

CURRICULUM VITAE

Name: Janna C. Nawroth

Current Position: Postdoctoral Fellow, supported by the Wyss Technology Development Fellowship

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Education:

Dec 2012	Ph.D.	California Institute of Technology (Biology)
Jun 2007	M.S.	Ruprecht Karl University Heidelberg, Germany (Molecular Biotechnology; Minor: Bioinformatics)
Jun 2004	B.S.	Ruprecht Karl University Heidelberg, Germany (Molecular Biotechnology; Minor: Bioinformatics)

Research Training:

Current	Technology Development Fellow for Biologically Inspired Engineering, Wyss Institute at Harvard University <i>Advisors:</i> Kevin K. Parker, Ph.D., Donald Ingber, M.D., Ph.D. <i>Research areas:</i> “organs on chips”, i.e., engineered tissues in microfluidic devices for quantitative studies of fluid-tissue interactions, disease processes, and toxicology
2013	Postdoctoral Fellow, Graduate Aerospace Laboratories, Division of Engineering & Applied Science, California Institute of Technology <i>Advisor:</i> John O. Dabiri, Ph.D. <i>Research areas:</i> microscale fluid transport and mixing in ciliated surfaces
2007-2012	Ph.D. Graduate Student, Division of Biology, California Institute of Technology <i>Advisor:</i> John O. Dabiri, Ph.D., Division of Engineering & Applied Science, California Institute of Technology <i>Co-advisor:</i> Kevin Kit Parker, Ph.D., Harvard School of Engineering and Applied Sciences <i>Research areas:</i> biological propulsion and fluid transport in native and engineered tissues
2005-2007	Research Associate in Neurobiology, Yale School of Medicine <i>Advisor:</i> Gordon M. Shepherd, M.D., Ph.D. <i>Co-Advisor:</i> James Mazer, Ph.D. <i>Research areas:</i> neural processing in visual and olfactory system
2004-2005	Trainee at Merck KGaA, Institute for Toxicology, Darmstadt, Germany <i>Advisor:</i> Michaela Kröger, Ph.D. <i>Research areas:</i> design and implementation of laboratory management software
2004	Research Assistant in Computational Neuroscience, Max-Planck-Institute for Medical Research, Heidelberg, Germany <i>Advisor:</i> Rainer Friedrich, Ph.D. <i>Research areas:</i> neural network modeling, neural processing in olfactory system

2003 Research Assistant in Computational Biology, German Cancer Research Center (DKFZ), Heidelberg, Germany
Advisor: Julian Mattes, Ph.D.
Research areas: computational image processing & feature detection

Other Relevant Training:

2000-2001 Electrical Engineering Vocational Training, Backnang, Germany
1999-2000 Wood Engineering Vocational Training, Waiblingen, Germany

Academic Appointments:

2008-2013 Research Fellow, Harvard School of Engineering and Applied Sciences
2005-2007 Research Associate, Department of Neurobiology, Yale School of Medicine

Awards and Honors:

2014 Technology Development Fellowship at the Wyss Institute for Biologically Inspired Engineering at Harvard University, Boston, MA
2013 Winning Poster of the Gallery of Fluid Motion at the Annual Meeting of American Physical Society, Division of Fluid Dynamics
2013 Demetriades–Tsafka–Kokkalis price for best Ph.D. thesis in Nanotechnology and related fields, California Institute of Technology, Pasadena, CA
2013 Invitation to 8th annual Science Foo Camp by Google, O'Reilly Media and Nature Journal
2012 Everhart Lecture Award, California Institute of Technology, Pasadena, CA
2012 1st Price Poster Award, Annual Division of Biology Retreat, California Institute of Technology
2009 PENS-Hertie Neuroscience Winter School Scholar, Hertie Foundation, Germany
2008-2012 Gordon and Betty Moore Fellowship for Graduate Studies, California Institute of Technology, Pasadena, CA
2008 Fellowship for “Neural Systems & Behavior” Graduate Level Research Course, Marine Biology Laboratory, Woods Hole, MA
2005 Master Research Fellowship, German Academic Exchange Service (DAAD)
2003 Erasmus Mundus Scholarship for 6 Months Exchange Study Program at Montpellier University, France
2001-2007 Scholarship for Bachelor and Master Studies, German National Merit Foundation (Studienstiftung des Deutschen Volkes)
1999 Travel Stipend and Book Award for Independent Field Studies on “Dragonflies in Southern France”, ZIS Foundation, Salem, Germany

Teaching Activities:

Harvard School of Engineering and Applied Sciences (SEAS)

2014 Bioengineering Projects: Research mentor (6 months duration, 2 undergraduate students)

California Institute of Technology

2013 Bioinspired Design Seminar: Course director/lecturer (winter term; 6 undergraduate students)
2012 Neuropathologies Seminar: Teaching assistant (winter term; 28 undergraduate and graduate students)
2011-present Experimental Marine Biology Projects: Research mentor (3-6 months duration; 1-2 undergraduate & K12 students)
2009-present Experimental Biopropulsion Projects: Research mentor (3-6 months duration; 1-2 undergraduate students)
2009-2011 Neuroscience Summer Course (Young Engineering and Science Scholar program): Lead instructor (team of 5 instructors; 3 weeks course duration; 30 K12 students)

- 2008-present Electrophysiology Laboratory Course: Laboratory assistant (20 undergraduate and graduate students)
 2008 Systems Neuroscience Seminar: Teaching assistant (winter term; 20 graduate students)

Management and Leadership Experiences:

- June 2014 Session Chair at Society of Industrial and Applied Mathematics (SIAM) Annual Meeting, Chicago, IL
 2013 – current Responsible for managing DARPA-funded research project at Wyss Institute, including all reporting and review duties, interaction with program manager, IP management, leading a team of 3 postdoctoral fellows, and coordinating all collaboration with Co-PIs.
 2013 – current Co-author of 2 NIH research proposals (UH3: awarded; RO1: in review)

Invited Presentations:

- April 2013 University of Zurich, Swiss Center for Regenerative Medicine, Zurich, Switzerland
 April 2013 University of Southern California, Aerospace & Mechanical Engineering, Los Angeles, CA
 May 2013 ETH Zurich, Mechanics and Materials, Zurich, Switzerland
 Nov 2012 Everhart Lecture, California Institute of Technology, Pasadena, CA
 Oct 2008 Biology Division Annual Retreat, California Institute of Technology, Pasadena, CA

Other Presentations:

- June 2014 Society of Industrial and Applied Mathematics (SIAM) Annual Meeting, Chicago, IL
 May 2014 Active Matter: Cytoskeleton, Cells, Tissues and Flocks. Kavli Institute for Theoretical Physics, Santa Barbara, CA
 Nov 2013 American Physical Society Division of Fluid Dynamics Annual Meeting, Pittsburgh, PA
 Jun 2013 25th Annual Meeting of Molecular Investigation of Microbe-Host Interaction. University of Wisconsin at Madison, Madison, WI
 Nov 2012 American Physical Society Division of Fluid Dynamics Annual Meeting, San Diego, CA
 Nov 2012 Fluid & Elasticity Meeting, La Jolla, CA
 Apr 2012 Southern California Symposium on Flow Physics, University of California, Santa Barbara, CA
 Nov 2011 American Physical Society Division of Fluid Dynamics Annual Meeting, Baltimore, MD
 Apr 2011 Southern California Symposium on Flow Physics, University of Southern California, Los Angeles, CA
 Jan 2010 Society for Integrative and Comparative Biology Annual Meeting, Seattle, WA
 Nov 2010 American Physical Society Division of Fluid Dynamics Annual Meeting, Long Beach, CA
 July 2010 University of Southern California, Aerospace & Mechanical Engineering, Los Angeles, CA
 Nov 2009 American Physical Society Division of Fluid Dynamics Annual Meeting, Minneapolis, MN

Professional Society Membership:

- 2008-present American Physical Society (APS)
 2011-2012 Biomedical Engineering Society (BMES)
 2009-2012 Society for Integrative & Comparative Biology (SICB)
 2005 -2008 Society for Neuroscience (SfN)

Journal Referee Assignments:

- 2012-present Reviewer New Biotechnology
 2012-present Reviewer Molecular Pharmaceutics
 2010-present Reviewer Journal of Experimental Biology

Peer-Reviewed Journal Articles:

Citations: 222
h-index: 6

1. **Nawroth JC**, Dabiri J. “Induced drift by a self-propelled swimmer at intermediate Reynolds numbers”. *Physics of Fluids* (in press).
2. H Guo, **Nawroth JC**, Ding Y, Kanso E. “Cilia beating patterns are not hydrodynamically optimal”. *Physics of Fluids* (in press).
3. Ding Y, **Nawroth JC**, McFall-Ngai M, Kanso E. “Mixing and transport by ciliary carpets: a numerical study”. *Journal of Fluid Mechanics* 2014 March; 743:124–140
4. **Nawroth JC** and Parker KK. “Design standards for engineered tissues”. *Biotechnol Adv.* 2013 Sep-Oct;31(5):632-7
5. **Nawroth JC**, Lee H, Feinberg AW, Ripplinger CM, McCain ML, Grosberg A, Dabiri DO, Parker KK. “A tissue-engineered jellyfish with biomimetic propulsion”. *Nature Biotechnology* 2012 July 22, 30:792–797 (Cover article)
6. Shim J, Grosberg A, **Nawroth JC**, Parker KK, and Bertoldi K. “Modeling of Cardiac Muscular Thin Films: Pre-stretch, Passive and Active Behavior”. *J Biomech.* 2012 Mar 15;45(5):832-41
7. **Nawroth JC**, Feitl KE, Colin SP, Costello JH, Dabiri JO. “Phenotypic plasticity in juvenile jellyfish facilitates effective animal-fluid interaction” *Biology Letters* 2010 June 23, 6(3): 389-393.
8. Du J, Riedel-Kruse IH, **Nawroth JC**, Roukes ML, Laurent GL, Masmanidis SC. “High-Resolution Three-Dimensional Extracellular Recording of Neuronal Activity With Microfabricated Electrode Arrays”. *J Neurophysiol.* 2009 March;101(3):1671-8.
9. **Nawroth JC**, Greer CA, Chen WR, Laughlin SB, Shepherd GM. “An energy budget for the olfactory glomerulus”. *J Neurosci.* 2007 Sep 5;27(36):9790-800 (Cover of Oct 3; 27 (40))

Abstracts, Posters and Peer-Reviewed Conference Proceedings:

1. **Nawroth JC**, Dabiri DO, McFall-Ngai M. “The Hawaiian bobtail squid as a model system for selective particle capture in microfluidic systems”. American Physical Society Division of Fluid Dynamics Annual Meeting, Pittsburgh, OH. November 2013.
2. **Nawroth JC**, Dabiri DO, McFall-Ngai M. “The Hawaiian bobtail squid as a model system for fluid transport, signal detection and particle capture in microfluidic systems”. 25th Annual Meeting of Molecular Investigation of Microbe-Host Interaction, University of Wisconsin at Madison, Madison, WI. June 2013.
3. **Nawroth JC**, Lee H, Feinberg AW, Ripplinger CM, McCain ML, Grosberg A, Dabiri DO, Parker KK. “Learning from real and tissue-engineered jellyfish: How to design and build a muscle-powered pump at intermediate Reynolds numbers”. American Physical Society Division of Fluid Dynamics Annual Meeting, San Diego, CA. November 2012.
4. **Nawroth JC**, Lee H, Feinberg AW, Ripplinger CM, McCain ML, Grosberg A, Dabiri DO, Parker KK. “A Tissue-Engineered Jellyfish with Biomimetic Propulsion and Feeding Currents”. Fluid & Elasticity Meeting, La Jolla, CA. November 2012.
5. **Nawroth JC**, Lee H, Feinberg AW, Ripplinger CM, McCain ML, Grosberg A, Dabiri DO, Parker KK. “A Tissue-Engineered Jellyfish with Biomimetic Propulsion and Feeding Currents”. Biomedical Engineering Society (BMES) Annual Meeting, Atlanta, GA. October 2012.
6. **Nawroth JC**, Lee H, Feinberg AW, Ripplinger CM, McCain ML, Grosberg A, Dabiri DO, Parker KK. “A Tissue-Engineered Jellyfish with Biomimetic Propulsion and Feeding Currents”. Southern California Symposium on Flow Physics, University of California, Santa Barbara, CA. April 2012
7. **Nawroth JC**, Dabiri DO. “Phenotypic plasticity in juvenile jellyfish medusae facilitates effective animal-fluid interaction”. Winter Conference on Growth and Form: Pattern Formation in Biology, Aspen Center for Physics, CO. January 2012
8. **Nawroth JC**, Dabiri DO “Jellyfish-Inspired Fluid Transport at Intermediate Reynolds Numbers”. Southern California Symposium on Flow Physics, University of Southern California, Los Angeles, CA. April 2011.
9. **Nawroth JC**, Dabiri DO “Lessons learned from the jellyfish: Fluid transport at intermediate Reynolds”. American Physical Society Division of Fluid Dynamics Annual Meeting, Baltimore, MD. November 2011.

10. **Nawroth JC**, Dabiri DO “Learning from jellyfish: Fluid transport in muscular pumps at intermediate Reynolds numbers”. American Physical Society Division of Fluid Dynamics Annual Meeting, Long Beach, CA. November 2010.
11. **Nawroth JC**, Dabiri DO “Adaptive phenotypic plasticity in juvenile Scyphomedusae facilitates effective animal-fluid interaction”. Society for Integrative and Comparative Biology Annual Meeting, Seattle, WA. January 2010.
12. **Nawroth JC**, Ripplinger CM, Feinberg AW, Dabiri JO, Parker K. “Optical mapping of electrical impulse propagation in the striated muscle of live jellyfish”. PENS-Hertie Winter School: Structure and Function of Neural Circuits, Obergurgl, Austria. January 2009.
13. **Nawroth JC**, Pala A, Phillips ME, Kim DH, Shepherd GM and Willhite DC. “Modified Trans-synaptic Tracing Viruses Reveal Novel Connectivity in the Rat Olfactory Bulb”. Cold Spring Harbor Laboratories Neuronal Circuits Meeting, Woodbury, NY. March 2008.
14. **Nawroth JC**, Greer CA, Chen WR, Laughlin SB, Shepherd GM. “An Energy budget of a defined cortical structure: the olfactory glomerulus”. Society for Neuroscience (SFN) Annual Meeting, San Diego, CA. November 2007.
15. Chang AY, **Nawroth JC**, Shon LY, Migliore M, Shepherd GM, Willhite DC. “Specificity of mitral and tufted cell lateral connectivity in the olfactory bulb”. Society for Neuroscience (SFN) Annual Meeting, San Diego, CA. November 2007.
16. Willhite DC, Shon LY, Chang AY, Fletcher M, **Nawroth JC**, Chen WR, Migliore M, Shepherd GM. “Viral transsynaptic tracing from dual injections in the olfactory system reveals convergent and segregated connectivity patterns in the olfactory bulb”. Association for Chemoreception Sciences (AChemS) Annual Meeting, Abstr. 29: #134, pp. 11. March 2007.
17. Mattes J, **Nawroth JC**, Boukamp P, Eils R, Greulich-Bode KM “Analyzing motion and deformation of the cell nucleus for studying co-localizations of nuclear structures”. 3rd IEEE International Symposium on Biomedical Imaging: Nano to Macro, 2006; 1044 – 1047

Ph.D. Thesis:

Nawroth JC. "Conceptual framework and physical implementation of a systematic design strategy for tissue-engineered devices" [Ph.D. dissertation]. California Institute of Technology; 2013.

Master Thesis:

Nawroth JC. “Neural processing in the olfactory system revealed by viral tracing of synaptic connectivity and neural network modeling” [M.S. thesis]. Ruprecht Karl University Heidelberg, Germany; 2007.