Michael P. **O'Donnell**

Postdoctoral Fellow

Brandeis University

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Education

University of Pennsylvania — *Philadelphia, PA*

Ph.D. in Cell and Molecular Biology

Thesis: Signal transduction mechanisms in commissural axon guidance: The role of intracellular tyrosine kinases in Netrin-DCC/frazzled axon attraction — *2012*

Drexel University — *Philadelphia, PA*

B.S. in Biomedical Engineering — *2002*

Positions and Employment

Brandeis University — *Mentor: Piali Sengupta*

Post-doctoral research — *2013 - present*

- Demonstrated that a bacterially-derived neurotransmitter, tyramine, can modulate olfactory responses and co-opt the function of the host tyraminergic/octopaminergic system.
- Studied the role of feeding state in the integration of sensory inputs during development. Identified a role for intestinal mTORC2 in promoting gut-to-brain signaling.
- Established a microfluidics-based system to study the effects of colonizing microbes on sensory-driven behavior in *C. elegans*. The system allows **high-throughput behavioral screening of both bacteria and chemosensory cues.**

University of Pennsylvania Medical School — *Mentor: Greg Bashaw*

Doctoral research — *2006 - 2012*

- Identified roles of multiple intracellular kinases in driving attractive axon guidance decisions in response to the highly conserved guidance cue, Netrin. These kinases couple the Netrin receptor to regulate multiple cytoskeletal events during axon guidance.

University of Pennsylvania Medical School — *Mentor: Peter Klein*

Pre-doctoral research — *2004 - 2006*

- Investigated the function of an IGF-receptor interacting protein essential for eye development.
- Studied the role glycogen synthase kinase (GSK3) in regulating the behavioral effects of lithium.

University of Pennsylvania School of Veterinary Medicine — *Mentor: Jean-Pierre Saint-Jeannet*

Pre-doctoral research — *2002 - 2004*

- Identified a feed-forward transcriptional system involving SoxE factors that is essential for long range neural crest cell migration in *Xenopus*.
- Investigated the function of a DMRT-family transcription factor in olfactory neuron specification.

Publications

Manuscripts

1. **O'Donnell, Michael P.**, BW Fox, PH Chao, FC Schroeder, and P Sengupta (Aug. 2019). *Modulation of sensory behavior and food choice by an enteric bacteria-produced neurotransmitter*. preprint. Neuroscience. `http://biorxiv.org/lookup/doi/10.1101/735845`.

Peer-reviewed primary research

1. **O'Donnell, Michael P.**, PH Chao, JE Kammenga, and P Sengupta (2018). Rictor/TORC2 mediates gut-to-brain signaling in the regulation of phenotypic plasticity in C. elegans. *PLoS genetics* **14**(2), e1007213.
2. Neal, SJ, A Takeishi, **O'Donnell, Michael P.**, J Park, M Hong, RA Butcher, K Kim, and P Sengupta (Sept. 2015). Feeding state-dependent regulation of developmental plasticity via CaMKI and neuroendocrine signaling. *eLife* **4**.
3. **O'Donnell, Michael P.** and GJ Bashaw (July 2013). Distinct functional domains of the Abelson tyrosine kinase control axon guidance responses to Netrin and Slit to regulate the assembly of neural circuits. *Development* **140**(13), 2724–2733.
4. **O'Donnell, Michael P.** and GJ Bashaw (Jan. 2013). Src inhibits midline axon crossing independent of Frazzled/Deleted in Colorectal Carcinoma (DCC) receptor tyrosine phosphorylation. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience* **33**(1), 305–314.

5. Garbe, DS, **O'Donnell, Mike**, and GJ Bashaw (Dec. 2007). Cytoplasmic domain requirements for Frazzled-mediated attractive axon turning at the Drosophila midline. *Development* **134**(24), 4325–4334.
6. **O'Donnell, Michael**, CS Hong, X Huang, RJ Delnicki, and JP Saint-Jeannet (Oct. 2006). Functional analysis of Sox8 during neural crest development in Xenopus. *Development* **133**(19), 3817–3826.
7. Wu, J, **O'Donnell, Michael**, AD Gitler, and PS Klein (Sept. 2006). Kermit 2/XGIPC, an IGF1 receptor interacting protein, is required for IGF signaling in Xenopus eye development. *Development* **133**(18), 3651–3660.
8. Huang, X, CS Hong, **O'Donnell, Michael**, and JP Saint-Jeannet (Aug. 2005). The doublesex-related gene, XDmrt4, is required for neurogenesis in the olfactory system. *Proceedings of the National Academy of Sciences of the United States of America* **102**(32), 11349–11354.

Reviews and Commentaries

1. **O'Donnell, Michael**, RK Chance, and GJ Bashaw (June 2009). Axon Growth and Guidance: Receptor Regulation and Signal Transduction. *Annual Review of Neuroscience* **32**(1), 383–412.
2. **O'Donnell, Michael P.**, M Khan, and P Sengupta (July 2018). Thermosensation: Human Parasitic Nematodes Use Heat to Hunt Hosts. eng. *Current biology: CB* **28**(14), R795–R798.

My Bibliography

https://www.ncbi.nlm.nih.gov/myncbi/1J16Yp6Zdle5w/bibliography/public/

Awards

1997-2002	AJ Drexel Scholarship	
2007-2009	Training program in Cell and Molecular Biology	*NIH T32-GM07229*
2009–2012	Training program in Developmental Biology	*NIH T32-HD007516*
2013	Training program in Quantitative Neuroscience	*NIH T32-NS-007292*
2014-2015	Ruth L. Kirschstein (NRSA) - *Genetic and Neural Basis of Pheromone Sensory Integration in Nematodes*	*NIH F32 DC013711*
2019	Susan Lindquist Fund award	

Seminars

Natural variation in a TOR-complex 2 component underlies a temperature-dependent polyphenic trait — *Invited seminar*
International Worm Meeting Quantitative Genetics Workshop, UCLA — *2015*

Intestinal colonization by bacteria alters chemosensory responses to alcohols — *Platform presentation*
International Worm Meeting Pathogen parallel session, UCLA — *2017*

TORC2 signaling and gut colonization regulates neuronal state — *Seminar*
Sommer laboratory, Max Planck Institute, Tubingen, Germany — *2017*

Intestinal mTORC2 and gut colonization regulates internal state. — *Seminar*
Boston Area Worm Meeting (BAWM), MIT — *2017*

Modulation of phenotypic plasticity by gut-brain signaling — *Seminar*
Gordon Research Conference on Modulation of Neural Circuits and Behavior, Sunday River, ME — *2018*

Modulation of aversive chemical responses by tyramine-producing bacteria — *Platform presentation*
C. elegans Neuro meeting, UW Madison — *2018*

Poster Presentations

Opposing peptide signals shape a polyphenic trait in *C. elegans*
Society for Molecular Biology and Evolution (SMBE) international meeting, San Juan, PR. — *2014*

Rictor limits temperature-dependent dauer formation by controlling intestine-neuron signaling

International Worm Meeting, UCLA — *2015*

Intestinal colonization by bacteria alters chemosensory avoidance of alcohols

Gordon Research Conference on Modulation of Neural Circuits and Behavior, Sunday River ME — *2018*

Teaching

Cell Biology — *Tutor*

Weekly tutoring sessions with 5 first-year graduate students — *2007*

Gene expression — *TA*

Led a weekly discussion section, contributed to exam writing and grading — *2009*

Molecular Genetics — *Guest Lecturer*

Lectures on *C elegans* genetics and natural variation, QTL analysis — *2014*

Neurogenetics — *Guest Lecturer*

Lectures on evolution of chemosensory receptors — *2014*

Molecular Genetics — *Guest Lecturer*

Lectures on *C elegans* genetics and natural variation, QTL analysis — *2016*

Neurogenetics — *Guest Lecturer*

Lectures on evolution of chemosensory receptors — *2018*

Outreach

2017 2018	Meet the Scientists program at the Discovery Museum, Acton MA	*All ages demonstration*
2017	Brandeis Scientist Big Sibling Summer program via the MRSEC REU program	*Mentoring non-Brandeis undergraduates*
2018	Brandeis Scientists in the classroom workshop	
2019	Brandeis Scientists in the classroom, Morgan King and Nathan Johnson's 7th grade science classes. `https://doi.org/10.6084/m9.figshare.9693464`	*McDevitt Middle School, Waltham*

Mentoring

Sengupta lab doctoral students

Anna Hartmann, Ph.D., Travis Rogers, Munzareen Khan — *Brandeis University*

Sengupta lab rotation students

Anna Hartmann, Ph.D., Michael Hobin, Daniel Powell, Isa Gell-Levey, Justin Shin — *Brandeis University*

Sengupta lab undergaduates

Jason Teng — *Brandeis University*

REU mentees

David Barnes — *Hampton University*

Bashaw lab rotation students

Celine Santiago, Ph.D., Michael Fleming, Ph.D., Joe Zinksi, Ph.D. — *University of Pennsylvania*

References

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