

Contact information

Program in Behavioral Neuroscience
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Education

- 2004 Ph.D. Biology, University of Oregon
 Institute of Neuroscience, Eugene, OR
 Dissertation Title: Steroid hormones and cell death: analysis of motoneuron and muscle fates during insect metamorphosis
- 1998 Neural Systems and Behavior Summer Course
 Marine Biological Laboratory, Woods Hole, MA
- 1993 B.S., University of California, San Diego
 Major: Biochemistry and Cell Biology
 Minor: Health Care- Social Issues Interdisciplinary Program

Professional experience

- 2017- Director, Program in Behavioral Neuroscience, Northeastern University
2015- Assistant Teaching Professor, Northeastern University (title change)
2014-2016 Course Manager, Neural Systems and Behavior Summer Course
2013-2017 Associate Director, Program in Behavioral Neuroscience, Northeastern University
2010-2013 Associate Director, Grass Laboratory at Marine Biological Laboratory
2009-2013 Assistant Academic Specialist & Head Advisor, Northeastern University
2008-2009 Visiting Assistant Professor, Department of Biology, Swarthmore College
2004-2008 Postdoctoral Fellow, Department of Neurobiology and Behavior, Cornell University
1997-2004 Graduate Research Assistant, Institute of Neuroscience, University of Oregon
1994-1996 Research Assistant, Division of Neuroscience, Oregon Regional Primate Res Center
1992-1994 Research Assistant, Regulatory Biology Lab, Salk Institute for Biological Studies
1992-1993 Lab Assistant, Department of Biology, University of California, San Diego

Professional appointments, service and training

- 2017-2018 Honors-College Collaboration Committee, Northeastern University
2016-2017 Research Leadership Development Initiative (ReDI) program, ADVANCE Office of Faculty Development at Northeastern
- 2015-2018 President, National Council of *Nu Rho Psi*, Honor Society in Neuroscience
2015-2016 Northeastern College of Science Dean Search Committee
2014-2017 Faculty for Undergraduate Neuroscience National Councilor
2013- Founding Chapter Advisor for *Nu Rho Psi* at Northeastern
2013- Northeastern College of Science Undergraduate Curriculum Committee
2012- Northeastern Biology Department Undergraduate Curriculum Committee
2011-2015 Faculty Advisor for student group NEURONS (Northeastern University Researchers of Neuroscience)
- 2010- Ad Hoc Reviewer for Journal of Experimental Biology
2010- Local Organizing Committee, NorthEast Undergraduate Research Organization for Neuroscience

2009- Behavioral Neuroscience Program Steering Committee
2006-2007 Co-organizer, Neuroethology Journal Club, Dept. of Neurobiology and Behavior, Cornell

Awards and funding

2008 Faculty Support Grant, Swarthmore College
2007 Grass Foundation Summer Fellow, Marine Biological Lab
“*In vitro* characterization of the vocal hindbrain central pattern generator of a teleost fish.”
2005-2008 Ruth L. Kirschstein National Research Service Award
National Institute on Deafness & other Communication Disorders
Grant number 5F32DC007792
“Steroid modulation of a rhythmic vocal pattern generator.”
2004 Heiligenberg Student Travel Award, International Society for Neuroethology
1993 Provost’s Honor List, UC San Diego
1989-1991 Dean’s List, CSU Fresno

Teaching experience

Courses Taught:

2009- Behavioral Endocrinology, Neurobiology, Animal Behavior, and Biological Psychology: intermediate level, lectures only
Seminar in Biological Psychology: advanced-level seminar
2008-2009 Molecular and Cellular Biology: team-taught introductory course, lectures and laboratory
Animal Communication - from Insects to Human Language: first year seminar
Neurobiology: upper-division course, lectures and laboratory
Pharmacology of neuroendocrine function: senior seminar
1999-2004 Summer teaching assistant, Neural Systems and Behavior course, Marine Biological Lab
1997 Graduate teaching assistant, University of Oregon, Department of Biology
Genetics & evolution laboratory; Human reproduction & development laboratory
1992 Undergraduate teaching assistant, Genetics, UC San Diego, Department of Biology

Teaching Presentations:

2015 Panelist for Top Hat in the “Student Response Showdown” for Technology in Teaching Expo, Academic Technology Services
2011 “Teaching the scientific method using an interrupted case study approach” for Center for Innovation and Excellence in Teaching and Learning (CIETL)

Teaching Training:

2014 Animal Behavior Society Workshop: Vision and Change in Animal Behavior Education, Princeton University
2014 Undergraduate Neuroscience Education Workshop: Challenges and Solutions in Creating Sustaining Programs at Ithaca College
2013 Summer Workshop, National Center for Case Study Teaching in Science, Univ of Buffalo
2013 Writing Intensive Workshop, Center for Advancing Teaching and Learning Through Research, Northeastern University
2009 “Best practices” for teaching behavior to undergraduates at Swarthmore College

Research project mentoring for Northeastern undergraduates

Honors Thesis Students:

2017-18 *Vasileios Kreouzis* (2018 grad) “Genetic modification of the stress axis originator, corticotropin releasing hormone, through modulation of the epigenetic regulator, RE-1 silencing transcription factor.” Honors Thesis at Northeastern University

- 2016-17 *Natasha Mathur* (2017 grad) “Differential Innervation of D1-Receptor and D2-Receptor Striatal Neurons in the Olfactory Tubercle”. Honors Thesis at Harvard Medical School
- 2013-14 *Margaret Minnig* (2015 grad) “Neuroanatomical connections in mouse visual cortex during motivation dependent food-cue processing”. Honors Thesis at Beth Israel Deaconess Medical Center
- Emily Swanson* (2014 grad) “Foveal fine structure in retinopathy of prematurity patients: an optical coherence tomographic study”. Honors Thesis at Boston Children’s Hospital
- 2011-12 *Demetris Roumis* (2012 grad) “Projections and processes of visual areas in alert mice” Honors Thesis at Harvard Medical School

Student Recipients of Summer Independent Research Fellowship for University Scholars:

- 2014 George Bekheet, Marc Tawfik, and John Howard (graduating 2017) “Neuroscience Outreach Project” in collaboration with College of Engineering

Student Recipients of Provost Research Award:

- 2013 *Molly Kirk* (2014 grad) “Steroid-mediated plasticity of teleost hindbrain vocal motoneurons *in vitro*” at Marine Biological Laboratory
- 2012 *Eric McDonald* (2013 grad) “Neural activity in the orbitofrontal cortex during an aversion/reward conflict” at Mass General Hospital
- 2011 *Glenn Goldey* (2012 grad) “Use of two-photon microscopy to study neuropharmacology in active, awake mice: a chronic model *in vivo*” at Harvard Medical School

Internships Supervised:

- 2017 *Dana Anderson* (2019 grad) “Identifying Afferents of Postrhinal Cortex” at Harvard Medical School
Christine Boutros (2017 grad) “Studying the Neuronal Underpinnings of Motivation” at Harvard Medical School
Bianca Corjuc (2018 grad) ”Nuclei Isolation: Alzheimer’s Disease and Tau Aggregation and Propagation” at Mass General Hospital
Francisca Finkel (2018 grad) “Patient-specific Anatomy- Improved Automated Segmentation for Deep Brain Stimulator Targeting” at Mass General Hospital
Alessandra Grillo (2017 grad) ”Substance use patterns in males and females with schizophrenia in Ethiopia” at Boston University Medical School
Jordan Marks (2018 grad) ”Analyzing ApoE-AB Interactions through a Bioluminescence Resonance Energy Transfer Assay” at Massachusetts General Hospital
Matthew Riina (2017 grad) "Elucidating the Mechanism of Action of a Novel Immuno-Oncology Drug" at Dana Farber.
Theodore Sheehan (2018 grad) “Pediatric Epilepsy Research Internship” at Boston Children’s Hospital.
- 2016 *Veronica Diaz* (2017 grad) “Deconstructing hunger neural circuits” at Harvard Medical School
Iain Drew (2016 grad) “Silk Delivery of AAV Viruses” at Harvard Medical School
Julia Dickerson (2016 grad) “A/Not A: A Study on Rule Learning in African Grey Parrots (*Psittacus erithacus*)” at Harvard University
Ryan Fallon (2016 grad) “The Biomechanics of Baseball Pitching” at Mass General Hospital
Kennedy Geenen (2018 grad) “Targeting resistant brain tumors with epigenetic modulators” at Mass General Hospital
Bailey Harrison (2017 grad) “Cerebellar Regulations of Social Behaviors” at Harvard Medical School
Robert Kerstens (2019 grad) “Motor learning in mice” at Harvard Medical School

- Kimberly Konig* (2016 grad) Residential Counseling Internship at Cambridge Eating Disorder Center
- Chloe Nobuhara* (2017 grad) “Targeting Bioactive Extracellular Tau in Alzheimer’s disease” at Mass General Hospital
- Anna Shirosky* (2018 grad) “Avian Cognition in African Grey Parrots” at Harvard University
- Nicole Ochandarena* (2016 grad) “Neurodevelopmental Phenotyping Program Internship at Boston Children’s Hospital
- 2015
- Olaide Adekanbi* (2017 grad) “Risk factors and genetics of hemorrhagic stroke and cerebral amyloid angiopathy” at Mass General Hospital
- Margee Kyada* (2017 grad) “Animal Model for Thalamic Visual Prosthesis“ at Mass General Hospital
- Jami Longo* (2016 grad) “Use of touch screen technology in modeling cognition” at Pfizer
- Robert Ohman* (2015 grad) "Activity-Dependent miRNA expression in *Drosophila* Neural Muscular Junction at Harvard Medical School
- Siva Subramanian* (2017) “Behavioral analysis of hunger-modulated mice” at Beth Israel Deaconess Medical Center
- 2014
- Danielle Rich* (2015 grad) “Neurological auto-immune disorders” at Brigham and Women’s Hospital
- Abigail Kim* (2015 grad) “Children burn psychiatry” at Shiner’s Children’s Hospital
- 2013
- Molly Kirk* (2014 grad) “Barrel cortex sensory receptive fields in an Alzheimer’s model” at Massachusetts General Hospital
- Jeffrey Curry* (2014 grad) “Fabrication of Fiber-optic-coupled tetrode microdrives for implantation in mouse cortex” at Beth Israel Deaconess Medical Center
- Jason Steinberg* (2013 grad) “CFTR inhibition as a means of Hydrocephalus suppression” at Children’s Hospital Boston
- Marcus Parker* (graduating 2016) “Wildlife Rehabilitation Internship” at Greenwood Wildlife Rehabilitation Center in Boulder, CO
- 2012
- Katherine Price* (2014 grad) “The effects of chronic nicotine withdrawal on nociception and the dopamine system” at Children’s Hospital Boston
- Dimira Tambunan* (2013 grad) “Establishing a mouse model for intellectual disability and autism spectrum disorder” at Children’s Hospital Boston
- Elisabeth Murphy* (2014 grad) “Analysis of the role of dendritic branching in brain development and learning and memory” at Children’s Hospital Boston
- Jessica Talero* (2014 grad) “Qualitative research and grant proposal writing for the Liberian Center of Excellence for Mental Health and Psychiatry at the Chester M. Pierce, MD Division of Global Psychiatry and the University of Liberia” at Mass General Hospital
- Laura Hollis* (2012 grad) “Research-based online community building” at Novartis Institutes for Biomedical Research
- Robert Lawrence* (2013 grad) “Anesthetic effects on bilateral visual evoked potentials (VEP) and somatosensory evoked potentials (SSEP) in the experimental autoimmune encephalomyelitis (EAE) DA rat model at EMD Serono Research Institute
- Samuel Rendall* (graduating 2016) “Evaluating Neural Network Modulation Resulting from Cerebellar Transcranial Magnetic Stimulation in Schizophrenic Patients” at Beth Israel Deaconess Medical Center
- Thomas Hirsch* (2014 grad) “Retrograde trafficking of different Cholera Toxin GM1 isoforms” at Children’s Hospital Boston
- 2011
- Michael McLaughlin* (2012 grad) “Stimulant use among athletes”
- Kristen Morin* (2011 grad) “Development of source memory” at MIT
- Heather Faherty* (2012 grad) “A positive sensor selection system in *Drosophila melanogaster* for the role of microRNA inhibition” at Harvard Medical School
- 2010
- Stephanie Miner* (2012 grad) “Acupuncture treatment of Kemp’s Ridley Sea Turtle” at New England Aquarium

Outreach

2015	Improving Education through Science Outreach (NSF-funded professional development workshop for faculty and college educators) at Cornell University
2015	Panelist, Women's Leadership Program, Northeastern Center for Student Involvement
2013	"There's a Scientist in my Classroom!" workshop at MIT
2013	Co-organizer with Northeastern alum, "Epicuriosity: Fun with Flavors and the Brain", Science of Food, Cambridge Science Festival
2011	Panelist for "Biomedical Science Leadership" at Stetson East dorm
2010-	Judge, Boston Regional Science Fair and Massachusetts State High School Science and Engineering Fair
2010	Career Panelist, Boston Regional Brain Bee (SFN's Brain Awareness Week)
2009	Poster Judge, Philadelphia Chapter of Society of Neuroscience Annual Meeting
2009	Workshop Leader, Expanding Your Horizons, science and math program for middle-school girls, Swarthmore College
2008	Panelist, Asian Women and Speaking in Public, Swarthmore Asian Organization
2008	Panelist, Job Search Discussion, Office of Postdoctoral Studies, Cornell University
2008	Invited Speaker, Biology Dining Discussions, Cornell University
2000-2001	McNair Scholars Program Mentor, University of Oregon
1998	Mentor, Willamette Science and Technology Center, Eugene, OR
1992-1993	Volunteer Counselor, Alisa Ann Ruch Burn Foundation, Champ Camp
1990-1991	Science and Math Tutor, CSU Fresno, Disabled Student Services

Research publications

- Chagnaud, B.P., Zee, M.C., Baker, R. and Bass, A.H. (2012) Innovations in motoneuron synchrony drive rapid temporal modulations in vertebrate acoustic signaling. *J. Neurophys.* 107(12): 3528-42.
- Kinch, G.L., Hoffman, K.L., Rodrigues, E.M., Zee, M.C. and Weeks, J.C. (2003) Steroid-triggered programmed cell death of a motoneuron is autophagic and involves structural alterations in mitochondria. *J. Comp. Neurol.* 457: 384-403.
- Zee, M.C. and Weeks, J.C. (2001) Developmental change in the steroid hormone signal for cell-autonomous, segment-specific programmed cell death of a motoneuron. *Dev. Biol.* 235: 45-61.
- Gruol, D.J., Vo, Q.D. and Zee, M.C. (1999) Profound differences in the transport of steroids by two mouse P-glycoproteins. *Biochem. Pharmacol.* 58(7): 1191-9.
- Simerly, R.B., Zee, M.C., Pendleton, J.W., Lubahn, D.B. and Korach, K.S. (1997) Estrogen receptor-dependent sexual differentiation of dopaminergic neurons in the preoptic region of the mouse. *Pro. Natl. Acad. Sci.* 94: 14077-14082.
- Gu, G., Rojo, A.A., Zee, M.C., Yu, J. and Simerly, R.B. (1996) Hormonal regulation of CREB phosphorylation in the anteroventral periventricular nucleus. *J. Neurosci.* 16(9): 3035-3044.
- Simerly, R.B., Carr, A.M., Zee, M.C. and Lorang, D. (1996) Ovarian steroid regulation of estrogen and progesterone receptor messenger ribonucleic acid in the anteroventral periventricular nucleus of the rat. *J. Neuroendo.* 8: 45-56.
- Gruol, D.J., Zee, M.C., Trotter, J. and Bourgeois, S. (1994) Reversal of multidrug resistance by RU 486. *Cancer Res.* 54: 3088-3091.

Abstracts

- Zee, M.C., Becker, L.A., DebBurman, S.K. and Kerchner, M.T. (2017) *Nu Rho Psi*, the National Honor Society in Neuroscience. *Soc. Neurosci. Abstr.*
- Becker, L., Zee, M.C., Cousens, G., Moskow, D. and Mickley, G.A. (2016) *Nu Rho Psi*, the National Honor Society in Neuroscience. *Soc. Neurosci. Abstr.* Program No. 23.11SA.
- Kirk, M.J.* and Zee, M.C. (2013) Extrinsic factors affecting vocal motoneuron function *in vivo* and *in vitro*. *Faculty for Undergraduate Neuroscience Poster Session at Society for Neuroscience*. *Northeastern undergraduate.
- Kirk, M.J.* and Zee, M.C. (2013) Primary cell culture of teleost vocal motoneurons and an analysis of the extracellular matrix. MBL Undergraduate Research Symposium, NSF-REU "Biological Discovery in Woods Hole program. *Northeastern undergraduate.
- Chagnaud, B.P., Zee, M.C., Baker, R. and Bass, A.H. (2011) Intrinsic and network properties of a highly synchronous hindbrain motor nucleus. 9th Göttingen Meeting of the German Neuroscience Society.
- Chagnaud, B.P., Zee, M.C., Baker, R. and Bass, A.H. (2010) Intrinsic properties and morphology of vocal motoneurons are well adapted for synchronous oscillatory firing in the high gamma range. *Soc. Neurosci. Abstr.* Program No. 411.13.
- Tingle, D.T.*, Fagg, A.H., Rennaker, R.L., and Zee, M.C. (2008) Decoding odor from the piriform cortex using a free-paced classifier. *Faculty for Undergraduate Neuroscience Poster Session at Society for Neuroscience*. *Swarthmore undergraduate.
- Zee, M.C. and Bass, A.H. (2007) Electrophysiological and neurochemical studies of sonic neurons in a teleost fish. *International Congress of Neuroethology*.
- Zee, M.C. and Bass, A.H. (2006) Vocal and non-vocal neurons of teleost fish exhibit differences in firing properties. *Soc. Neurosci. Abstr.* Program No. 374.13.
- Zee, M.C., Roberts, W.M., and Weeks, J.C. (2004) Membrane currents measured during steroid-mediated programmed cell death of a motoneuron. *Soc. Neurosci. Abstr.* Program No. 728.8.
- Zee, M.C., Hoffman, K.L. and Weeks, J.C. (2003) Steroid-mediated neuronal death: protection by elevated potassium and the role of ionic currents. *Soc. Neurosci. Abstr.* Program No. 355.5.
- Zee, M.C. and Weeks, J.C. (2002) Segment-specific fate of a larval neuromuscular system during metamorphosis differs in two families of Lepidoptera. *Soc. Neurosci. Abstr.* Program No. 877.4.
- Ibanez, M.A., Zee, M.C., Crabtree, M., and Simerly, R.B. (1998) Developmental critical period for sexual differentiation of dopaminergic neurons in the anteroventral periventricular nucleus. *Soc. Neurosci. Abstr.* 24:1546.
- Gu, G.B., Yu, J.H., Zee, M.C. and Simerly, R.B. (1996) Ovarian steroid hormones differentially regulate expression of AMPA glutamate receptor subtypes in the anteroventral periventricular nucleus of the juvenile female rat. *Soc. Neurosci. Abstr.* 22:1789.
- Zee, M.C., Gu, G.B., Krause, J.E. and Simerly, R.B. (1995) Hormonal regulation of substance P receptor (NK-1) mRNA in the anteroventral periventricular nucleus of the rat. *Soc. Neurosci. Abstr.* 21:1890.
- Pendleton, J.W., Carr, A.M., Zee, M.C. and Simerly, R.B. (1995) Expression of nuclear trans-acting factors is regulated differentially by ovarian steroids in the anteroventral periventricular nucleus (AVPV) of the rat. *Soc. Neurosci. Abstr.* 21:1891.

Other publications

Hesp, Z.C., Cousens, G.A., Becker, L., Zee, M.C. and Mickley, G.A. (2016) *Nu Rho Psi*, the national honor society in neuroscience: a decade of progress. *J. Undergraduate Neuroscience Education*, Spring 2016, 14(2):E9-E12.

Zee, M.C. (2008) Our scooters, our brains. *Scoot! Magazine* 46: 52.

Interviewed by a science writer for the article, "Stipend survival." (2004) *Nature* 428: 102-103.

Invited talks and conference presentations

- 2011 "Underwater songs- how intrinsic membrane properties and inhibitory neuromodulators control vocal neuron discharge in a teleost fish." 39th Annual Hunter College Psychology Convention.
- 2011 "Underwater songs- how hormones and neurons control vocal production in fishes." Stonehill College.
- 2010-2011 "Animal and insect brain primer- a look beyond our five senses." Annual NorthEast Undergraduate Research Organization for Neuroscience Meetings at Quinnipiac University, Hamden CT.
- 2010 "Neurobiology of chocolate" for student group NEURONS
- 2009 "Steroid-mediated death and remodeling of a neuromuscular system during insect metamorphosis." Swarthmore College.
- 2009 "Cellular basis of learning & memory", guest lecture for Intro to Cognitive Science, Swarthmore
- 2009 "A mind-altering experience: how chocolate affects our brains", Swarthmore Alumni Association
- 2008 "Underwater songs- studying acoustic communication in Midshipman fishes." Swarthmore College and Oberlin College.
- 2008 "Underwater songs- how neurons control vocal production in fishes." Dennison University and CUNY, York College.
- 2007 "Singing Fish *in vitro*: Electrophysiological and neuroanatomical correlates of sonic neuron rhythmic activity." J.B. Johnston Club, San Diego CA.
- 2003 "Steroid-mediated death and remodeling of a neuromuscular system during metamorphosis." Cornell University Neuroethology Journal Club, Ithaca NY.
- 2003 "Segment-specific fate of a larval neuromuscular system during metamorphosis differs in two families of Lepidoptera." J.B. Johnston Club, New Orleans LA.
- 1999 Developmental change in the steroid hormone signal for segment-specific programmed cell death of motoneurons." Western Nerve Net, OHSU, Portland OR.

Professional memberships

MBL Society
Animal Behavior Society
Society for Neuroscience
Council on Undergraduate Research
Faculty for Undergraduate Neuroscience
Nu Rho Psi, National Honor Society in Neuroscience