

## CURRICULUM VITAE

Daniel Meulemans Medeiros  
Associate Professor  
Department of Ecology and Evolutionary Biology (EBIO)  
Ramaley N122 Campus Box 334  
University of Colorado  
Boulder, CO 80309-0334  
Office location: Ramaley C271  
Phone: (626) 833-4960  
EBIO Fax: (303) 492-8699  
email: [Daniel.Medeiros@Colorado.edu](mailto:Daniel.Medeiros@Colorado.edu)  
<https://medeiroslab.weebly.com>

## VITA

### **Education**

- 1) **California Institute of Technology**, Postdoctoral Fellow, Biology (2003-2005)
- 2) **California Institute of Technology**, Ph.D., Biology (2003)
- 3) **University of Hawaii at Manoa**, B.S., Zoology (1996)

### **Positions**

- 1) **Associate Professor**, University of Colorado, Boulder, Dept. of Ecology and Evolutionary Biology (2015-Present)
- 2) **Assistant Professor**, University of Colorado, Boulder, Dept. of Ecology and Evolutionary Biology (2008-2015)
- 3) **Senior Research Fellow**, California Institute of Technology, Biology (2005-2008)
- 4) **Postdoctoral fellow**, Division of Biology, California Institute of Technology (2003-2005)
- 5) **Graduate research assistant**, Division of Biology, California Institute of Technology (1997-2003)
- 6) **Junior Research Assistant**, University of Hawaii, Manoa, Department of Microbiology (1996-1997)
- 7) **Laboratory technician**, University of Hawaii, Manoa, Department of Entomology (1992-1996)

## PEER-REVIEWED PUBLICATIONS

- 1) Zhang, G., Jin, L. Q., Rodemer, W., Hu, J., Root, Z. D., Medeiros, D., & Selzer, M. E. (2022) The composition and cellular sources of CSPGs in the glial scar after spinal cord injury in the lamprey. *Frontiers in Molecular Neuroscience*, 291.
- 2) Stundl J, Soukup V, Franěk R, Pospisilova A, Psutkova V, Pšenička M, Cerny R, Bronner ME, Medeiros DM, Jandzik D (2022) Efficient CRISPR Mutagenesis in Sturgeon Demonstrates Its Utility in Large, Slow-Maturing Vertebrates. *Frontiers in Cell and Developmental Biology* 10.
- 3) Root ZD, Allen C, Gould C, Brewer M, Jandzik D, Medeiros DM (2022) A Comprehensive Analysis of Fibrillar Collagens in Lamprey Suggests a Conserved Role in Vertebrate Musculoskeletal Evolution. *Frontiers in Cell and Developmental Biology* 10.
- 4) Root ZD, Gould C, Brewer M, Jandzik D, Medeiros DM (2021) Comparative Approaches in Vertebrate Cartilage Histogenesis and Regulation: Insights from Lampreys and Hagfishes. *Diversity* 13.[1-3]
- 5) Root ZD, Jandzik D, Allen C, Brewer M, Romášek M, Square T, Medeiros DM (2021) Lamprey lecticans link new vertebrate genes to the origin and elaboration of vertebrate tissues. *Developmental Biology* 476: 282-293.

- 6) Square TA, Jandzik D, Massey JL, Romasek M, Stein HP, Hansen AW, Purkayastha A, Cattell MV, Medeiros DM (2020) Evolution of the endothelin pathway drove neural crest cell diversification. *Nature* 585: 563-+.
- 7) Barske L, Fabian P, Hirschberger C, Jandzik D, Square T, Xu P, Nelson N, Yu HV, Medeiros DM, Gillis JA, Crump JG (2020) Evolution of vertebrate gill covers via shifts in an ancient Pou3f3 enhancer. *Proceedings of the National Academy of Sciences* 117: 24876-24884.
- 8) Square T, Jandzik D, Romasek M, Cerny R, Medeiros DM (2017). The origin and diversification of the developmental mechanisms that pattern the vertebrate head skeleton. *Developmental Biology* 427:219:229.
- 9) Square T, Jandzik D, Cattell M, Hansen A, Medeiros DM (2016) Embryonic expression of endothelins and their receptors in lamprey and frog reveals stem vertebrate origins of complex Endothelin signaling. *Scientific Reports* 6: 34282.
- 10) Lee EM, Yuan T, Ballim RD, Nguyen K, Kelsh RN, Medeiros DM, McCauley DW (2016) Functional constraints on SoxE proteins in neural crest development: The importance of differential expression for evolution of protein activity. *Developmental Biology* 418: 166-178.
- 11) Medeiros DM (2015) Ancient origin for the axochord: a putative notochord homolog (Comment). *Bioessays*. 2015;37(8):834.
- 12) Romasek M, Square T, Jandzik D, Klymkowsky, M, Medeiros DM (2015) The CRISPR/Cas system in the sea lamprey: A powerful tool for understanding ancestral gene functions in vertebrates. *Development* 142:4180-4187
- 13) Taniguchi Y, Kurth T, Medeiros DM, Tazaki A, Ramm, R, Epperlein, HH. (2015). Mesodermal origin of median fin mesenchyme and tail muscle in amphibian larvae. *Scientific Reports* 5.
- 14) Campo-Paysaa, F., Jandzik, D., Takio-Ogawa, Y., Cattell, M., Neef, H., Langeland, J., Kuratani, S., Medeiros, D., Mazan, S., Kuraku, S., Laudet, V., and Schubert, M. (2015). Evolution of retinoic acid receptors in chordates: insights from three lamprey species, *Lampetra fluviatilis*, *Petromyzon marinus*, and *Lethenteron japonicum*. *EvoDevo* 6 (1):18.
- 15) Lowe CJ, Clarke DN, Medeiros D.M., Rokhsar D.S., Gerhart J, (2015). The deuterostome context of chordate origins. *Nature* 520: 456-465.
- 16) Jandzik D, Garnett AT, Square TA, Cattell MV, Yu JK, Medeiros, DM (2015). Evolution of the new vertebrate head by co-option of an ancient chordate skeletal tissue. *Nature* 518: 534-7.
- 17) Square, T., Jandzik, D., Cattell, M., Coe, A., Doherty, J. and Medeiros, DM (2015). A gene expression map of the larval *Xenopus laevis* head reveals developmental changes underlying the evolution of new skeletal elements. *Developmental Biology* 397: 293-304.
- 18) Jandzik, D., Hawkins, M.B., Cattell, M.V., Cerny, R., Square, T.A., Medeiros, DM. (2014). Roles for FGF in lamprey pharyngeal pouch formation and skeletogenesis highlight ancestral functions in the vertebrate head. *Development* 141, 629-638.
- 19) Van Otterloo, E., Cornell, R.A., Medeiros, DM, Garnett, A.T. (2013). Gene regulatory evolution and the origin of macroevolutionary novelties: insights from the neural crest. *Genesis*. 51(7):457-470.
- 20) Medeiros, DM. (2013). The Evolution of the Neural Crest; New Perspectives from Lamprey and Invertebrate Neural Crest-Like Cells. *WIREs Developmental Biology*. Epub date 8/28/12.
- 21) Cox, S., Kim, H., Garnett, A., Medeiros, DM, An, W., Crump, J.G. (2012). An Essential Role of Variant Histone H3.3 for Ectomesenchyme Potential of the Cranial Neural Crest' . *PLoS Genetics*. 8(9):e1002938.
- 22) Garnett, A.T., Square, T.A., Medeiros, DM. (2012) Wnt and FGF signals are integrated through evolutionarily conserved enhancers to achieve robust expression of pax3 and zic genes at the zebrafish neural plate border. *Development* 139(22):4220-316.
- 23) Medeiros, DM, Crump, J.G. (2012). New perspectives on pharyngeal dorsoventral patterning in development and evolution of the vertebrate jaw. (2012) *Developmental Biology*. 371(2):121-35.

- 24) Van Otterloo, E., Li. W., Cattell, M., Garnett, A., Medeiros, DM, Cornell, R.A. (2012). Tfp2-mediated control of SoxE expression arose in the vertebrate lineage and facilitated the emergence of neural crest. **Development** 139(4):720-30.
- 25) Cattell, M., Garnett, A., Klymkowsky, M., Medeiros, DM. (2012). A maternally established Sox-axis is a conserved feature of chordate development. **Evolution and Development**. 14(1):104-115.
- 26) Cattell, M., Lai, S., Cerny, R., Medeiros, DM. (2011). A new mechanistic scenario for the origin and evolution of vertebrate cartilage. **PLoS ONE**, 6(7): e22474. (13 pages)
- 27) Cerny, R, Cattell, M, Sauka-Spengler, T, Bronner-Fraser, M, Yu, F, Meulemans Medeiros, D. (2010) Evidence for the prepatter/cooption model of vertebrate jaw evolution. **Proceedings of the National Academy of Sciences** 107: 17262-17267.
- 28) Holland , L.Z., (54 others including Meulemans, D), Holland, P.W.H., (2008). The amphioxus genome illuminates vertebrate origins and cephalochordate biology. **Genome Research**.18:1100-1111.
- 29) Yu, J.-K., Meulemans, D., Mckeon, S., Bronner-Fraser, M. (2008). Insights from the amphioxus genome on the origin of vertebrate neural crest. **Genome Research** 18:1127-1132.
- 30) Meulemans, D., Bronner-Fraser, M. (2007). The Amphioxus SoxB Family: Implications for the Evolution of Vertebrate Placodes **Int J Biol Sci**, 3(6):356-64.
- 31) Meulemans, D., Bronner-Fraser, M. (2007). Insights from Amphioxus into the Evolution of Vertebrate Cartilage. **PLoS ONE**, 2(8):e787.
- 32) Sauka-Spengler, T., Meulemans, D., Jones, M., Bronner-Fraser, M. (2007). Ancient Evolutionary Origin of the Neural Crest Gene Regulatory Network. **Developmental Cell** 13, 405-420.
- 33) Epperlein, H.H. Selleck, M., Meulemans, D., Mchedlishvili, L., Cerny, R., Sobkow, L., Bronner-Fraser, M.,(2007). Migratory patterns and developmental potential of trunk neural crest cells in the axolotl embryo. **Developmental Dynamics**. 236, 398-403.
- 34) Meulemans, D., Bronner-Fraser, M. (2005). Central role of gene cooption in neural crest evolution. **J. Exp. Zool. (Mol. Dev. Evol.)** 304B.
- 35) Meulemans, D., Bronner-Fraser, M. (2004). Gene-regulatory interactions in neural crest evolution and development. **Developmental Cell** 7, 291-299.
- 36) Cerny R, Lwigale P, Ericsson R, Meulemans, D., Epperlein H.H., Bronner-Fraser M. (2004) Developmental origins and evolution of jaws: new interpretation of "maxillary" and "mandibular". **Developmental Biology** 276 (1): 225-236.
- 37) Cerny, R., Meulemans, D., Berger, J., Wilsch-Brauninger, M., Kurth, T., Bronner-Fraser, M., and Epperlein, H. H. (2004). Combined intrinsic and extrinsic influences pattern cranial neural crest migration and pharyngeal arch morphogenesis in axolotl. **Developmental Biology** 266, 252-69.
- 38) Meulemans, D., McCauley, D., and Bronner-Fraser, M. (2003). Id expression in amphioxus and lamprey highlights the role of gene cooption during neural crest evolution. **Developmental Biology** 264, 430-42.
- 39) Schubert, M., Meulemans, D., Bronner-Fraser, M., Holland, L. Z., and Holland, N. D. (2003). Differential mesodermal expression of two amphioxus MyoD family members (*AmphiMRF1* and *AmphiMRF2*). **Gene Expression Patterns** 3, 199-202.
- 40) Meulemans, D., and Bronner-Fraser, M. (2002). Amphioxus and lamprey AP-2 genes: implications for neural crest evolution and migration patterns. **Development** 129, 4953-4962.
- 41) Tang, S. J., Meulemans, D., Vazquez, L., Colaco, N., and Schuman, E. (2001). A role for a rat homolog of stauferin in the transport of RNA to neuronal dendrites. **Neuron** 32, 463-75.
- 42) Epperlein H.H., Meulemans, D., Bronner-Fraser M., Steinbeisser H., and Selleck M.A.J. (2000) Analysis of cranial neural crest migratory pathways in axolotl using cell markers and transplantation. **Development** 127:2751-2761.

## **PUBLISHED PREPRINTS**

- 1) Root, Z.D., Jandzik, D., Gould, C., Allen, C., Brewer, M., Medeiros, D.M. Cartilage Diversification and Modularity Presaged the Evolution of the Gnathostome Head Skeleton. (2022) **Research Square** doi: <https://doi.org/10.21203/rs.3.rs-2128667/v1>
- 2) Lamanna, F., Hervas-Sotomayor, F., Oel, P.A., Jandzik, D., Sobrido-Cameán, D., Martik, M.L., Green, S.A., Brüning, T., Mößiger, K., Schmidt, J., Schneider, C., Sepp, M., Murat, F., Smith, J.J., Bronner, M.E., Rodicio, M.C., Barreiro-Iglesias, A., Medeiros, D.M., Arendt, D., Kaessmann, H. (2022) Reconstructing the ancestral vertebrate brain using a lamprey neural cell type atlas. **bioRxiv** 2022.02.28.482278; doi: <https://doi.org/10.1101/2022.02.28.482278>

## **BOOKS EDITED**

- 1) Eames, B.F., **Medeiros, D.M.**, and Adameyko, I., editors (2020) Evolving Neural Crest Cells. 250 pages. In the series “*Evolutionary Cell Biology*” Edited by Brian Hall and Sally Moody. Taylor and Francis publishers.

## **FUNDING**

- 1) **NSF IOS: Evolution of the Gene Regulatory Network for Pharyngeal Segmentation.** Dec 2021-Nov 2025 (**\$881,793**). **Sole PI**
- 2) **CU Innovative Seed Grant Program: A Functional Genomics Approach to Understanding the Evolution of “Endless Forms”.** July 2020-June 2021. (**\$45,000**). **Sole PI**
- 3) **NSF Conference Grant: Pan American Society for Evolutionary Developmental Biology Biennial meeting.** July 2019. (**\$19,990**) **Sole PI** on behalf of PASEDB.
- 4) **University of Colorado, Anschutz Medical Campus RNA Bioscience Initiative Award: Understanding Jaw Evolution by Comparing Craniofacial Progenitor Cells in Lamprey and Zebrafish.** December 2017. (**\$7000**) **Co-PI with James Nichols** (CU Anschutz)
- 5) **NSF Conference Grant: Pan American Society for Evolutionary Developmental Biology Biennial meeting.** August 2017. (**\$20,350**) **Sole PI** on behalf of PASEDB.
- 6) **NIH R13: Pan American Society for Evolutionary Developmental Biology Biennial meeting.** August 2017-August 2022. (**\$31,200**) **Sole PI** on behalf of PASEDB.
- 7) **NSF IOS: Testing Models of Jaw Joint Evolution Using the Sea Lamprey, Xenopus laevis, and zebrafish.** June 2017-May 2021 (**\$600,000**) **Sole PI**
- 8) **NIH R21: Testing Models of Pharyngeal Segmentation Using the Sea Lamprey Petromyzon marinus and the frog Xenopus laevis.** Sept 2016-August 2018 (**\$418,731**) **Sole PI**
- 9) **NSF IOS: A mechanistic model for the evolution of the vertebrate head skeleton.** March 2013-March 2016 (**\$530,000**) **Sole PI**
- 10) **NIH R03: A Cis-regulatory Model for Neural Border Induction.** April 2012-March 2014. (**\$228,750**) **Sole PI**
- 11) **NSF IOS EAGER: Methods for the continuous laboratory culture and transgenesis of the amphioxus Branchiostoma floridae.** April 2012-March 2014. (\$300,000 total, **\$155,000** to Medeiros lab) **Co-PI.**
- 12) **NSF IOS: Endothelin Signaling in the Lamprey Head and the Evolution of the Jaw.** January 2010-December 2012. (**\$400,000**). **Sole PI**
- 13) **CU Innovative Seed Grant Program: Empirically Optimized Software for Finding Gene-Regulatory Elements in the Human Genome.** July 2009-June 2010. (**\$41,000**). **Sole PI**

## **CONFERENCES, SYMPOSIA, SEMINARS**

### ***Invited Conference and Symposium Talks***

- 1) **Genetics, Disease, Development and Regeneration T32 Training Grant Seminar**, CU Anschutz Medical Campus, Aurora, Colorado, April 2023
- 2) **Fondation des Treilles Workshop, A Neural Crest Perspective on Craniofacial Development**, Provence, France, October 2022 (declined due to scheduling conflict).
- 3) **Gordon Research Conference, Craniofacial Morphogenesis and Tissue Regeneration** Ventura, California, October 2022.
- 4) **American Association for Anatomy Annual Meeting at Experimental Biology 2022**, Non-traditional models to study craniofacial development. Philadelphia, Pennsylvania, April 2022. (declined due to natural disaster)
- 5) **Mini-symposium on Neural Crest and Neural Crest Derived Pathologies**, Organizers Igor Adameyko and Sofie Mohlin, digital event, March 2022 (declined due to natural disaster)
- 6) **European Society for Evolutionary Developmental Biology Biennial Conference**, Amphioxus Satellite Meeting, Galway, Ireland, June 2018.
- 7) **European Society for Evolutionary Developmental Biology Biennial Conference**, Galway, Ireland, June 2018.
- 8) **Society for Developmental Biology Southwest Regional Meeting**, Houston, Texas, October 2017.
- 9) **Gordon Research Conference, Neural Crest and Cranial Placodes**, Ventura, California, February, 2017.
- 10) **Stem Cells, Gene Regulatory Networks and the Evolution of Vertebrates** A symposium recognizing the contributions of Marianne Bronner. California Institute of Technology, Pasadena, January, 2016.
- 11) **Plenary Talk, Sea Urchin Developmental Biology Meeting**, Marine Biology Laboratory, Woods Hole Massachusetts, October 2015. (Declined due to scheduling conflict)
- 12) **Gordon Research Conference, Neural Crest and Cranial Placodes**, Bentley University, Waltham, Massachusetts July 2015. (Cancelled due to family emergency)
- 13) **European Society for Evolutionary Developmental Biology Biennial Conference**, Amphioxus Satellite Meeting, Vienna, Austria, July 2014. (Declined due to scheduling conflict)
- 14) **Plenary Talk, Sea Urchin Developmental Biology Meeting**, Marine Biology Laboratory, Woods Hole Massachusetts, April 2014.
- 15) **Southwest Regional Society for Developmental Biology Meeting**, Denver, Colorado, March 2014.
- 16) **Gordon Research Conference, Neural Crest and Cranial Placodes**, Stonehill College Easton, Massachusetts, July 2013.
- 17) **Asia Pacific Developmental Biology Conference**, Evo/Devo Satellite meeting, Taipei, Taiwan, October, 2012.
- 18) **Student Conference on Evolutionary Developmental Biology**, The Weizmann Institute of Science, Tel Aviv, Israel, Spring 2012. (Declined due to scheduling conflict).
- 19) **European Evolutionary Developmental Biology Conference**, Paris, France, July 2010.
- 20) **NSF IGERT Symposium "From Patterns to Processes: Bridging Micro- and Macroevolutionary Concepts Through Evo-Devo."** University of Oregon, Eugene, Oregon, Spring 2008.
- 21) **7<sup>th</sup> Annual International Congress on Vertebrate Morphology** Symposium " Evolutionary Origin Of Neural Crest And Placodes." Boca Raton, Florida, Summer 2004.

#### ***Invited Departmental Seminars***

- 1) **University of Colorado, Denver**, Department of Integrative Biology, August, 2018.
- 2) **University of California, San Diego**, Section on Developmental and Cellular Biology, February, 2018
- 3) **Cincinnati Children's Hospital Medical Center**, Graduate Program in Molecular & Developmental Biology, December, 2017
- 4) **University of Chicago, Chicago, Illinois**, Development, Regeneration, and Stem Cell Biology Program, November, 2016
- 5) **Technische Universitat, Dresden, Germany**, Center for Regenerative Therapies, Elly

- Tanaka group, September, 2016
- 6) **Charles University, Prague, Czech Republic**, Department of Zoology, Robert Cerny Group, September, 2016
  - 7) **Observatoire Océanologique de Villefranche-sur-Mer, Villefranche-sur-Mer, France**, September, 2016
  - 8) **University of Colorado, Colorado Springs, Department of Biology Seminar Series, Colorado Springs**, Colorado, April 2013
  - 9) **University of Oklahoma, Department of Zoology Seminar Series, Norman, Oklahoma**, February 2013.
  - 10) **University of Oregon, Ecology and Evolutionary Biology Seminar Series, Eugene, Oregon**, November 2011.
  - 11) **Stanford University, Hopkins Marine Station Seminar Series, Monterey, California**, February 2011.
  - 12) **Colorado State University, Biology Department Seminar Series, Fort Collins, Colorado**, May 2010.
  - 13) **CU Denver Health Sciences Center Cancer, Cell and Developmental Biology Seminar Series, Aurora**, Colorado, March 2009.

#### ***Contributed oral presentations***

- 1) **Society for Comparative and Integrative Biology**; Session: Evolutionary Developmental Biology of the Head and Trunk, Salt Lake City, Utah, January 2011.
- 2) **Denver Area Zebrafish and Amphibian Meeting**. University of Colorado Health Sciences Center, Aurora, Colorado, Fall 2008.

#### ***Contributed poster presentations***

- 1) Root ZD, Allen C, Brewer M, Gould C, **Medeiros DM** (2021) Straw, sticks, and bricks: Genome duplication and the evolution of fibrillar collagens in the vertebrate musculoskeletal system. *Integrative and Comparative Biology* 61: E758-E759.
- 2) Brewer ME, Root ZR, **Medeiros DM** (2021) Tendon development in lamprey and its implications for vertebrate morphological evolution. *Integrative and Comparative Biology* 61: E1067-E1068.
- 3) Root ZD, Jandzik D, **Medeiros DM** (2019) Straw, Sticks, and Bricks: Understanding Vertebrate Musculoskeletal Evolution through Fibrillar Collagens and their Diversification. *Integrative and Comparative Biology* 59: E398-E398.
- 4) Briggs-Hale JM, Root ZD, **Medeiros DM** (2019) The Evolution of Jaw Joint Precursors in a Jawless Vertebrate. *Integrative and Comparative Biology* 59: E278-E278.
- 5) Tyler A. Square, David Jandzik, Haley P. Stein, Andrew W. Hansen, Marek Romášek, Amrita Purkayastha, James L. Massey, Maria V. Cattell, **Medeiros DM** (2017). Beyond the Jaw Joint: endothelins drove neural crest cell differentiation in stem vertebrates. Pan-American Society for Evolutionary Developmental Biology biannual meeting.
- 6) Square T, Romasek, M, Jandzik D, Cattell, M, **Medeiros DM**. (2015). Neural Crest Cell Specification via Endothelin Pathways Evolved in Stem Vertebrates. Pan-American Society for Evolutionary Developmental Biology biannual meeting.
- 7) Square T, Jandzik D, **Medeiros DM**. (2015). A gene expression map of the larval *Xenopus laevis* head reveals developmental changes underlying the evolution of new skeletal elements in vertebrates. Society for Integrative and Comparative Biology Annual Meeting.
- 8) Romasek M, Square T, Jandzik D, **Medeiros DM**. (2015). CRISPR/Cas system in the sea lamprey: A tool for understanding ancestral gene functions in vertebrates. Society for Integrative and Comparative Biology Annual Meeting.
- 9) Garnett AT and **Medeiros D.M.** (2014). Divergence of gene expression patterns through enhancer modification. Talk. Southwest Regional Meeting of the Society for Developmental Biology.

- 10) Romasek, M., Cattell, M., Square, T., Cerny, R., and **Medeiros, D. M.** (2014). Genetic and developmental characterization of embryonic skeletal tissues in sea lamprey. Southwest Regional Meeting of the Society for Developmental Biology.
- 11) Square, T., Jandzik, D. **Medeiros, D. M.** (2014) Conserved and derived patterns of transcription factor expression in the developing *Xenopus laevis* head skeleton. Southwest Regional Meeting of the Society for Developmental Biology.
- 12) Garnett, A. T., Square, T., and **Medeiros, D. M.** (2012). Divergence of gene expression patterns by enhancer modification. International Conference on Zebrafish Development and Genetics.
- 13) Garnett, A. T., Square, T., and **Medeiros, D. M.** (2011). Divergence of neural plate border genes by enhancer modification. Society for Developmental Biology Annual Meeting.
- 14) Garnett, A., Square, T., and **Medeiros, D. M.** (2010). Subfunctionalization of neural plate border genes by enhancer modification. Society for Developmental Biology Annual Meeting.
- 15) **Medeiros, D. M.**, Sauka-Spengler, T., Bronner-Fraser, M., and Cerny, R. (2009). Endothelin signaling in the lamprey head and the evolution of the jaw. Society for Developmental Biology Annual Meeting.

## **MEMBERSHIPS AND HONORS**

### ***National Society Memberships***

- 1) Pan American Society for Evolutionary Developmental Biology, 2015-present
- 2) Society of Integrative and Comparative Biology, 2009-present
- 3) Society for Developmental Biology, 2008-present

### ***Awards***

- 1) Graduation with Highest Honors, University of Hawaii, 1996
- 2) Barry Goldwater Scholar, 1995-1996
- 3) Howard Hughes Undergraduate Research Fellow, 1993-1995

## **TEACHING AND MENTORING**

### ***Courses taught (ratings out of 6 points possible)***

- 1) **EBIO 1210**, *General Biology*: Second half. Includes cell biology, genetics, biotechnology, developmental biology, and evolution. Two sections each term, each approximately 350 students. Fall 2009- 2010, Fall 2012-2015. Instructor ratings; 4.6, 4.6, 4.5, 4.6, 5.2, 4.8, 5.2, 5.4, 5.1, 5.1, 5.3, 5.2. Course ratings; 4.5, 4.5, 4.4, 4.5, 4.8, 4.6, 4.7, 5.0, 4.6, 4.6, 4.9, 4.6.
- 2) **EBIO 2070**, *Genetics*. Spring 2018, 2020, Instructor ratings; 4.1, N/A Course ratings; 4.0, N/A.
- 3) **EBIO 4800/5800**, *DNA, Development, Diversity*. Spring 2009-2013. Instructor ratings; 5.0, 5.5, 5.9, 6.0, 5.7 Course ratings; 4.7, 5.1, 5.5, 5.5, 5.3
- 4) **EBIO 6300**, *Graduate seminar in Evolutionary Developmental Biology*. Spring 2010-2018. Instructor ratings; 6.0, 6.0, 4.7, 5.7, 5.7, 6.0, 6.0 Course ratings; 6.0, 6.0, 4.7, 5.3, 5.7, 6.0, 6.0
- 5) **EBIO/MCDB4440/5440**, *Animal Developmental Diversity*. 2014-present. Instructor ratings until 2019; 5.3, 5.4, 5.7, 5.7, 5.7, 5.3, Course ratings until 2019; 4.6, 5.0, 5.4, 5.3, 5.3, 4.6. 2020-2022; "frequently" or "almost always" for all questions.

### ***Courses developed***

- 1) **EBIO 4800/5800, DNA, Development, Diversity.** I developed a writing-based “critical thinking” course that exposes undergraduate junior and seniors, and beginning graduate students to literature and analysis in the field of evolutionary developmental biology. Students write 1-page daily responses to primary literature, present papers, participate in daily discussions, and write an 8-10 page mock grant proposal.
- 2) **EBIO/MCDB 4440/5440, Animal Developmental Diversity.** At the request of undergraduates in my critical thinking course, I developed this 3 credit course with an associated 1 credit wet lab in comparative vertebrate development. The course exposes undergraduates and graduate students to key techniques in developmental biology including microinjection, in situ hybridization, bioinformatics, transgenics, and cis-regulatory analysis.

### ***Undergraduate mentoring***

#### *Undergraduate Researchers*

- 1) **Tyler Square**, Undergraduate Research Assistantship Program Fellow (URAP, 2009), Undergraduate Research Opportunities Program Fellow (UROP, 2010), HHMI Undergraduate Research Fellow (2011).
- 2) **Johanna Mehias**, (CU Volunteer, 2009)
- 3) **Mimi (Su) Lai**, (URAP Fellow, 2010)
- 4) **Steven Erickson**, (UROP Fellow, 2010, HHMI Undergraduate Research Fellow 2011)
- 5) **Alex Marsh**, (URAP Fellow, 2010)
- 6) **Charles Ventriglia**, (URAP Fellow, 2011)
- 7) **Luke Stewart** (CU Volunteer, 2012)
- 8) **Timothy Wanninger** (Regent University Volunteer, 2012)
- 9) **Alex Coe** (HHMI Undergraduate Research Fellow, 2013)
- 10) **Natalie Heil** (HHMI Undergraduate Research Fellow, 2013)
- 11) **Tobias Albrightsen** (UROP Fellow, CU Work-study student, 2012-2015)
- 12) **Meagan Kitt** (HHMI Undergraduate Research Fellow, 2012)
- 13) **Claire Spitzer** (UROP Fellow, 2012)
- 14) **Nicolas Pizzi** (Summer Minority Access to Research Training, 2013)
- 15) **Daniel Brunelle** (UROP Fellow, 2013)
- 16) **Kathryn Hutton** (Directed Research Student, 2014, UROP Fellow, 2013, 2014)
- 17) **Drew Hansen** (CU Work-study student 2015-2017, UROP 2015)
- 18) **Haley Stein** (UROP Fellow, 2015, BURST Fellow, 2016)
- 19) **Cole Steinmetz** (Directed Research Student, 2015)
- 20) **Ka (Peter) Sam** (Volunteer, Directed Research Student, 2016-2017)
- 21) **Emily Garrison** (Volunteer, Directed Research Student, 2017)
- 22) **Aynsley Jessip** (UROP Fellow, 2017)
- 23) **Aaron Arman** (Directed Research Student, 2017, 2018)
- 24) **Trevor Isner** (Directed Research Student, 2017, 2018)
- 25) **Julia Briggs-Hale** (BSI Fellow, Summer and Fall 2018)
- 26) **Amrita Purkayastha** (Volunteer, 2018)
- 27) **Cara Allen** (Volunteer, 2019, 2020, BSI Scholar, 2020, UROP Fellow 2021)
- 28) **Margaux Brewer** (Directed Research Student, hourly student assistant, 2019, UROP Fellow, 2020, 2021)
- 29) **Claire Gould** (Independent Study Student, BSI Scholar 2020, UROP Fellow, 2021)
- 30) **Cameron Bellian** (Volunteer, 2020, UROP Fellow 2021)
- 31) **Austin Katzer** (Volunteer, 2020, BSI Scholar, 2021)
- 32) **Lucy Dale** (UROP, Fellow 2021)
- 33) **Louis Balas** (Volunteer, 2022, 2023)
- 34) **Javier Sanchez** (Volunteer, 2022, 2023)
- 35) **Blake French** (Volunteer, 2023)

#### *Senior Honors Theses Directed*

- 1) **Tyler Square** (EBIO, *Summa Cum Laude*, 2011)
- 2) **Meagan Kitt** (EBIO, *Magna Cum Laude*, 2013)



- 3) **Claire Gould** (MCDB, *Magna Cum Laude*, 2021)
- 4) **Austin Katzer** (EBIO, Latin honors expected 2022)
- 5) **Louis Balas** (MCDB, Latin honors expected 2023)
- 6) **Blake French** (EBIO, Latin honors expected 2023)

Senior Honors Thesis Committees

- 1) **Chucky (Zuo Bin) Lee** (MCDB, 2011)
- 2) **Alex Coe** (MCDB, 2014)
- 3) **Lara Janisewski** (MCDB, 2015)
- 4) **Alex Ary** (IPHY, 2016)
- 5) **Cassandra Horton** (IPHY, 2020)
- 6) **Elizabeth Prafke**, (Sociology, 2023)

High School Students Mentored

- 1) **Om Neelay** (2011) Awarded first prize in Bioscience for his project at the Boulder County high school Science Research Symposium.
- 2) **Cassie Mocek** (2011)
- 3) **Harnek Gulati** (2012)
- 4) **Michelle Free** (2012)
- 5) **Natalie Todd** (2012)
- 6) **Johanne Albrightsen** (2013)
- 7) **Amrita Purkayastha** (2016-2017) Awarded first prize in Bioscience for her project at the Boulder County high school Science Research Symposium.
- 8) **Stian Cattell-Ravdal** (2018)
- 9) **Thomas Pasnau** (2019)

**Graduate Student Mentoring**

Theses directed

- 1) **Jacob Doherty** (M.A., Summer 2014)
- 2) **Tyler Square** (Ph.D., 2017)
- 3) **Marek Romasek** (Ph.D., 2015-2016, left program)
- 4) **James Massey** (M.A., 2022)
- 5) **Zachary Root** (Ph.D., expected 2022)
- 6) **Lindsey Ray** (Ph.D., expected 2023)
- 7) **Blake French** (B.S./M.A., expected, 2024)

Rotation students advised

- 1) **Gilson Sanchez** (Ph.D., Biochemistry and Chemistry, 2015)
- 2) **Chelsea Drown** (Ph.D., MCDB, expected 2027)

Graduate student committees

- 1) **Brent Hawkins** (M.A., EBIO, 2011)
- 2) **Sharon Aigler** (M.A., EBIO, 2010)
- 3) **Bader Alhajeri** (M.A., EBIO, 2010)
- 4) **Rebecca Povilus** (Ph.D., formerly EBIO)
- 5) **Jera Law** (Ph.D., formerly CU Denver Health Sciences Center)
- 6) **Sierra Love Stowell** (Ph.D., EBIO expected 2015)
- 7) **Lisa Jung** (M.S., Integrated Physiology, expected 2014)
- 8) **Robert Roscow** (M.A., EBIO, expected 2015)
- 9) **Julie Szymaszek** (M.A., EBIO, 2014)
- 10) **Hilary Hastings** (B.A./M.A., EBIO 2014)
- 11) **Jennyfer Mora** (Ph.D., University of Denver, expected 2017)
- 12) **Ying Zao** (Ph.D., MCDB, 2015)
- 13) **Jeff Colgren** (Ph.D., University of Denver, 2021)
- 14) **Daniel Zarate** (Ph.D., EBIO, expected 2023)

**Postdoctoral mentoring**

- 1) **Aaron Garnett, Ph.D.**, UC Berkeley, 2008. NSF Postdoctoral Fellow in Bioinformatics. (2008-2014)
- 2) **David Jandzik, Ph.D.**, Comenius University, Bratislava, 2007. (2011-present)

## **SERVICE**

### ***Departmental service***

- 1) JEDI meta-committee, 2022
- 2) Research Meta-committee, 2021
- 3) Budget Committee, 2020
- 4) Merit Committee, 2014, 2016, 2020
- 5) Research Committee, 2020
- 6) Graduate Committee, 2015-2017
- 7) EBIO Website Committee, 2009-2015
- 8) Colglazier Undergraduate Scholarship Committee, 2008
- 9) Curriculum Committee, 2008-2010, 2014-2015
- 10) Gen Bio Committee, 2009-present
- 11) Executive Committee, 2010-2011
- 12) Autoclave Committee, 2008-present
- 13) Evolution Job Search Committee, 2012-2013

### ***University service***

- 1) IACUC EBIO Alternate voting member, 2012-2016
- 2) PUEC, Diana Oliveras, Fall 2013
- 3) IACUC eRA (electronic research administration) Search Committee, Fall 2013
- 4) CU Innovative Seed Grant Reviewer, Biomedical Section A, Spring 2012
- 5) CU Innovative Seed Grant Reviewer, Biomedical Section A, Spring 2011

### ***National Professional service***

- 1) **Session Chair**, Pan American Society for Evolutionary Developmental Biology Biennial Meeting, July 2019.
- 2) **Judge, Best Student Oral Presentation Competition** for the Division of Evolutionary Developmental Biology at the SICB annual meeting, September 2018.
- 3) **Session Chair**, Pan American Society for Evolutionary Developmental Biology Biennial Meeting, August 2017.
- 4) **Ad hoc reviewer for NSF**, Integrated Organismal Systems cluster October 2017.
- 5) **Development Officer**, Pan American Society for Evolutionary Developmental Biology, 2016-present.
- 6) **Ad hoc reviewer for NIH**, Institute of Cardiovascular Differentiation and Development, September 2014.
- 7) **Ad hoc reviewer for the French National Research Agency**, August 2014.
- 8) **Panelist, NSF IOS Evolution of Animal Development Preproposal Review Panel**, March 2014.
- 9) **Panelist, NSF IOS Animal Development and EvoDevo Full Proposal Review Panel**, October 2013.
- 10) **Panelist, NSF IOS Evolution of Animal Development Preproposal Review Panel**, April 2013.
- 11) **Editorial Board**, the journal *Developmental Biology* (Feb 2011-present)
- 12) **Ad hoc reviewer** for the NSF, Integrated Organismal Systems cluster (5 proposals)
- 13) **Reviewer** for the journals, PNAS, *Developmental Biology*, *Nature*, *Science*, *Developmental Dynamics*, *Evolution and Development*, *WIREs Developmental Biology*, *EvoDevo*, *Molecular Biology and Evolution*, *Nature Communications*, *PLOS ONE*, *BMC Evolutionary*

Biology, Journal of Dental Research, among others. Approximately 10 manuscripts per year.

- 14) **Organizer**, Denver Area Zebrafish and Amphibian Meeting. CU Boulder, Boulder Colorado, Spring, 2009.
- 15) **Session Chair**, Society for Comparative and Integrative Biology; Session: Evolutionary Developmental Biology of the Head and Trunk, Salt Lake City, Utah, January 2011

### ***Community outreach activities***

- 1) **Creator and Consultant for Butterfly Pavilion Exhibit “Hidden Links, Discovering Your Inner Invertebrate”**. The overarching goal of this NSF-funded zoo exhibit is to show guests how vertebrates and invertebrates are evolutionarily connected and, in doing so, help motivate visitors to support the conservation of threatened invertebrates globally. Exhibit components will include tanks for supervised interactions with live amphioxus and lamprey larvae, an observation station with microscopes and magnifying glasses, a microscope connected to a digital camera and projector for observations and presentations, and an interactive play station with fabricated animal segments, printed informational posters, and informational videos. In preparation Spring 2022. Opening Spring 2023
- 2) **Mentor for Middle School STEM program** Earth Explorers, a non-profit STEM education organization that exposes middle school students to basic research through experiments and interviews with professional scientists. Students then make videos about their experiences, which are shown at biannual film festival. Fall 2019.
- 3) **Middle School Lab Tour**. 24 7<sup>th</sup> and 8<sup>th</sup> grade students from Horizons K-8 toured the Medeiros Lab and fish room were given a short presentation about EvoDevo research. April 2019.
- 4) **High School Lecture**. Evolutionary Developmental Biology. Fairview High School. Boulder, Colorado, May 2018.
- 5) **Public Lecture**, Boulder Flatirons Rotary Club, What Darwin Didn't Know about Animal Evolution, March 2018.
- 6) **Public Lecture**, Glenwood Springs Library Spring Lecture Series, What Darwin Didn't Know about Animal Evolution. Glenwood Springs, Colorado, May 2017.
- 7) **Public Lecture**, CU on the Weekend Program, What Darwin Didn't Know about Animal Evolution. Jennie Smoly Caruthers Biotechnology Building, Butcher Auditorium, February 2017.
- 8) **High School Lectures**, Two sections of Genetics, Development and Evolution. Centaurus High School. Lafayette, Colorado, April 2016.
- 9) **Elementary School Demonstration**, Frog Development. Community Montessori Elementary School, Boulder, Colorado, April 2016.
- 10) **Panel Member**, “Born to Run” Panel for course English 121. Front Range Community College, Westminster, Colorado, March 2016.
- 11) **Elementary School Lecture**, Human Evolution. Community Montessori Elementary School, Boulder, Colorado, April 2015.
- 12) **Public Lecture**, What Darwin didn't know: The New Science of Evo-Devo and the Origins of Animal Diversity. CU Museum of Natural History, February 2014.
- 13) **Mentor for Middle School STEM program** Earth Explorers, a non-profit STEM education organization that exposes middle school students to basic research through experiments and interviews with professional scientists. Students then make videos about their experiences, which are shown at biannual film festival. 2014-2015.
- 14) **Scientific Advisor**, CU Museum of Natural History traveling exhibit, “DNA to Diversity; EvoDevo and the Evolution of Animal Form”. This exhibit is designed to introduce high school, junior college, and college students across the state, and in neighboring states, to the major themes and advances in the field of Evolutionary Developmental Biology. Opened February 2014.
- 15) **Public Lecture**, CU Secular Students and Skeptics Society Darwin Day celebration, February 2013.

- 16) **Workshop Lectures**, EBIO Evolution Outreach Committee's Teaching Evolution Workshop, 2011, 2012
- 17) **High School Student Mentor**, Boulder Valley School District Science Research Seminar program, 6 high school students, 2011-present.
- 18) **Panel member**, performance art piece "Preparations for the obsolescence of the Y Chromosome" by Michelle Ellsworth, Professor of Dance, CU Boulder Theatre and Dance Department, 2011.

**PROFESSIONAL DEVELOPMENT**

- 1) LEAP Assistant Professor Intro. To Leadership Workshop, 3 days, Spring 2009
- 2) FTEP Teaching Assessment Workshop, 3 days, Spring 2010

## REFERENCES

**1) Marianne Bronner**

*Thesis Advisor*  
[mbronner@caltech.edu](mailto:mbronner@caltech.edu)  
Albert Billings Ruddock Professor  
California Institute of Technology  
Division of Biology and Biological Engineering  
Pasadena, CA 91125  
(626) 395-3355

**2) Carole LaBonne**

*Colleague and Coauthor*  
[clabonne@northwestern.edu](mailto:clabonne@northwestern.edu)  
Northwestern University  
2205 Tech Drive, Hogan 2-100  
Evanston, IL 60208  
(847) 491-4165

**3) Chris Lowe**

*Colleague and Coauthor*  
[clowe@stanford.edu](mailto:clowe@stanford.edu)  
Stanford University  
Hopkins Marine Station  
120 Oceanview Blvd.  
Pacific Grove  
CA 93950  
(831) 655-6227

**4) Michael Klymkowsky**

*Collaborator*  
[michael.klymkowsky@colorado.edu](mailto:michael.klymkowsky@colorado.edu)  
University of Colorado, Boulder  
MCD Biology  
Porter room B425  
Boulder, Colorado 80309  
(303) 492-8508

**5) Henrik Kaessman**

*Collaborator*  
[h.kaessmann@zmbh.uni-heidelberg.de](mailto:h.kaessmann@zmbh.uni-heidelberg.de)  
ZMBH Research Group Leader  
ZMBH  
Im Neuenheimer Feld 282  
69120 Heidelberg, Germany  
+49 (0) 6221 - 545854