Kaitlin N Allen, PhD
Postdoctoral Scholar, Department of Biology
Woods Hole Oceanographic Institution
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EDUCATION & TRAINING

2024-present **Postdoctoral Scholar at Woods Hole Oceanographic Institution**
Department of Biology

2018-2024 **PhD, University of California Berkeley**
Department of Integrative Biology
NSF Graduate Research Fellow & Berkeley Fellow

2016-2017 **Certificate in Public Health – Colorado School of Public Health**
Concentration in Animals, People and the Environment

2010-2014 **BS, Massachusetts Institute of Technology**
Department of Biology
Concentration in Science, Technology and Society

RESEARCH INTERESTS

I am a postdoctoral scholar in the Biology Department at the Woods Hole Oceanographic Institution, with expertise in **molecular physiology in marine mammals.** I study the cellular underpinnings of diving in marine mammals, with the goal of understanding the mechanisms modulating energy balance in these animals. I have developed my research career in environments ranging from a teaching hospital, to an integrative biology department, to an oceanographic institution. I have built strong skills in molecular and cell biology, including the development and use of primary cell culture systems from non-model species, targeted and untargeted gene expression analysis, and diving and exercise physiology. I also have ten years of experience with translational research models including transgenic mice, and I use this experience to develop innovative approaches to studying marine mammal physiology. My goals are **to identify the molecular mechanisms critical to extreme diving behaviors** in marine mammals, and to interpret the impacts of those mechanisms in a broader taxonomic and evolutionary context.

I endeavor to create a research and mentorship **environment that offers a sense of belonging to all students,** and to foster rewarding, productive, and respectful professional relationships. I have taught courses in undergraduate Human Physiology to students with a range of academic backgrounds, and I have successfully mentored undergraduate students in the laboratory. I communicate my work to the scientific community through national and international meetings (>20 meeting abstracts and symposia) and peer-reviewed publications, and to the public via both standalone outreach opportunities and those that **facilitate continued communication between scientists and the public.**

FUNDING, AWARDS & ASSOCIATIONS

Fellowships

2024-present	$131,490	Woods Hole Oceanographic Institution Postdoctoral Scholarship
2018-2023	$138,000	NSF Graduate Research Fellowship Program (GRFP)
2018-2020	$65,000	Berkeley Graduate Fellowship

Funding

2025	$1,500	FaunaBio Translational Research Award
2024	$7,500	Integrative Biology Dissertation Completion Award
2024	$500	American Physiological Society Dr. Dolittle Travel Award
2023	$1,000	UC Berkeley Big Give Research Award
2022	$1,000	Sigma Xi Grants in Aid of Research
2021	$500	American Physiological Society Research Recognition Award
2020	$500	American Physiological Society Novo Nordisk Student Travel Award

2020-2023	$10,860	UC Berkeley Department of Integrative Biology Summer Grant
2019	$500	American Cetacean Society (LA chapter) Student Travel Grant
2019	$500	Coll Perske Memorial Fund Student Travel Grant

Honors

2025	FaunaBio Translational Research Award
2024	Outstanding Graduate Student Instructor Award, UC Berkeley, Dept of Molecular and Cell Biology
2021	American Physiological Society Research Recognition Award
2015	Antarctic Service Medal

PUBLICATIONS

In preparation

[3] **Allen KN,** Vázquez-Medina JP & Shero MR. Isolation of proliferative endothelial cell cultures from preserved arteries from seals: a method for expanding field applications of cell culture. *Anticipated submission Winter 2025.*

[2] **Allen KN,** Li AL, Moreno-Santillán DD, Luong D & Vázquez-Medina JP. Oxidant stress but not hypoxia/reoxygenation modulates expression of iron- and sulfur-handling genes in seal endothelial cells. *Anticipated submission Winter 2025.*

[1] Piotrowski ER, Lam EK, Moreno-Santillán DD, **Allen KN,** Crocker DE, Goksøyr A & Vázquez-Medina JP. Phthalate exposure induces inflammatory and metabolic signaling and alters mitochondrial respiration in marine mammal and human cells. *Anticipated submission Winter 2025.*

In print

[24] Arevalo JA, Xing D, Leija RG, Thorwald MA, Moreno-Santillán DD, **Allen KN,** Avalos HC, Selleghin-Veiga G, Brooks GA & Vázquez-Medina JP. 2025. Age-related declines in mitochondrial Prdx6 contribute to dysregulated muscle bioenergetics. *Redox Biology*. doi: 10.1016/j.redox.2025.103808.

[23] Vazquez JM, Khudyakov JI, Madelaire CB, Godard-Codding CA, Routti H, Lam EK, Piotrowski ER, Merrill GB, Wisse JH, **Allen KN,** Conner J, Blévin P, Spyropoulos DD, Goksøyr A & Vázquez-Medina JP. 2024. *Ex vivo* and *in vitro* methods as a platform for studying anthropogenic effects on marine mammals: four challenges and how to meet them. *Frontiers in Marine Science.* doi: 10.3389/fmars.2024.1466968.

[22] **Allen KN**, Torres-Velarde JM, Vazquez JM, Moreno-Santillán DD, Sudmant PH & Vázquez-Medina JP. 2024. Hypoxia exposure blunts angiogenic signaling and upregulates the antioxidant system in endothelial cells derived from elephant seals. *BMC Biology.* doi: 10.1101/2023.07.01.547248.

[21] Torres-Velarde JM, **Allen KN**, Salvador-Pascual A, Leija RG, Luong D, Moreno-Santillán DD, Ensminger DE & Vázquez-Medina JP. 2024. Peroxiredoxin 6 suppresses ferroptosis in lung endothelial cells. *Free Radical Biology and Medicine.* doi: 10.1016/j.freeradbiomed.2024.04.208.

[20] Khudyakov JI, **Allen KN**, Crocker DE, Trost NS, Roberts AH, Pirard L, Debier C, Piotrowski ER & Vázquez-Medina JP. 2022. Comprehensive molecular and morphological resolution of blubber stratification in a deep-diving, fasting-adapted seal. *Front Physiol.* doi: 10.3389/fphys.2022.1057721.

[19] Noh HJ, Turner-Maier J, Schulberg SA, Fitzgerald ML, Johnson J, **Allen KN**, Hückstädt LA, Batten AJ, Alfoldi J, Costa DP, Karlsson EK, Zapol WM, Buys ES, Lindblad-Toh K & Hindle AG. 2022. The Antarctic Weddell seal genome reveals evidence of selection on cardiovascular phenotype and lipid handling. *Commun Biol.* doi: 10.1038/s42003-022-03089-2.

[18] **Allen KN** & Vázquez-Medina JP. 2021. Reactive oxygen species, redox signaling, and regulation of vascular endothelial signaling. In *Endothelial Signaling in Vascular Dysfunction and Disease*, pp. 37–45. Elsevier. doi: 10.1016/B978-0-12-816196-8.00011-4.

[17] Ensminger DC, Crocker DE, Lam EK, **Allen KN** & Vázquez-Medina JP. 2021. Repeated stimulation of the HPA axis alters white blood cell count without increasing oxidative stress or inflammatory cytokines in fasting elephant seal pups. *J Exp Biol.* doi: 10.1242/jeb.243198.

[16] Akther F, Razan MR, Shaligram S, Graham JL, Stanhope KL, **Allen KN**, Vázquez-Medina JP, Havel PJ & Rahimian R. 2021. Potentiation of Acetylcholine-Induced Relaxation of Aorta in Male UC Davis Type 2 Diabetes Mellitus (UCD-T2DM) Rats: Sex-Specific Responses. *Front Physiol.* doi: 10.3389/fphys.2021.616317.

[15] Ensminger DC, Salvador-Pascual A, Arango BG, **Allen KN** & Vázquez-Medina JP. 2021. Fasting ameliorates oxidative stress: A review of physiological strategies across life history events in wild vertebrates. *Comp Biochem Physiol A Mol Integr Physiol.* doi: 10.1016/j.cbpa.2021.110929.

[14] Lam EK, **Allen KN**, Torres-Velarde JM & Vázquez-Medina JP. 2020. Functional Studies with Primary Cells Provide a System for Genome-to-Phenome Investigations in Marine Mammals. *Integr Comp Biol.* doi: 10.1093/icb/icaa065.

[13] **Allen KN** & Vázquez-Medina JP. 2019. Natural Tolerance to Ischemia and Hypoxemia in Diving Mammals: A Review. *Front Physiol.* doi: 10.3389/fphys.2019.01199.

[12] **Allen KN**, Vázquez-Medina JP, Lawler JM, Mellish JE, Horning M & Hindle AG. 2019. Muscular apoptosis but not oxidative stress increases with old age in a long-lived diver, the Weddell seal. *J Exp Biol.* doi: 10.1242/jeb.200246.

[11] Hindle AG, **Allen KN**, Batten AJ, Hückstädt LA, Turner-Maier J, Schulberg SA, Johnson J, Karlsson E, Lindblad-Toh K, Costa DP, Bloch DB, Zapol WM & Buys ES (2019). Low guanylyl cyclase activity in Weddell seals: implications for peripheral vasoconstriction and perfusion of the brain during diving. *Am J Physiol Regul Integr Comp Physiol.* doi: 10.1152/ajpregu.00283.2018.

[10] Bagchi A, Batten AJ, Levin M, **Allen KN**, Fitzgerald ML, Hückstädt LA, Costa DP, Buys ES & Hindle AG (2018). Intrinsic anti-inflammatory properties in the serum of two species of deep-diving seal. *J Exp Biol.* doi: 10.1242/jeb.178491.

[9] Muenster S, Lieb WS, Fabry G, **Allen KN**, Kamat SS, Guy AH, Dordea AC, Teixeira L, Tainsh RE, Yu B, Zhu W, Ashpole NE, Malhotra R, Brouckaert P, Bloch DB, Scherrer-Crosbie M, Stamer WD, Kuehn MH, Pasquale LR & Buys ES (2017). The Ability of Nitric Oxide to Lower Intraocular Pressure Is Dependent on Guanylyl Cyclase. *Invest Opthalmol Vis Sci.* doi: 10.1167/iovs.17-22168.

[8] Nagasaka Y, Wepler M, Thoonen R, Sips PY, **Allen KN**, Graw JA, Yao V, Burns SM, Muenster S, Brouckaert P, Miller K, Solt K, Buys ES, Ichinose F & Zapol WM (2017). Sensitivity to Sevoflurane anesthesia is decreased in mice with a congenital deletion of Guanylyl Cyclase-1 alpha. *BMC Anesthesiol.* doi: 10.1186/s12871-017-0368-5.

[7] Vandenwijngaert S, Swinnen M, Walravens AS, Beerens M, Gillijns H, Caluwé E, Tainsh RE, Nathan DI, **Allen KN**, Brouckaert P, Bartunek J, Scherrer-Crosbie M, Bloch KD, Bloch DB, Janssens SP & Buys ES (2017). Decreased Soluble Guanylate Cyclase Contributes to Cardiac Dysfunction Induced by Chronic Doxorubicin Treatment in Mice. *Antioxid Redox Signal*. doi: 10.1089/ars.2015.6542.

[6] Din MO, Danino T, Prindle A, Skalak M, Selimkhanov J, **Allen KN**, Julio E, Atolia E, Tsimring LS, Bhatia SN & Hasty J (2016). Synchronized cycles of bacterial lysis for in vivo delivery. *Nature*. doi: 10.1038/nature18930.

[5] Wu C, Arora P, Agha O, Hurst LA, **Allen KN**, Nathan DI, Hu D, Jiramongkolchai P, Smith JG, Melander O, Trenson S, Janssens SP, Domian I, Wang TJ, Bloch KD, Buys ES, Bloch DB & Newton-Cheh C (2016). Novel MicroRNA Regulators of Atrial Natriuretic Peptide Production. *Mol Cell Biol.* doi: 10.1128/MCB.01114-15.

[4] Dordea AC, Bray MA, **Allen KN**, Logan DJ, Fei F, Malhotra R, Gregory MS, Carpenter AE & Buys ES (2016). An open-source computational tool to automatically quantify immunolabeled retinal ganglion cells. *Exp Eye Res.* doi: 10.1016/j.exer.2016.04.012.

[3] Dordea AC, Vandenwijngaert S, Garcia V, Tainsh RE, Nathan DI, **Allen KN**, Raher MJ, Tainsh LT, Zhang F, Lieb WS, Mikelman S, Kirby A, Stevens C, Thoonen R, Hindle AG, Sips PY, Falck JR, Daly MJ, Brouckaert P, Bloch KD, Bloch DB, Malhotra R, Schwartzman ML & Buys ES (2016). Androgen-sensitive hypertension associated with soluble guanylate cyclase-α1 deficiency is mediated by 20-HETE. *Am J Physiol Heart Circ Physiol.* doi: 10.1152/ajpheart.00877.2015.

[2] Arora P, Wu C, Hamid T, Arora G, Agha O, **Allen KN**, Tainsh RET, Hu D, Ryan RA, Domian IJ, Buys ES, Bloch DB, Prabhu SD, Bloch KD, Newton-Cheh C & Wang TJ (2016). Acute Metabolic Influences on the Natriuretic Peptide System in Humans. *J Am Coll Cardiol.* doi: 10.1016/j.jacc.2015.11.049.

[1] Danino T, Prindle A, Kwong GA, Skalak M, Li H, **Allen KN**, Hasty J & Bhatia SN (2015). Programmable probiotics for detection of cancer in urine. *Sci Transl Med.* doi: 10.1126/scitranslmed.aaa3519.

CONFERENCE ABSTRACTS

Oral presentations

[10] **Allen KN,** Li AL, Moreno-Santillán DD & Vázquez-Medina JP. 2025. Cysteine and iron handling characterize seal endothelial cell resistance to lipid peroxidation. American Physiological Society Summit. Baltimore, MD, USA. ***[winner of the FaunaBio Translational Research Award]***

[9] **Allen KN,** Moreno-Santillán DD & Vázquez-Medina JP. 2024. Elephant seal endothelial cells modify iron handling to avoid lipid peroxidation. 25th Biennial Conference on the Biology of Marine Mammals. Perth, Australia.

[8] **Allen KN,** Crocker DE & Vázquez-Medina JP. 2024. Fasting metabolic profiles are cell-autonomous in elephant seal primary muscle cells. American Physiological Society Summit. Long Beach, CA, USA. ***[winner of the Dr. Doolittle Travel Award]***

[7] **Allen KN,** Torres-Velarde JM & Vázquez-Medina JP. 2023. Seal endothelial cells exhibit blunted angiogenic signaling during hypoxia. American Physiological Society Summit. Long Beach, CA, USA.

[6] **Allen KN,** Li AL & Vázquez-Medina JP. 2022. Rapid hypoxia-induced upregulation of glutathione-related genes may protect elephant seal endothelial cells against oxidative stress. Experimental Biology. Philadelphia, PA, USA.

[5] **Allen KN,** Luong D, Li AL & Vázquez-Medina JP. 2021. Elephant seal endothelial cells are resistant to oxidative stress. Experimental Biology. Virtual. ***[winner of Research Recognition Award]***

[4] **Allen KN,** Luong D & Vázquez-Medina JP. 2021. Seal endothelial cells mount a rapid and sustained response to hypoxia. Society for Integrative and Comparative Biology. Virtual.

[3] **Allen KN,** Hindle AG & Vázquez-Medina JP. 2019. Mechanisms of tolerance to hypoxia and oxidative stress in primary endothelial cells isolated from seals. World Marine Mammal Conference. Barcelona, Spain.

[2] **Allen KN,** Hindle AG & Vázquez-Medina JP. 2019. Mechanisms of tolerance to hypoxia and oxidative stress in primary endothelial cells isolated from seals. International Congress on Comparative Physiology and Biochemistry. Ottawa, Canada.

[1] **Allen KN,** Hindle AG & Vázquez-Medina JP. 2018. Studying natural tolerance to ischemia/reperfusion using endothelial cells derived from seals. American Physiological Society Intersociety Meeting – Comparative Physiology: Complexity and Integration. New Orleans, LA, USA.

Poster presentations

[5] **Allen KN,** Li AL, Moreno-Santillán DD & Vázquez-Medina JP. 2025. Cysteine and iron handling characterize seal endothelial cell resistance to lipid peroxidation. American Physiological Society Summit. Baltimore, MD, USA.

[4] **Allen KN,** Crocker DE & Vázquez-Medina JP. 2024. Fasting metabolic profiles are cell-autonomous in elephant seal primary muscle cells. American Physiological Society Summit. Long Beach, CA, USA.

[3] **Allen KN,** Torres-Velarde JM, Vazquez JM, Moreno-Santillán DD, Sudmant PH & Vázquez-Medina JP. 2023. Hypoxia exposure blunts angiogenic signaling and upregulates the antioxidant system in seal endothelial cells. Center for Physiological Genomics of Low Oxygen Summit. La Jolla, CA, USA.

[2] **Allen KN,** Sudmant PH & Vázquez-Medina JP. 2022. Gene expression signatures of the long-term transcriptional response to hypoxia in endothelial cells from seals. 24th Biennial Conference on the Biology of Marine Mammals. Palm Beach, FL, USA.

[1] **Allen KN,** Hindle AG, Vázquez-Medina JP, Lawler JM, Mellish JE & Horning M. 2018. Age- and muscle-specific oxidative stress management strategies in a long-lived diver, the Weddell seal. Experimental Biology. San Diego, CA, USA.

Other conference abstracts

[20] Cotoia A, Krasic E, **Allen KN**, Vázquez-Medina JP & Tift MS. 2025. Comparison of the heme oxygenase/carbon monoxide pathway and downstream cytoprotection between human and northern elephant seal vascular endothelial cells. American Physiological Society Summit. Baltimore, MD, USA.

[19] Cotoia A, Krasic E, **Allen KN**, Vázquez-Medina JP & Tift MS. 2025. Comparison of the heme oxygenase/carbon monoxide pathway and downstream cytoprotection between human and northern elephant seal vascular endothelial cells. Southeast and Mid-Atlantic Marine Mammal Symposium. Jacksonville, FL, USA.

[18] Lam EK, Torres-Velarde JM, **Allen KN**, Vazquez JM, Xing D, Crocker DE & Vázquez-Medina JP. 2024. MyoD over-expression reprograms elephant seal fibroblasts into muscle cells. 25th Biennial Conference on the Biology of Marine Mammals. Perth, Australia.

[17] Cotoia A, Krasic E, **Allen KN**, Vázquez-Medina JP & Tift MS. 2024. Comparative analysis of the heme oxygenase/carbon monoxide pathway and downstream cytoprotection between human and northern elephant seal (Mirounga angustirostris) vascular endothelial cells. 25th Biennial Conference on the Biology of Marine Mammals. Perth, Australia.

[16] Lam EK, Torres-Velarde JM, **Allen KN**, Vazquez JM, Crocker DE & Vázquez-Medina JP. 2024. MyoD over-expression reprograms marine mammal fibroblasts into muscle cells. American Physiological Society Summit. Long Beach, CA, USA.

[15] Torres-Velarde JM, **Allen KN,** Salvador-Pascual A & Vázquez-Medina JP. 2022. Peroxiredoxin 6 suppresses ferroptosis in lung endothelial cells. Society for Redox Biology and Medicine 29th Annual Meeting. Orlando, FL, USA.

[14] Vázquez-Medina JP & **Allen KN**. 2022. Endothelial cells derived from elephant seals respond to extended hypoxia by suppressing inflammation and conserving glutathione. Society for Redox Biology and Medicine 29th Annual Meeting. Orlando, FL, USA.

[13] Vázquez-Medina JP, **Allen KN** & Torres-Velarde JM. 2022. Endothelial cells derived from elephant seals respond to hypoxia by suppressing inflammation and upregulating antioxidant genes. 8th American Physiological Society Intersociety Meeting in Comparative Physiology. San Diego, CA, USA.

[12] Khudyakov J, Vázquez-Medina JP, **Allen KN**, Pirard L, Debier C & Crocker DE. 2022. Molecular signatures predict functional differences between blubber layers in marine mammals. 8th American Physiological Society Intersociety Meeting in Comparative Physiology. San Diego, CA, USA.

[11] Lam EK, Torres-Velarde JM, **Allen KN**, Arango BG, Crocker DE & Vázquez-Medina JP. 2022. Direct reprogramming of dermal fibroblasts derived from northern elephant seals into muscle cells. Experimental Biology. Philadelphia, PA, USA.

[10] Vázquez-Medina JP, Torres-Velarde JM, **Allen KN**, Salvador-Pascual A & Ensminger DC. 2022. Peroxiredoxin 6 suppresses erastin-induced ferroptosis in lung endothelial cells. Experimental Biology. Philadelphia, PA, USA.

[9] Lam EK, Torres-Velarde JM, **Allen KN**, Crocker DE & Vázquez-Medina JP. 2022. Direct reprograming of dermal fibroblasts derived from Northern elephant seals into muscle cells. 24th Biennial Conference on the Biology of Marine Mammals. Palm Beach, FL, USA.

[8] Torres-Velarde JM, **Allen KN** & Vázquez-Medina JP. 2021. Peroxiredoxin 6 suppresses erastin-induced ferroptosis in lung endothelial cells. Society for Free Radical Biology and Medicine 28th Annual Meeting. Savannah, GA, USA.

[7] Lam EK, Torres-Velarde JM, **Allen KN,** Crocker DE & Vázquez-Medina JP. 2021. Direct reprogramming of dermal fibroblasts derived from northern elephant seals into muscle cells. Experimental Biology. Virtual.

[6] Vázquez-Medina JP, Torres-Velarde JM, **Allen KN,** Salvador-Pascual A & Ensminger DC. 2021. Peroxiredoxin 6 suppresses erastin-induced ferroptosis in lung endothelial cells. Experimental Biology. Virtual.

[5] Ensminger DC, Crocker DE, Lam EK, **Allen KN** & Vázquez-Medina JP. 2021. Acute and chronic HPA axis stimulation alters white blood cell ratios but not inflammatory markers or oxidative stress in elephant seals. Experimental Biology. Virtual.

[4] Torres-Velarde JM, **Allen KN** & Vázquez-Medina JP. 2020. Peroxiredoxin 6 suppresses ferroptosis in lung endothelial cells. Society for Redox Biology and Medicine 27th Annual Meeting. Virtual.

[3] Lam EK, Torres-Velarde JM, **Allen KN,** Crocker DE & Vázquez-Medina JP. 2019. Direct reprogramming of dermal fibroblasts derived from northern elephant seals into muscle cells. World Marine Mammal Conference. Barcelona, Spain.

[2] Lam EK, **Allen KN,** Torres-Velarde JM, Crocker DE & Vázquez-Medina JP. 2019. Direct reprogramming of dermal fibroblasts derived from northern elephant seals into muscle cells. International Congress on Comparative Physiology and Biochemistry. Ottawa, Canada.

[1] Vázquez-Medina JP, **Allen KN** & Hindle AG. 2018. Seal endothelial cells: a comparative model to study natural tolerance to ischemia/reperfusion. Experimental Biology. San Diego, CA, USA.

PROFESSIONAL EXPERIENCE

Laboratory work and training

Postdoctoral Scholar Sept 2024-present

with Drs. Michelle Shero, Mark Hahn and Colleen Hansel

Woods Hole Oceanographic Institution, Biology Department

Lab research focus: Physiological ecology of marine mammals; physiological and behavioral determinants of reproductive success and lifelong fitness

- Identified gene expression changes associated with iron flux in muscle from grey and Weddell seal moms and pups during the lactation period, including with respect to an apparent decoupling of high serum iron from iron uptake in muscle from moms
- Evaluated cellular ATP production rates in Weddell seal myoblasts, finding that oxidative production of ATP dominates the cellular phenotype, but that treatment with serum from pups late in the lactation/nursing period drives a shift toward glycolytic sources of ATP
- Prepared and submitted a full proposal (as Co-PI) to NSF Office of Polar Programs assessing the impacts of lactation on mitochondrial network integrity and function in Weddell seal muscle cells
- Prepared a Biological Project Registration application to meet institutional biosafety requirements
- Applied for and obtained a 10 year permit from the National Marine Fisheries Service (as PI) for the possession of marine mammal parts and cell cultures, and established a collaboration with the International Fund for Animal Welfare to obtain necropsy samples from stranded marine mammals for the expansion of a current cell culture biobank; the permit and this collaboration provide a strong foundation for future work and setting up a new lab

Graduate Student Fellow Sept 2018-Aug 2024

with Dr. José Pablo Vázquez-Medina

University of California Berkeley, Department of Integrative Biology

Lab research focus: Physiological adaptations to natural and anthropogenic stressors in marine vertebrates

- Established and characterized a biobank of primary cells from northern elephant seals, including arterial endothelial cells, skeletal muscle myoblasts, and adipose-derived stem cells
- Identified real-time transcriptomic and functional cellular responses to hypoxia in elephant seal cells, including the decoupling of the canonical HIF-angiogenesis pathway in endothelial cells
- Quantified muscle cell reliance on oxidative vs. glycolytic pathways, concluding that a cell-autonomous reliance on glycolysis to produce ATP increases across the postnatal fast in elephant seal pups
- Conducted cellular and molecular assays, including: RT-qPCR, western blotting, gene knockdown via RNAi, and immunohistochemistry and confocal microscopy
- Served as a Co-Investigator on a National Marine Fisheries Service (NMFS) permit authorizing the possession and use of marine mammal parts and cell cultures
- Wrote and managed IACUC protocols for cetacean and pinniped field studies
- Work culminated in 3 first-authored peer-reviewed publications (with 2 additional first-authored manuscripts anticipated), 1 first-authored textbook chapter, and 6 additional co-authored works

Graduate Student Researcher Sept 2023-Aug 2024
with Dr. José Pablo Vázquez-Medina
University of California Berkeley, Department of Integrative Biology

Lab research focus: Oxidative stress and redox signaling in pre-clinical models of disease

- Maintained primary pulmonary microvascular endothelial cel cultures from humans and transgenic mice
- Validated the use of siRNAs in target gene knockdown in human primary endothelial cells
- Evaluated the role of Prdx6 and Gpx4 in cellular respiration
- Maintained a mouse colony with 4 individual transgenic mouse strains, including PCR-based and Sanger sequencing methods for genotyping
- Managed an IACUC protocol for laboratory animal research, including training new lab personnel in laboratory and animal handling techniques
- Work culminated in co-authorship on 2 peer-reviewed publications

Research Technician Sept 2017-Aug 2018
with Dr. José Pablo Vázquez-Medina
University of California Berkeley, Department of Integrative Biology

Lab research focus: Physiological adaptations to natural and anthropogenic stressors in marine vertebrates; oxidative stress and redox signaling in pre-clinical models of disease

- Established and characterized the first primary endothelial cell cultures from northern elephant seals
- Quantified pharmacologically-driven oxidant generation in seal endothelial cells, confirming the molecular capacity for this system to produce oxidants
- Trained 5 undergraduate student researchers and 2 incoming graduate students in basic lab safety practices, primary cell culture methods, and basic molecular biology methods including cloning, PCR, western blot, and immunohistochemistry
- Managed laboratory biological use authorization and chemical hygiene plan, including providing safety training in laboratory practices for all lab personnel

Research Technician June 2014-July 2016
in the laboratory of Dr. Emmanuel Buys
Massachusetts General Hospital & Harvard Medical School, Anesthesia Center for Critical Care Research

Lab research focus: Nitric oxide signaling in translational models of hypertension

- Evaluated the physiological and molecular effects of NO-cGMP pathway modulation on intraocular pressure in sheep using a custom-made device for corneal delivery of NO
- Gained experience using large animal models in translational research, including with anesthesia induction and recovery and venous catheter placement in sheep
- Assayed regulation of atrial natriuretic peptide expression in a transgenic mouse model as a function of post-transcriptional modification by miRNAs
- Maintained mouse colonies, including management of breeding pairs, animal inventory, and all PCR-based genotyping for multiple heterozygous transgenic mouse strains
- Conducted molecular biology analyses, gene silencing experiments, and enzyme immunoassays for tissue and cell samples targeting the impacts of the NO-cGMP pathway on cellular function
- Work culminated in authorship on 7 peer-reviewed publications

Research Technician June 2014-July 2016
in the laboratories of Drs. Allyson Hindle, Emmanuel Buys and Warren Zapol
Massachusetts General Hospital & Harvard Medical School, Anesthesia Center for Critical Care Research

Lab research focus: Diving physiology and regulation of vasomotor tone in pinnipeds

- Investigated the molecular mechanisms controlling vascular tone in the Weddell seal, including 4 months of fieldwork over two seasons in McMurdo Sound, Antarctica
- Developed protocols to establish primary cell cultures for arterial endothelial cells, arterial smooth muscle cells, dermal fibroblasts, skeletal muscle myoblasts, and adipose-derived stem cells from Weddell seals
- Collected blood samples and tissue biopsies from Weddell seal adults and pups
- Conducted opportunistic necropsies on Weddell seals and prepared samples for downstream analyses, including nucleic acid extraction, enzyme activity assays, and immunohistochemistry
- Conducted soluble guanylate cyclase (sGC) enzyme activity assays in tissue and blood samples from seals
- Conducted lipopolysaccharide (LPS) exposure in peripheral blood mononuclear cells from Weddell seals
- Ordered, packed, and shipped laboratory and field supplies for two field seasons in the Antarctic
- Work culminated in authorship on 3 peer-reviewed publications

Research Assistant June 2013-June 2014
in the laboratory of Dr. Sangeeta Bhatia
Massachusetts Institute of Technology, Koch Institute for Integrative Cancer Research, Laboratory for Multiscale Regenerative Technologies

Lab research focus: Nano-based drug development; targeted chemotherapeutics

- Characterized and compared the selective colonization dynamics and *in vivo* stability of attenuated *Salmonella typhimirium* strains engineered for chemotherapeutic potential
- Intravenous, subcutaneous, and intraperitoneal injection, oral gavage, and basic anesthesia in rodent models
- Conducted whole animal imaging, tissue collection and dissection, and screening of organ homogenates for bacterial growth
- Work culminated in an undergraduate thesis and authorship on 2 peer-reviewed publications

Research Assistant June-Aug 2011
in the laboratory of Dr. Ali Khademhosseini
Brigham and Women's Hospital, Center for Biomedical Engineering

Lab research focus: Tissue engineering; nanotechnologies for medical applications

- Prepared thermally-responsive poly(N-isopropylacrylamide)-based micromolds for cell culture
- Co-cultured adherent cells in dynamic micromolds with the goal of recapitulating heterogeneous tissue organization *in vivo*

Fieldwork

Field Assistant Nov 2022-Feb 2023
with Drs. Michelle Shero and Allyson Hindle
Physiological and genetic correlates of reproductive success in high- versus low-quality Weddell seals

Deployed to McMurdo Station, Antarctica for the 2022-2023 austral summer season (~12 weeks) on a project investigating the physiological and genomic drivers of differential reproductive output in female Weddell seals. Participated in animal surveys for mark-recapture, include the use of both ground- and aerial-based VHF telemetry to find and identify tagged animals. Collected blood samples, tissue biopsies, and microbiological swabs during live animal handlings. In addition to prescribed project responsibilities, I also led a successful independent effort to isolate and develop skeletal muscle myoblast and adipose-derived stem cell cultures from seal tissue biopsies, which was not an original aim in Dr. Shero's project.

Field Assistant Apr 2024
with Drs. José Pablo Vázquez-Medina, Allyson Hindle and Cassondra Williams
Role of endothelial cell activation in hypoxia tolerance of an elite diver, the Weddell seal

Conducted 6 days of fieldwork at Año Nuevo State Park in Pescadero, CA, USA. Worked in a field team of 4-6 other people to evaluate the impact of apneic events on endothelial activation and the inflammatory response in seals. While

the original project targeted Weddell seals, limited field opportunities in the Antarctic led to the development of a local pilot season in northern elephant seals. Captured, transported and instrumented juvenile elephant seals for captive sleep apnea studies. Collected blood samples during both apneic and eupneic periods from a captive, un-sedated animal instrumented with a catheter. Processed blood samples at time of collection for blood gas chemistry, white blood cell counts, and hematocrit measurements.

Field Assistant Feb, May 2019

with Drs. José Pablo Vázquez-Medina and Tania Zenteno-Savín

Cellular models for the study of stress responses in baleen whales

Conducted two ~10-day trips to La Paz, Baja California Sur, Mexico to collect skin and blubber biopsies from live baleen whales with collaborators at the Universidad Autónoma de Baja California Sur (UABCS) and Centro de Investigaciones Biológicas del Noroeste (CIBNOR). Coordinated the shipping and ordering of field supplies to collaborator's lab. Processed and prepared dart biopsies in the field. Isolated putative adipose-derived stem cells and dermal fibroblasts from dart biopsies from blue, humpback, and fin whales in the lab in La Paz. Assisted with the preparation of a CITES permit to import samples from Mexico to the United States.

Field Assistant Mar-Aug 2017

with Dr. Amanda Goldberg

Plague ecology in the endangered northern Idaho ground squirrel

Conducted 20 weeks of fieldwork in northern Idaho investigating plague ecology in a listed threatened species, the northern Idaho ground squirrel. Worked independently and within a team of 2-8 others to trap, handle, and process squirrels and other small mammals for study, including the use of isoflurane anesthesia in the field. Utilized VHF telemetry to identify squirrel hibernacula for snow cover analysis. Maintained field camp including instruments, gear, living quarts, and vehicles.

Field Assistant Oct-Dec 2015, 2016

with Drs. Emmanuel Buys, Allyson Hindle and Warren Zapol

Unraveling the genomic and molecular basis of the diving: nitric oxide signaling and vasoregulation in Weddell seals

Deployed to McMurdo Station, Antarctica for the 2015-2016 and 2016-2017 austral summer seasons (4 months total). Captured and handled live Weddell seals for physiology measurements including basic blood chemistry, blood counts, morphometrics, and tissue biopsy (skin, blubber, and skeletal muscle). Established primary cell cultures from tissue from live animals and discarded placental tissue, including the first endothelial cell, smooth muscle, and dermal fibroblast cultures from Weddell seals. Collected tissues from opportunistic necropsies of both pups and adults; prepared tissues for downstream analyses including nucleic acid extraction, fixing and sectioning, and enzyme activity assays. Coordinated laboratory and field logistics with project PIs to facilitate sample collection, shipment and management.

Organizational / Funding Proposals / Technical Training

Postdoctoral Fellowship Proposal, Life Sciences Research Foundation Oct 2025

As project PI

Learning from Nature's Extremes: Decoding Marine Mammal Iron Tolerance to Reveal Mechanisms of Cellular Resilience

Request $255,000

Iron is indispensable for oxygen transport and mitochondrial function, yet its redox activity makes it highly cytotoxic when unregulated. Excess iron accumulation contributes to oxidative injury, ferroptosis, and the pathogenesis of disorders such as hemochromatosis, liver cirrhosis, and cardiovascular dysfunction. Paradoxically, marine mammals maintain circulating iron levels far in excess of those that cause pathology in humans, though marine mammals avoid cellular injury. This proposal leverages the unique cellular physiology of the northern elephant seal to uncover molecular mechanisms of natural iron tolerance that may inform new cytoprotective strategies in human disease. These studies integrate comparative physiology, cell biology, and evolutionary genomics to define the molecular basis of naturally high iron tolerance and reveal new therapeutic targets for mitigating iron-mediated injury and ferroptosis in the clinic.

- Formulated project design and experiments, conducted literature searches, wrote proposal
- Conducted pilot experiments and generated preliminary data
- Established and developed northern elephant seal and human endothelial cell cultures critical to the project

Research Proposal, NSF Office of Polar Programs, full proposal submission Jun 2025
As project Co-PI with Dr. Michelle Shero

Impacts of lactation on mitochondrial network integrity and function in muscle cells of the Antarctic Weddell seal
Request $509,054

Marine mammals have large body oxygen stores (via iron-core hemoproteins) to dive extensively, and Weddell seals must travel beneath shorefast sea ice to establish protected breeding colonies in McMurdo Sound. Iron also plays critical roles in mitochondrial function, integrity, and metabolism. We will use an innovative, semi-renewable primary muscle cell culture system to evaluate the impacts of iron mobilization in Weddell seals. This system enables the disentangling of cell-autonomous and circulating factors on iron management, through the lens of a species which tolerates naturally high and variable iron loads. This proposal capitalizes on existing samples from the Antarctic to advance our understanding of metabolic physiology and mammalian iron homeostasis.

- Formulated project design and experiments, conducted literature searches, wrote proposal
- Conducted pilot experiments and generated preliminary data, including the design and validation of 18 target primer pairs for use in multiple marine mammal species
- Established and developed Weddell seal primary myoblast cell cultures critical to the project
- Planned project logistics, including all budgetary requirements
- Formed collaborations with regional stranding network for additional (comparative) sampling opportunities and prepared application for MMPA permits required for possession of marine mammal samples and cell cultures

Southern Ocean Summer School May 2024
Course participant

Southern Ocean and its central role for climate
Institut d'Etudes Scientifiques de Cargèse

Participant in a 12-day course on the critical role of the Southern Ocean in maintaining crucial clime and life-supporting functions. Course addressed key questions in ocean dynamics, ice-ocean interactions, biological processes and carbon cycling, and the policy implications of Southern Ocean sciences. Course was structured as a morning lecture series followed by an afternoon practical session in which groups chose to address a pressing issue in Southern Ocean science, with prompts ranging from predicting ice-ocean shifts from climate models, to ecological impacts of biogeochemical processes over time, to crafting appropriate policy recommendations for the future of the Southern Ocean.

Postdoctoral Fellowship Proposal, NSF Office of Polar Programs Feb 2024
As project PI

Investigating the dynamics and physiological impacts of iron flux in the Antarctic Weddell seal
Request $167,800

Nutrient cycling and biological iron transfer by marine megafauna support productivity in the Southern Ocean, where iron is a rate-limiting element across trophic levels. Weddell seals capitalize on large iron-based body oxygen stores to dive extensively beneath shorefast sea ice to forage and establish protected breeding colonies, but high levels of free iron associated with these stores risk cellular and tissue damage via iron's oxidizing reactions with molecular oxygen and membrane lipids. This proposal will advance our understanding of iron management in the ice-dependent Weddell seal by coupling a primary cell culture system with a classical pulse-chase experimental design and loss-of-function gene expression studies to identify the relative contribution of key iron management proteins in regulating iron flux. This proposal anchors cellular-level findings in broader organismal life history and evolutionary contexts and applies innovative techniques to polar science, advancing our understanding of critical iron store management across taxa.

- Formulated project design and experiments, conducted literature searches, wrote proposal
- Generated preliminary data, including establishing and characterizing Weddell seal myoblast cultures for use in this project

Postdoctoral Fellowship Proposal, Woods Hole Oceanographic Institution Oct 2023
As project PI

Novel application of iron isotope enrichment to evaluate iron flux tolerance in muscle cells from the Weddell seal
Awarded $131,490

Pinnipeds take up and mobilize immense quantities of iron from their environment for the production of diving-related hemoproteins and provisioning to pups during lactation. Hemoprotein and body iron stores in seals scale with diving capacity, and high iron turnover rates in seals are associated with transferrin saturations well in excess of the clinical threshold for iron overload. Ferrous iron interacts with molecular oxygen to cause peroxidation of phospholipid membranes, which may lead to ferroptosis, a regulated form of iron-dependent cell death. This proposal uses skeletal muscle progenitor cells to study iron flux in the Antarctic Weddell seal, and to evaluate innate resistance to iron toxicity in pinnipeds. This project integrates comparative molecular physiology and mass spectrometry analyses of iron flux to identify functional tradeoffs associated with high iron turnover rates in marine mammals.

- Formulated project design and experiments, conducted literature searches, wrote proposal
- Established and characterized Weddell seal primary myoblast cell cultures, including qPCR verification of muscle cell gene expression in these cultures

Symposium on the cell biology, physiology and toxicology of marine mammals May 2023
Workshop coordinator and participant
University of California Berkeley

The primary aim of the workshop was to facilitate an international conversation on emerging middle-out methods in molecular physiology for use in marine mammal research, with a focus on ecologically relevant stressors and toxicants. The workshop brought together ~30 researchers from the United States, Canada, Norway, Belgium, and France. Responsible for coordinating workshop content with the hosts (Dr. José Pablo Vázquez-Medina and Dr. Anders Goksøyr). Presented during the seminar portion of the workshop and led group discussions regarding best practices in the field. The workshop ultimately produced a perspective paper on which I am a coauthor, which was published in Frontiers in Marine Science in 2024.

Graduate Research Fellowship Proposal, National Science Foundation Fall 2018-Spring 2023
As project PI

A novel approach to studying ischemia/reperfusion tolerance in diving mammals
Awarded $138,000

During a dive, marine mammals tolerate physiological conditions that induce cellular damage in their terrestrial counterparts. Some seal species restrict the perfusion of organs not actively required during a dive by as much as 90%. Tissues experiencing vasoconstriction, and therefore partial ischemia, during a dive are reperfused upon surfacing. In terrestrial mammals, such ischemia-reperfusion events are known to cause oxidative injury via the increased production of reactive oxygen species. Vascular endothelial cells are susceptible to ischemia-reperfusion injury, as characterized by increased endothelial cell permeability and decreased responsiveness to endothelial-dependent vasodilators such as acetylcholine. This proposal develops seal endothelial cell cultures from placental arteries for use in the investigation of ischemia-reperfusion tolerance, and to critically assess the link between known physiological traits in animals and related biochemical observations in tissues.

PARTICIPATION IN EDUCATION PROGRAMS AND PEDAGOGY TRAINING

Teaching & Mentoring Experience

Graduate Student Mentor 2018-2024
University of California Berkeley, Undergraduate Research Apprenticeship Program (URAP)

Mentored five undergraduate students in the laboratory for 10-20 h/week. Each student participated for at least 1 full year, and up to 2.5 years. Trained students in general lab safety and awareness, primary cell culture methods, and molecular biology techniques. Student projects utilized marine mammal primary cell cultures and material derived from cell cultures to investigate the role of the antioxidant system in protecting marine mammal cells from oxidative damage.

Students also developed protocols for the differentiation and histological analysis of adipose-derived stem cells from northern elephant seals. Two mentees have since gone on to medical or graduate school. One mentee has gone on to a professional career in industry. Two of my mentees completed an Honors Thesis in the lab for their bachelor's degree:
Alexander Li, "Natural tolerance to endothelial oxidative stress in elephant seals"
Diamond Luong, "Lipid peroxidation handling in northern elephant seal and human endothelial cells"

Graduate Student Instructor and Reader 2019-2023
University of California Berkeley, Department of Molecular and Cell Biology
Introduction to Human Physiology (MCB 32), lecture/discussion course, 3 semesters plus 1 summer term
Graduate student instructor for a human physiology course designed to fulfill a breadth requirement for non-majors. Taught a total of 325 students in 9 discussion sections, with ~35 students per section. Evaluated and provided feedback on student work for ~300 students as a reader. Wrote and edited in-class assignments including case studies, prepared exam review material, and wrote both multiple choice and open-ended questions for exams. Recipient of the 2024 Outstanding Graduate Student Instructor Award.

Graduate Student Instructor 2020
University of California Berkeley, Department of Integrative Biology
Survey of Human Physiology (IB 132), lecture/discussion course, 1 semester
Graduate student instructor for an upper division human physiology course for majors. Taught a total of 60 students in 2 discussion sections of ~30 students each. Wrote and edited in-class assignments including case studies, prepared exam review material, and wrote both multiple choice and open-ended questions for exams.

Undergraduate Teaching Assistant 2014
Massachusetts Institute of Technology, Department of Biology
Introduction to Experimental Biology and Communication (7.02), laboratory course, 1 semester
Laboratory teaching assistant for introductory biology lab for majors

Undergraduate Peer Tutor 2012-2014
Massachusetts Institute of Technology, Department of Biology
Peer tutor for biology courses, including: Introductory Biology, Introduction to Experimental Biology and Communication, Genetics, Cell Biology, Human Physiology

Pedagogy and Curriculum Development Training

Teaching and Mentoring in the Physical and Life Sciences workshop (course participant) Fall 2019
University of California Berkeley
Participant in a five-week research mentorship course covering: undergraduate research project development, effective communication strategies for research mentors, establishing and communicating clear work expectations, evaluating teaching and mentoring efficacy, developing project-specific assessment methods, and fostering undergraduate independence and impact in research

Integrative Biology Teaching Colloquium (course participant) Fall 2018
University of California Berkeley
Semester-long teaching course covering: organizing effective discussion sections, developing a teaching style, self-evaluation of teaching efficacy, evaluating student learning, creating new courses, employing technology in the classroom, and common challenges in science education

Graduate Student Instructor Ethics and Responsibilities Course (course participant) Fall 2018
University of California Berkeley
Full-day teaching ethics course covering: inclusive classroom strategies, teaching students with disabilities, creating a harassment-free educational environment, and fostering academic integrity

PROFESSIONAL ACTIVITIES AND ASSOCIATIONS

2025-present **WHOI Postdoctoral Association Peer Mentoring Program,** mentor

2025-present **American Physiological Society Trainee Advisory Committee (TAC)**
Comparative & Evolutionary Physiology Section Trainee Representative

Reviewer: BMC Ecology and Evolution, BMC Genomics, Journal of Experimental Biology, Gene, Journal of Experimental Zoology, Conservation Physiology

Associations
American Physiological Society (APS), 2018-present
Society for Marine Mammalogy (SMM), 2019-present
Society for Integrative and Comparative Biology (SICB), 2020-2021

SPECIALIZED FIELD & LABORATORY SKILLS

Marine mammal primary cell culture: 10 years of experience establishing and culturing primary cells from marine mammals (both pinnipeds and cetaceans), including arterial endothelial cells, vascular smooth muscle cells, adipose-derived stem cells, skeletal muscle myoblasts, placental trophoblasts, placental fibroblasts, and dermal fibroblasts

Cellular respiration: Optimization and validation of cellular respiration assays using Agilent's Seahorse phosphorescent probe-based system, including with marine mammal primary cells in XFp, XFe24, and XF96/Pro formats

Gene expression analysis: Targeted (qPCR) gene expression analysis in both model and non-model species, including the development and validation of qPCR primer pairs for marine mammal species; untargeted (RNA-seq) gene expression analysis including enrichment and functional interaction network analyses

Molecular and cell biology: ELISA, enzyme activity assay, western blotting, RT-qPCR (including primer design and validation for use in non-model species); fluorescence and confocal microscopy in both live and fixed cells

Diving physiology: capture/handling of live pinnipeds; blood draws for hematology and molecular analyses; biopsy of muscle, blubber, and skin from marine mammals; necropsy; aerial- and ground-based VHF telemetry; collection of morphometric data including through the use of ultrasound

Laboratory animal husbandry and handling: 10 years' experience with laboratory rodent colony management and experimental manipulation, including genotyping, breeding, ear tagging, injection (tail vein, intraperitoneal, subcutaneous), oral gavage, isoflurane anesthesia, euthanasia, and tissue collection; with exposure to large lab animal husbandry and experimental use (sheep; primates) including induction, management, and recovery from isoflurane anesthesia, intubation/extubation, venous catheterization, postsurgical monitoring, and euthanasia

Permits: National Marine Fisheries Service Marine Mammal Protection Act Permit (as PI), U.S. Stranding Network Authorization Letter (as PI), Institutional Biological Project Registration (as PI), IACUC protocol preparation in both model and non-model species

OUTREACH & SCIENCE COMMUNICATION

Featured in the media:
Life Lines by Dr. Doolittle blog (American Physiological Society; writer), "Fasting as a strategy to build athletic diving capacity" – 2024

The Company of Biologists PreLights, Hypoxia blunts angiogenic signaling and upregulates the antioxidant system in elephant seal endothelial cells – 2023

Life Lines by Dr. Doolittle (blog of the American Physiological Society)
"Snoring seals can teach us so much about sleep apnea" – 2021
"Extreme physiology of diving" – 2021
"Physiology of diving animals: how do they deal with hypoxia?" – 2020

"Seals, seals, and more seals" – 2018

I Spy Physiology (blog of the American Physiological Society)
"What snoozing seals can teach us about cardiovascular health" – 2021

60N Science Blog (writer), "Age, is it really just a number?" – 2019
Outreach programs:
Letters to a Pre-Scientist, K-12 pen pal program, 2019-2022
Skype A Scientist, K-12 school outreach program, 2018-2022
Popping the Science Bubble, Berkeley Public Library lecture series, 2021
Be A Scientist, Bay Area Scientists in Schools (BASIS), 2021
Great Minds in STEM, fellowship reviewer, 2020
Expanding Your Horizons, workshop organizer, 2019

INVITED PRESENTATIONS

FaunaBio Leveraging Novel Animal Models for Translational Research seminar series
"Cysteine & iron handling characterize seal endothelial cell resistance to lipid peroxidation," scheduled February 2026

Texas Tech University, Dept of Kinesiology & Sports Management and Dept of Biology joint seminar
"Diving in a dish: hypoxia and oxidative stress tolerance in seals," June 2025

University of North Carolina Wilmington, Dept of Biology seminar
"Diving in a dish: cellular mechanisms supporting hypoxia and oxidative stress tolerance in seals," January 2025

Woods Hole Oceanographic Institution, Dept of Biology seminar
"Diving in a dish: cellular mechanisms underlying hypoxia and oxidative stress tolerance in seals," December 2024

University of California Berkeley, Dept of Integrative Biology, Integrative Human Biology (course) guest lecture
"Why don't seals need SCUBA? Diving physiology & hypoxia tolerance in some of nature's most prolific divers," February 2024

Symposium on the cell biology, physiology & toxicology of marine mammals, University of California Berkeley
"Cellular mechanisms of hypoxia tolerance in diving seals," May 2023

University of California Berkeley, Department of Integrative Biology, Marine Mammals (course) guest lecture
"Diving Physiology: marine mammal adaptations to life below the surface," October 2023
"Diving Physiology: marine mammal adaptations to life below the surface," November 2021
"Systematics of Pinnipeds," Sep 2019 and "Diving Physiology," November 2019

Duke University, Bass Connections (course) guest lecture
"Cellular mechanisms of natural hypoxia tolerance," April 2023

University of the Pacific, Dept of Biology seminar
"Cellular mechanisms of vascular hypoxia tolerance: insight from diving mammals," February 2022