MARK Q. MARTINDALE, Ph.D.
Director of Whitney Laboratory for Marine Bioscience
Professor of Biology

I have been trained as an experimental embryologist from an early academic age. I became exposed to research as an undergraduate at the New College in Sarasota, Florida and have since worked on the development or regeneration of some 15 animal phyla. I am a co-author on two important genome papers of basally branching metazoans (the anthozoan cnidarian *Nematostella vectensis* and the ctenophore *Mnemiopsis leidyi*).

One area I am particularly interested in the origin of spatial organization during the early developmental period and changes in developmental programs associated with dramatic changes in animal body plans. Other areas of interest include the role of life history evolution on development, and the relationship between development and regenerative healing from a phylogenetic perspective, and the evolution of biological novelties.

I am strongly committed to scientific training and mentoring; in fact fourteen out of fifteen of my former postdoctoral associates have tenure, are in tenure track positions, or have remained in academic science. This is something I'm working to instill even further into the Whitney Laboratory culture. I have worked and taught at marine labs around the world and believe strongly in empirical science, field experience, and have consistently been a proponent of utilizing biological diversity as a tool for understanding basic concepts in biology.

Education:

1985	Ph.D. Zoology, University of Texas, Austin
1981	B.A. Natural Sciences, New College of the University of South Florida, Sarasota

Professional Experience:

2013-present	Graduate Faculty, University of Florida. Genetics and Neurosc IDP Program
2012-Present	Director and Professor, Whitney Laboratory for Marine Bioscience, University of Florida
2012-2016	Director, Seahorse Key Marine Lab
2007-2012	Director, Kewalo Marine Lab, University of Hawai'i at Manoa (UHM)
2005-2013	Professor, Kewalo Marine Lab, UHM
2003-2013	Cell and Molecular Biology Program, UHM
1999-2005	Associate Professor, Kewalo Marine Lab, UHM
1999-2007	Evolution, Ecology, and Conservation Biology, UHM
1999-present	Graduate Faculty, Department of Zoology, UHM
1998-1999	Assistant Researcher, Kewalo Marine Lab, UHM
1997-1998	Associate Professor, University of Chicago
1990-1997	Assistant Professor, University of Chicago

Postgraduate Appointments:

1986-1990	Department of Anatomy and Cellular Biology, Harvard Medical School
1985-1986	Department of Zoology, University of Texas

Awards and Fellowships:

2009	Alexander Kowalevsky Medal for Comparative Embryology, St. Petersburg, Society of Naturalists
2004	University of Hawai'i Regents Medal for Excellence in Research Award
1998	NASA Life Sciences Fellow, Marine Biological Lab, Woods Hole, MA
1997	Faculty Teaching Award, Pritzker School of Medicine, University of Chicago

1996	Evelyn and Melvin Spiegel Endowed Fellow and the Bernard Davis Fellow, Marine Biological Lab, Woods Hole, MA
1994-1998	Independent Lab at Marine Biological Lab, Woods Hole, MA
1992-1994	Independent Lab at Duke University Marine Lab, Beaufort, NC
1987-1990	N.I.H. N.R.S.A. Postdoc Fellowship Harvard Medical School
1988	Young Investigator of the Year, Runner-Up, Society of Developmental Biology
1985	Young Investigator of the Year, Society of Developmental Biologists

Associations, Teaching and Service:

2016	Southeast Regional Society for Developmental Biology Meeting Organizer
2015-18	Graduate faculty University of North Carolina, Charlotte, appointed
2015	NIH Dev1 Study Section, Ad hoc
2014	NIH Systems Biology ad hoc Study Section
2014	University Sao Paulo, Brasil, Marine Invertebrate Embryology, Instructor San Sebastiao CEMIMar Marine Lab
2014	Society For Developmental Biology (SDB) Meeting Co-Organizer, Seattle, WA
2014	NASA Astrobiology Study Section
2014	NIH Dev1 Study Section
2013	NASA Exobiology Study Section
2012	NIH CHHD Fall Study Section
2012	Sao Paulo School of Advanced Science, Brasil, Instructor Evolution Course
2012	NASA Exobiology Panel Chair
2012	NSF NESCent participant, Cephalopod Genomics
2012	NIH GVE Spring Study Section
2012	UHM Tenure and Promotion Review Committee (Convener and Chair)
2011	West Coast Regional SDB Meeting Organizer
2010-2012	Chair (Elected) of the Division of Evolutionary Developmental Biology, SICB
2010	Konrad Lorenz Workshop Participant, “The Emergence of Form,” Vienna
2010	Distinguished Lecturer, Duke University Genetics and Genomics Program
2010	The Richard G. Kessel Lecturer in Embryology, Woods Hole, MA
2010	Sigma Xi, Full Member (Elected)
2009-2012	UH Cell, Molecular and Neurobiology Graduate Admission Committee
2009	NSF Genome Resource for Non-Model Systems Invited Workshop
2008	Fellow (Elected) American Association of the Advancement of Science
2006	NSF NESCent participant, Myelin as a Model for Evolutionary Innovation
2006	Chair, P.B.R.C. Departmental Personnel Committee (DPC)
2004	Basal Metazoan Genome Steering Committee, Joint Genome Institute (D.O.E)
2003	Hawaii’s Center for Genomics/Proteomics, and Bioinform. Res.Initiative
2003-2006	University Research Council (URC) Member
2003-2004	Chair, P.B.R.C. Departmental Personnel Committee (DPC)
2002	Cruickshank Endowed Lecturer, University of Rhode Island
2001	Co-instructor, Comparative Invertebrate Embryology, Friday Harbor, University of Washington
1999-2002	Program Officer, Division of Evolutionary Development, Society for Integrative and Comparative Biology
1999-2010	Instructor, Embryology Course, MBL, Woods Hole, MA
1996	Lecturer, Embryology, Course MBL, Woods Hole, MA
1996-1997	Lecturer, Development and Neurobiology of the Leech, MBL, Woods Hole, MA
1996-1999	Member-at-Large, Society for Integrative and Comparative Biology
1996	Organizer, Society for Integrative and Comparative Biology, "Evolution of Development: Patterns and Process", Albuquerque, New Mexico
1994	Co-Organizer, Society for Integrative and Comparative Biology Symposium, "Evolution of Animal Body Plans"

Publishing:

Co-Editor-in-Chief:	EvoDevo (Open Access, BioMed Central) (www.evodevojournal.com)
Editorial Boards:	Developmental Biology Development, Genes, and Evolution (DGE) Evolution and Development Zoology Acta Zoologica
Guest Editor:	Proceedings of the National Academy of Sciences (P.N.A.S.) PLoS Genetics

Recent Publications (2012-Present):

1. Servetnick, M., Steinworth, B., Babonis, L., Simmons, D., Salinas-Saavedra, M., and Martindale, M.Q. Cas9-mediated excision of Nematostella brachyury disrupts endomesoderm and oralaboral patterning. **Development**, In Press.
2. Wijesena, N., Simmons, D.K. and Martindale, M.Q., 2017. Antagonistic BMP–cWNT signaling in the cnidarian Nematostella vectensis reveals insight into the evolution of mesoderm. **Proceedings of the National Academy of Sciences**, p.201701607.
3. Mart.n-Dur.n, J.M., Passamaneck, Y.J., Martindale, M.Q. and Hejnol, A., 2016. The developmental basis for the recurrent evolution of deuterostomy and protostomy. **Nature Ecology & Evolution**, 1, p.0005.
4. Reitzel., A., Pang, K., and Martindale, M.Q. 2016. Developmental expression of “germline” and “sex determination” related genes in the ctenophore Mnemiopsis leidyi. **EvoDevo**. 7:17 DOI: 10.1186/s13227-016-0051-9.
5. Layden, M.J., Johnston, H., Amiel, A., Steinworth, B., Havrilak, J., Chock, T., R.ttinger, E., and Martindale, M.Q. 2016. MAPK signaling is necessary for neurogenesis in Nematostella vectensis. **BMC Biology**. 14:61 DOI: 10.1186/s12915-016-0282-1
6. Babonis, L., Martindale, M.Q., and Ryan, J. 2016. Do novel genes drive morphological novelty? An investigation of the nematosomes in the sea anemone Nematostella vectensis. *BMC Evolutionary Biology*, 16:114 DOI: 10.1186/s12862-016-0683-3.
7. Levin M, Anavy L, Cole AG, Winter E, Mostov N, Khair S, Senderovich N, Kovalev E, Silver DH, Feder M, Fernandez-Valverde SL, Nakanishi N, Simmons D, Simakov O, Larsson T, Liu SY, Jerafi-Vider A, Yaniv K, Ryan JF, Martindale MQ, Rink JC, Arendt D, Degnan SM, Degnan BM, Hashimshony T, & Yanai I. (2016) The mid-developmental transition and the evolution of animal body plans. **Nature**, 2016, doi:10.1038/nature16994.
8. Botman D., Jansson, F., R.ttinger E., Martindale M.Q., de Jong J., Kaandorp J.A. 2015. Analysis of a spatial gene expression database for sea anemone Nematostella vectensis during early development. **BMC Systems Biology**. 9:63. doi: 10.1186/s12918-015-0209-4
9. R.ttiinger, E., DuBuc, T., Amiel A., and Martindale, M.Q. 2015. Nodal signaling is required for mesoderm formation and ventral fates in the indirect developing hemichordate, Ptychodera flava. **Biology Open**, 011809.
10. Zhang, S., Ross, K.D., Seidner, G.A., Gorman, M.R., Poon, T.H., Wang, X., Keithley, E.M., Lee, P.N., Martindale, M.Q., Joiner, W.J., and Bruce A. Hamilton, B.A. Nmf9 encodes a highly conserved protein important to neurological function in mice and flies. **PLoS Genetics**. 11, e1005344.
11. Salinas-Saavedra, M., Stephenson, T.Q., Dunn, C.W., and Martindale, M.Q. 2015. Par system components are asymmetrically localized in ectodermal epithelia, but not during early development in the sea anemone Nematostella vectensis. **EvoDevo**. 6:20. DOI: 10.1186/s13227-015-0014-6.
12. YJ Passamaneck, A Hejnol, MQ Martindale Passamaneck, Y.J., Hejnol, A., Martindale, M.Q. 2015. Mesodermal gene expression during the embryonic and larval development of the articulate brachiopod Terebratalia transversa. **EvoDevo**, 6:10. DOI: 10.1186/s13227-015-0004-8

13. Li, X., Liu, H., Luo, J.C., Rhodes, S.A., Trigg, L.M., van Rossum, D.B., Anishkin, A., Diatta, F.H., Sassic, J.K., Simmons, D.K., Kamel., B., Medina, M., Martindale, M.Q., and Jegla T. 2015. A major diversification of voltage-gated K+ channels occurred in ancestral parahoxozoans. **P.N.A.S.**, 112, E1010-1019.
14. DuBuc, T.Q., Dattoli, A.A., Babonis, L. Salinas-Saavedra, M., Roettinger, E., Martindale, M.Q., and Postma, M. 2015. In vivo visualisation of Lifeact-mTurquoise2 throughout Nematostella vectensis development reveals diverse cellular structures and unusual F-actin accumulation at the nuclear envelope during cleavage. **BMC Cell Biol.** 14, 44-59.
15. Li, X., Martinson, A. S., Layden, M.J., Diatta, F.H., Sberna, A. P., Simmons, D.K., Martindale, M.Q., and Jegla T. 2015. Ether-a-go-go family Voltage-Gated K+ Channels evolved in an ancestral metazoan and functionally diversified in a Cnidarian/Bilaterian Ancestor. **J. Exp. Biol.** 218, 526-36.
16. Layden, M.J ., and Martindale, M.Q. 2014. Non-canonical Notch signaling represents an ancestral mechanism to regulate neural differentiation. **EvoDevo**, 5:30. doi:10.1186/2041-9139-5-30.
17. Peres, R., Reitzel, A.M., Passamaneck , Y., Afeche, S.C., Cipolla-Neto J., Marques, A.C., and Martindale, M.Q. 2014. Developmental and light-entrained expression of melatonin and its relationship to the circadian clock in the sea anemone Nematostella vectensis. **EvoDevo** 5 :26.
18. Botman D, R.ttinger E, Martindale MQ, de Jong J, Kaandorp JA. 2014. A Computational Approach towards a Gene Regulatory Network for the Developing Nematostella vectensis Gut. **PLoS ONE** 9(7): e103341. doi:10.1371/journal.pone.0103341
19. Babonis L.S., and Martindale, M.Q. Old cell new trick? 2014. Cnidocytes as a model for the evolution of novelty. Integrative and Comparative Biology. **ICU**, 108. doi: 10.1093/icb/icu027.
20. Schnitzler, C.E., Simmons, D.K., Pang, K., Martindale, M.Q., and Baxevanis, A.D. 2014. Expression of multiple Sox genes through embryonic development in the ctenophore Mnemiopsis leidyi is spatially restricted to zones of cell proliferation. **EvoDevo**, 5:15 DOI: 10.1186/2041-9139-5-15.
21. Martinsona , A.S., van Rossuma, D.B., Laydenb, M.J., Rhodesa, S.A. , Martindale, M.Q., and Jegla,T., 2014. Functional evolution of Erg potassium channel gating reveals an ancient origin for IKr. **PNAS.** 111(15), 5712–5717. www.pnas.org/cgi/doi/10.1073/pnas.1321716111.
22. DuBuc T.Q., Traylor-Knowles N., Martindale M.Q. 2014. Initiating a regenerative response, cellular and molecular features of wound healing in the cnidarian Nematostella vectensis. **BMC Biology**, 12:24. DOI: 10.1186/1741-7007-12-24
23. Fischer, A., Pang, K., Henry, J..Q., and Martindale, M.Q. 2014. A cleavage clock regulates features of lineage-specific differentiation in the development in a basal branching metazoan, the ctenophore Mnemiopsis leidyi. 2014. **EvoDevo**. 5:4 DOI: 10.1186/2041-9139-5-4.
24. Reitzel, A.M., Passamaneck, Y.J.,. Karchner, S.I., Franks, D.G., Martindale, M.Q., Tarrant, A.M., and Hahn, M.E. 2014. Aryl hydrocarbon receptor (AHR) in the cnidarian Nematostella vectensis: comparative expression, protein interactions, and ligand binding. **Dev. Genes, and Evol.** 224, 12-24.
25. Ryan, J.F., Pang, K., Schnitzler, C.E., Nguyen, A., Moreland, R.T., Simmons, D.K., Koch, B.J., Havlak, P., NISC Comparative Sequencing Program, Smith, S.A., Putnam, N., Dunn, C.W., Wolfsberg, T.G., J.E., Mullikin, J.C., Martindale, M.Q., and Baxevanis, A.D. 2013. Total genome sequencing of the genome of the ctenophore Mnemiopsis leidyi using new generation approaches. **Science**. 342, 1336-DOI: 10.1126/science.1242592.
26. Marlow, H.Q., Matus, D.Q., and Martindale, M.Q. 2013. Ectopic activation of the cannonical Wnt signaling pathway affects ectodermal patterning along the primary axis during larval development in the anthozoan Nematostella vectensis. **Dev Bio**. http://dx.doi.org/10.1016/j.ydbio.2013.05.022i.
27. Passamaneck, Y.J., and Martindale. M.Q. 2013. Evidence for a phototransduction cascade in an early brachiopod embryo. **Integrative and Comparative Biology**. doi: 10.1093/icb/ict037.
28. Reitzel, A. M., Herrera, S., Layden, M. J., Martindale, M. Q. and Shank, T. M. 2013. Going where traditional markers have not gone before: utility of and promise for RAD sequencing in marine invertebrate phylogeography and population genomics. **Molecular Ecology**. doi: 10.1111/mec.12228 †These authors contributed equally.

29. R.ttinger, E., Dahlin, P., and. Martindale, M.Q. 2012. A provisional cnidarian Gene Regulatory Network for “endomesoderm” specification: The inputs of Wnt/.-catenin signaling. **PLoS Genetics**. 2012. http://www.plosgenetics.org/doi/pgen.1003164.
30. Schnitzler, C., Pang, K., Powers, M., Reitzel, A.M., Ryan, J.F., Simmons, D., Park, M., Gupta, J., Brooks, S.Y., Blakesley, R.W., Haddock, S.H.D., J.C., Martindale, M.Q., and Baxevanis, A.D. 2012. Bioluminescence and the evolution of photoproteins: A ctenophore genome lights the way. **BMC Biology**, 10:107 doi:10.1186/1741-7007-10-107
31. Passamaneck, Y.J., and Martindale, M.Q. 2012. Cell proliferation is necessary for the regeneration of oral structures in the anthozoan cnidarian Nematostella vectensis. **BMC Dev. Biol.** 12:34
32. Jegla, T., Marlow, H.Q., Chen, B., Simmons, D.K., Jacobo, S.M., and Martindale, M.Q. Expanded Functional Diversity of Shaker K+ Channels in Cnidarians Is Driven by Gene Expansion. 2012. **PLoS ONE** 7(12): e51366. doi:10.1371/journal.pone.0051366
33. Amy Apprill, Heather Q. Marlow, Mark Q. Martindale, and Michael S. Rapp.. Specificity of Associations between Bacteria and the Coral Pocillopora meandrina during Early Development. **Appl. Environ. Microbiol**. 2012; 78 7467-7475.
34. DuBuc, T., Ryan, J., Shinzato, C., Satoh, N., and Martindale, M.Q. 2012. Coral Comparative Genomics Reveals an Extensive Hox Cluster in the Cnidarian-Bilaterian Ancestor. **Integrative and Comparative Biology**, pp. 1–7. doi:10.1093/icb/ics098
35. Weber, C., Martindale, M.Q., Tapscott, S.J., and Unguez, G.A. 2012. Regeneration of adult noncontractile myogenic tissues through the activation of Pax7-positive cell in the electric fish S. macrurus. **PLoS One**, Vol 7 Issue 5, e36819.
36. Santagata, S., Resh, C., Hejnol, A., Martindale, M.Q., and Passamaneck, Y.J. 2012. Development of the larval anterior neurogenic domains of Terebratalia transversa (Brachiopoda) provides insights into the diversification of larval apical organs and the spiralian nervous system. **EvoDevo** 3:3.
37. Simmons, D.K., Pang, K., and Martindale, M.Q. 2012. Lim Homeobox Genes in the Ctenophore Mnemiopsis leidyi: The Evolution of Neural Cell Type Specification. **EvoDevo**. 3:2.
38. Layden, M., Boukhout , M., and Martindale, M.Q. 2012. Nematostella vectensis achaete-scute homolog NvashA regulates embryonic ectodermal neurogenesis and represents an ancient component of the metazoan neural specification pathway. **Development** 139, 1013-1022.
39. Marlow, H.Q., R.ttiinger, E., Boukhout , M., and Martindale, M.Q. 2012. Functional Roles of Notch Signaling in the cnidarian Nematostella vectensis. **Dev. Biol.** 362, 295–308.

Research Support:
2014 – 2017 NASA, Principal Investigator, The cellular and molecular basis for the evolution of cell-type complexity ($802,683)

UF Opportunity Fund. Evolution of an antiviral immune signaling network from early animal models to humans. CoP.I. ($100,000)

Pending:
NIH. The activation of regenerative abilities in ctenophores, CoP.I. , ($1,843,762)

NASA. Characterizing the mechanisms that generate cell type diversity P.I. (2,845,836)

NSF. IOS Preliminary Proposal: Colloborative Research: The developmental evolution of metazoan axial properties.

NSF. IOS Preliminary Proposal: The evolution of the extracellular matrix and its role in the stabilization of cell fate

NSF FSML: Single Cell Marine ’Omics at the Whitney Lab for Marine Bioscience P.I. $359,083