in haemoglobinless Antarctic fishes. *J. Exp. Biol.* 206: 411-421.
6. Dirmeier, R., **O'Brien, K.M.**, Engle, M., Dodd, A., Spears, E., and R.O. Poyton. (2002). Exposure of yeast cells to anoxia induces transient oxidative stress. *J. Biol. Chem.* 277: 34773-34789.
5. Dagsgaard, C., Taylor, L., **O'Brien, K.M.**, and R.O. Poyton. (2001). Effects of anoxia and the mitochondrion on expression of aerobic nuclear COX genes in yeast: Evidence for a signaling pathway from the mitochondrial genome to the nucleus. *J. Biol. Chem.* 276: 7593-7601.
4. **O'Brien, K.M.**, and B.D. Sidell. (2000). The interplay among cardiac ultrastructure, metabolism and the expression of oxygen-binding proteins in Antarctic fishes. *J. Exp. Biol.* 203: 1287-1297.
3. **O'Brien, K.M.**, Xue, H., and B.D. Sidell. (2000). Quantification of oxygen diffusion distance within the spongy myocardium of hearts from Antarctic fishes. *Resp. Physiol.* 122:71-80.
2. McCleave, J.D., Brickley, P.J., **O'Brien, K.M.**, Kistner, D.A., Wong, M.W., Gallagher, M., and S.M. Watson. (1998). Do leptocephali of the European eel swim to reach continental waters? Status of the question. *J. Mar. Biol. Ass. U.K.* 78:285-306.
1. **O'Brien, K.M.**, and B.D. Sidell. (1997). The loss of hemoglobin and/or myoglobin affects cardiac ultrastructure in Antarctic fishes. *Antarc. J. U.S.* 32:98-100.

PRESENTATIONS

- Rix, A.S., and K. M. O'Brien. Characterization of the HIF-1 pathway in response to an acute heat stress in Antarctic fishes. *Intersociety Meeting of the American Physiological Society, Comparative Physiology: Complexity and Integration*, Oct 25-28, 2018, New Orleans, LA.
- Rix, A.S., and K. M. O'Brien. Characterization of the HIF-1 pathway in response to an acute heat stress in Antarctic fishes. *Alaska INBRE Retreat*, Oct. 2018, Talkeetna, AK.
- Brooking, A., Rix, A.S., and K.M. O'Brien. Sequencing Hypoxia Responsive Genes in Antarctic Fish. *UAF URSA Undergraduate Research Day*, April 10, 2018, Fairbanks, AK.
- Rix, A.S., and K.M. O'Brien. The cDNA sequence of hypoxia inducible factor -1 in Antarctic notothenioid fishes. *UAF BGSA Midnight Sun Symposium*, April 13, 2018, Fairbanks, AK.
- Rix, A.S., and K.M. O'Brien. Molecular underpinnings of hypoxia and thermal tolerance in Antarctic fishes. *UA Biomedical Research Conference*. May 18, 2018, Anchorage, AK.

- Rix, A.S., and K.M. O'Brien. Probing the hypoxic response of Antarctic fish. *Western States INBRE Conference*, Oct 2017, Jackson, WY.
- Rix, A.S., and K.M. O'Brien. Probing the hypoxic response of Antarctic fish. *Alaska INBRE Retreat*, Sept 2017, Denali, AK. *Placed 2nd in graduate student competition.*
- O'Brien, K.M., and A.S. Rix. Mitochondrial adaptations associated with the loss of hemoglobin and myoglobin may constrain cardiac performance of Antarctic fishes, *APS Conference: Physiological Bioenergetics: Mitochondria from Bench to Bedside*, Aug 2017, San Diego, CA.
- Farrell, A.P., Egginton, S., Axelsson, M., Crockett, E.L., and K.M. O'Brien. Nature's natural knockouts: Cardiac capacities of Antarctic fishes without haemoglobin and myoglobin. *Canadian Society of Zoology*. May 2017. University of Manitoba, Winnipeg, Canada
- Rix, A.S. and K.M. O'Brien. Polyglutamine and glutamic acid repeats within hypoxia inducible factor 1- α in notothenioids may alter the hypoxic response. *Society for Integrative and Comparative Biology*. Jan. 2017. New Orleans, LA.
- O'Brien, K.M., and A.S. Rix. Mitochondrial function may contribute to thermal tolerance of red-white-blooded notothenioid fishes, *Society for Experimental Biology*, Brighton, England, July 2016.
- Egginton, S.E., Crockett, E.L., O'Brien, K.M., and A.P. Farrell. Is cardiovascular scope in Antarctic fishes adequate in the face of global warming? *Society for Experimental Biology meeting*, Brighton, England, July 2016.
- Grove, T.J., E.L. Crockett, K.M. O'Brien, and S.E. Egginton. Chilled out vasoactivity in Antarctic icefish. *Society for Experimental Biology*, Brighton, England, July 2016.
- O'Brien, K.M. Mitochondrial function and thermal tolerance in Antarctic notothenioids. *International Congress on the Biology of Fishes*, San Marcos TX, June 2016.
- Rix, A.S., and K.M. O'Brien. The cDNA sequence of hypoxia-inducible factor-1 α in Antarctic notothenioid fishes. UAF Biomedical Research Conference, May 2016.
- Brookings, A., O. Toien, B., Barnes, K.M. O'Brien. Mitochondrial DNA copy number does not change during hibernation. Undergraduate Research Day, UAF. April 2016.
- Oldham, C, A., and K.M. O'Brien. Activity of the 20S proteasome is not strongly correlated with the expression of oxygen-binding proteins in Antarctic notothenioids. *American Physiological Society Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology*,. San Diego, CA, Oct. 2014
- Dullen, K., Orczewska, J., Mueller, I., and K.M. O'Brien. Creatine kinase isoforms are

- differentially expressed between hearts of red- and white-blooded Antarctic fishes. *Society for Integrative and Comparative Biology*, San Francisco, CA, Jan. 2013.
- Devor, D., O'Brien, K.M., and E.L. Crockett. Thermal tolerance is not limited by oxygen-carrying capacity in Antarctic notothenioid fishes. *SCAR 2012*, Portland, OR, July. 2012.
- Mueller, I.A., and K.M. O'Brien. Loss of hemoglobin and myoglobin in Antarctic icefish is correlated with changes in mitochondrial ultrastructure and function, which might contribute to their lower thermal tolerance. *Gordon Conference on Mitochondrial Biology*, Proctor Academy, NH, June 2011.
- Mueller, I.A., and K.M. O'Brien. Oxidative stress occurs in cardiac muscle of some Antarctic icefishes in response to an increase in temperature. *Society for Integrative and Comparative Biology*, Salt Lake City, UT, Jan. 2011
- Mueller, I.A., and K.M. O'Brien. The effect of mitochondrial ultrastructure on function in Antarctic notothenioid fishes. *Society for Integrative and Comparative Biology*, Seattle, WA, Jan. 2010.
- Kammer, A.R., and K.M. O'Brien. Oxidative stress in response to cold acclimation in threespine sticklebacks (*Gasterosteus aculeatus*). *Society for Integrative and Comparative Biology*, Seattle, WA, Jan. 2010.
- Orczewska, J.I., and K.M. O'Brien. Timecourse for metabolic remodeling in response to cold acclimation in threespine sticklebacks *Society for Integrative and Comparative Biology*, Seattle, WA, Jan., 2010.
- O'Brien, K.M. How do fish swim when it's cold? Studying threespine sticklebacks to understand how muscles maintain function at cold temperature. *Barrow Arctic Science Consortium Schoolyard Project*, Barrow, AK, Aug. 2008.
- Urschel, M., and K.M. O'Brien. Molecular mechanisms regulating high densities of mitochondria in the heart ventricle of Antarctic icefishes, *Society for Integrative and Comparative Biology*, San Antonio, TX, Jan. 2008.
- Hartleben, G., Tawney, R., and K.M. O'Brien. Reactive oxygen species may stimulate mitochondrial biogenesis in response to cold temperature in aerobic muscle of threespine sticklebacks, *Society for Integrative and Comparative Biology*, San Antonio, TX, Jan. 2008.
- O'Brien, K.M., Urschel, M., and I. Mueller. NO-mediated pathway of mitochondrial biogenesis in hearts of Antarctic fishes, *Gordon Conference- Mitochondria and Chloroplasts*, Oxford, England, Aug. 2006.
- O'Brien, K.M., Hartleben, G., and R. Tawney. The potential role of reactive oxygen species in muscle remodeling in response to cold temperature in *Gasterosteus aculeatus*,

International Conference on Stickleback Behavior and Evolution, Anchorage, AK, July 2006.

Mueller, I., and K.M. O'Brien. Identification of proteins involved in mitochondrial morphology, *UA Biomedical Research Conference*, Anchorage, AK, May 2006.

Schmoll, M., and K.M. O'Brien. Translocation of yeast flavohemoglobin into the mitochondrion, *UA Biomedical Research Conference*, Anchorage, AK, May 2006.

Smith, L., and K.M. O'Brien. Regulation of expression of yeast flavohemoglobin in *Saccharomyces cerevisiae*, *UA Biomedical Research Conference*, Anchorage AK, May 2006.

O'Brien, K.M., Smith, L., and R. Tawney. Yeast flavohemoglobin is upregulated by reactive oxygen species and protects SOD mutants against nitrosative stress, *Experimental Biology*, San Francisco, CA, April 2005.

O'Brien, K.M., Engle, M., Dirmeier, R., and R.O. Poyton. Characterization of oxidative stress in yeast mutants lacking superoxide dismutase, *American Physiological Society*, San Diego, CA, Aug. 2002.

O'Brien, K.M., Engle, M., Dirmeier, R., and R.O. Poyton. Yeast flavohemoglobin may protect mutants lacking superoxide dismutase from oxidative stress, *International Congress of Physiological Sciences*, Christchurch, NZ, Aug. 2001.

O'Brien, K.M., and B.D. Sidell. A new method for quantifying oxygen-diffusion distance within spongy myocardium, *Society for Integrative and Comparative Biology*, Atlanta, GA, Jan. 2000.

O'Brien, K.M., and B.D. Sidell. Ultrastructural modifications may maintain metabolic capacity in hearts of Antarctic fishes that lack oxygen-binding proteins. *Biology of Antarctic Fish SCAR VII Mini-symposium*, Auckland, NZ, Sept. 1998.

O'Brien, K.M., and B.D. Sidell. The loss of hemoglobin and/or myoglobin affects the cardiac physiology of Antarctic fishes, *Society for Integrative and Comparative Biology*, Boston, MA, Jan. 1998.

INVITED PRESENTATIONS

O'Brien, K.M. The impact of climate warming on Antarctic fishes: Can notothenioids respond to hypoxia? *Stress and Immune Responses of Antarctic Notothenioid Fishes*, Fago, Portugal, May 2, 2019.

O'Brien, K.M. Is there an advantage to being an icefish, lacking oxygen-binding proteins? *Society for Integrative and Comparative Biology*, Portland, OR, Jan. 2016.

- O'Brien, K.M. How will Antarctic notothenioid fishes fare as the Southern Ocean warms? Invited plenary speaker, *International Congress on the Biology of Fishes*, Edinburgh, Scotland, Aug. 2014.
- O'Brien, K.M. Multiplying mitochondria in the cold: How do fish do it and why? *Society for Integrative and Comparative Biology*, San Francisco, CA, Jan. 2013.
- O'Brien, K.M. Insights into the physiological underpinnings of thermal tolerance in Antarctic notothenioid fishes. *International Congress on the Biology of Fishes*, Madison, WI, July 2012.
- O'Brien, K.M. Polar Science: From the field to the classroom. *American Geophysical Union*, San Francisco, CA, Dec. 2010
- O'Brien, K.M. Pumping without iron: The unique architecture of cardiomyocytes in the hemoglobinless Channichthyids. *Society for Integrative and Comparative Biology Symposium on Advances in Antarctic Marine Science*, Seattle, WA, Jan. 2010.
- O'Brien, K.M. Mitochondrial biogenesis in the cold. *Journal of Experimental Biology Symposium on the Biology of Energy Expenditure*, Mürren, Switzerland, March 2010.

TEACHING EXPERIENCE

University of Alaska Fairbanks

- Fundamentals of Biology I (BIOL 115X): 4 credit course with laboratory; team-taught.
- Introduction to Cell and Molecular Biology (BIOL/CHEM 261): A new, 4 credit course for which I developed both the lecture and laboratory.
- Cell Biology (BIOL/CHEM 461/661): 4 credit course with laboratory.
- Cell Physiology (BIOL 693): 2 credit graduate seminar course focused on physiological, biochemical and molecular responses of organisms to changes in temperature and hypoxia.
- Synthetic Biology (BIOL/MATH 393): A new, 3 credit course co-taught with Dr. Elizabeth Allman in the Math Dept. Lecture and laboratory.
- Advanced Laboratory in Cell and Molecular Biology (BIOL 466) A new laboratory course; team-taught.

PROFESSIONAL ACTIVITIES

Public Service

- Editor, judge or mentor for the Alaska Statewide High School Science Symposium, Fairbanks, 2004-2007, 2009, 2010, 2017.
- Elementary School Science Fair Judge, Fairbanks, AK, 2004-2007, 2009.

University Service

- Co-Leader AK INBRE Research Training Core, fall 2016 – present.
- Search committee member for a vertebrate physiologist in IAB & B&W, spring 2016.
- Radiation Safety Committee, fall 2014 – present.
- Biomedical Curriculum Development Committee, 2014-2015.

- Green Bikes Steering Committee, summer 2012- 2014.
- Irving-Scholander Committee, 2010-2011, Co-Chair, 2012-present.
- Teaching Advisory Committee, Biology and Wildlife, 2009- 2010.
- Advanced Instrumentation Laboratory Committee, 2007- 2013.
- Affiliate Faculty Review Committee for IAB and Biology and Wildlife, 2007- present.
- Provost Council for Biomedical Health Research and Education, 2006-08.
- BIOS Planning and Bioscience Users Committee, 2006-2011.
- EPSCoR Travel Committee, 2004-06.

Professional Service

- Advisory board of *Journal of Comparative Physiology B* 2018- present.
- Editorial board, *Comp. Biochem. Physiol. Part B.*, summer 2014 - present.
- Program Officer, Division of Comparative Physiology and Biochemistry for the Society of Integrative and Comparative Biology. Jan 2011- Dec 2012.
- Editor, *Frontiers in Aquatic Physiology*, May 2010- present.
- Palmer Station Area Users Committee, Sept. 2009- 2012.
- Chief Scientist, U.S. Antarctic R/V *Laurence M. Gould*, April -June 2011, April-July 2013, April-July, 2013, June 2015.
- Station Science Leader at the U.S. Antarctic Research Station, Palmer Station, April - June 2009, April -July 2013, July 2017.
- *Genome Consortium for Active Teaching* Steering Committee, Jan 2011- 2015.
- NSF panelist (Integrative Organismal Biology, Polar Programs, and CAREER) Sept. 2006, Oct. 2008, Oct. 2010, Sept. 2011, Sept. 2018.
- Ad-hoc reviewer for *FEBS Journal*, *Journal of Biological Chemistry*, *Journal of Experimental Biology*, *Journal of Fish Biology*, *Marine Biology*, *Nature Ecology and Evolution*, *PNAS*, and the *National Science Foundation*.

Professional Memberships

- *American Physiological Society*
- *Society for Integrative and Comparative Biologists*

AWARDS

- Outstanding Teacher in Biology and Wildlife, 2017-18
- CAREER Award, *National Science Foundation*, 2007-2012

GRADUATE STUDENT ADVISEES

Current Graduate Student Advisees (* Chair or Co-Chair)

Anna Rix* (Ph.D.), Michelle Johannsen* (Ph.D), Elizabeth Evans (M.S., Ohio University), Cassie Duncan (M.S.), Ashley Rossin (Ph.D., CFOS)

Former graduate advisees (* Chair)

Saurav Bhowmick (Ph.D., 2017), Mitchell Reed (Ph.D., 2017), Corey Oldham* (M.S, 2015), Kelly Keenan* (M.S., 2015), Laura Teigen* (M.S., 2013), Irina Mueller* (Ph.D., 2012), Julieanna Orczewska* (M.S., 2011), Aaron Kammer* (M.S., 2010), Matthew Urschel* (M.S., 2008), Sayali Kulkaarni (M.S., 2008), Brian Barth (Ph.D., 2009), Anshul Pandya (Ph.D., 2009),

Lori Bogren (Ph.D., 2013), Kimberley Iceman (Ph.D., 2013), Shannon Uffenbeck (Ph.D., 2013),
Rebekah Hare-Sanford (Ph.D, 2013), Kenneth Shin (M.S)