

# Siddharth Ramakrishnan

Jennie M Caruthers Chair in Neuroscience  
Department of Biological Sciences  
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## SUMMARY

Researcher and educator, **Jennie M Caruthers Chair in Neuroscience** at University of Puget Sound, Washington. Expertise in electrophysiology, small animals, neural cultures, bio-electronic devices and lipid bilayers. Extensive interdisciplinary teaching experience in basic biology, cellular neuroscience, neuroethology, neuroendocrinology and the intersection of art, science & technology. Recipient of the **NSF Early CAREER award**.

## EDUCATION

### UNIVERSITY OF ILLINOIS, CHICAGO

*Ph.D. in Biological Science (Neuroscience), Summa cum laude*  
*Master of Science in Computer Science, Summa cum laude*

Chicago, IL  
2005  
2002

### BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCES

*Bachelor of Engineering in Computer Science, Distinction*

Pilani, India  
2000

## PROFESSIONAL EXPERIENCE

### UNIVERSITY OF PUGET SOUND

**Assistant Professor, Department of Biology, Jennie M Caruthers Chair in Neuroscience**

- Developing undergraduate Neuroscience curricula, providing research experience for undergraduates and fostering the Neuroscience program

Tacoma, WA  
Current

### COLUMBIA UNIVERSITY

**Associate Research Scientist, Department of Electrical Engineering**

- Engineering biosensors by integrating membrane proteins in lipid bilayers with CMOS microelectrode arrays

New York, NY  
Feb – Aug 2012

### COLUMBIA UNIVERSITY

**Postdoctoral Researcher, Department of Electrical Engineering**

- Designed hybrid neural-microelectrode array interfaces to record from neurons
- Creating artificial cell membranes with functional proteins on nano-engineered surfaces for energy harvesting

New York, NY  
2009 - 2012

### UNIVERSITY OF CALIFORNIA, LOS ANGELES

**Postdoctoral Researcher, Department of Physiology, School of Medicine**

- Showed how developing, migrating neurons in embryonic brain acquire electrical activity
- Showed effects of endocrine disruptors on embryonic development.

Los Angeles, CA  
2006 – 2009

## TEACHING EXPERIENCE

### UNIVERSITY OF PUGET SOUND

**Assistant Professor**

- Nanobiology
- Art, Science and Technology
- Foundations in Neuroscience (Class of 40 students)
- Neuroendocrinology (Class of 14 students)
- Methods in Neuroscience (Lab based, 5-8students)
- Queer Cultures (Science, Sexuality and Ethics)
- Cell Biology Laboratory
- History of Medicine (STS, Kristin Johnson, Guest Lecture 2/18/2014)
- Buddhism and Consciousness (Religion, Elisabeth Benard, Guest Lecture 9/13/2013)
- Robotics and the Brain, Freshman Seminar (Biology, Peter Wimberger, Guest Lecture, 4/24/2013)
- Nerve and Muscle Physiology (Exercise Science, Jung Kim, Guest Lecture 10/29/2012)
- Behavioral Neuroscience (Psychology, David Andresen, Guest Lecture 11/9/2012, 11/12/2012)

Tacoma, WA  
2013-present

**THE NEW SCHOOL OF DESIGN, PARSONS**

New York, NY

**Co-Instructor**

2010 -2012

- Taught Art, Science and Technology ([www.nanobioart.com/classes/ArtSci](http://www.nanobioart.com/classes/ArtSci)) - Online Course; ~10 graduate students
- Biotechnology, Nanotechnology and Art ([artscicenter.com/hybrid](http://artscicenter.com/hybrid)); Class Size: ~15 graduate students

**THE NEW SCHOOL OF DESIGN, PARSONS**

New York, NY

**Invited Lecturer**

2011

- “Animal Worlds, Animal Senses” for Prof. Jackie Brookner. Discussed topics from animal sensory behavior to consciousness; Class size: ~15 graduate students

**JOHN J COLLEGE OF CRIMINAL JUSTICE**

New York, NY

**Invited Lecturer**

2011

- Taught the neurohormonal basis of sexual behavior; Class Size: ~15 graduate students

**UNIVERSITY OF CALIFORNIA, LOS ANGELES**

Los Angeles, CA

**Invited Lecturer, Design Media Arts / Nanoscience and Culture**

2008

- Taught Nanoscience & Culture; ~10 Honors undergraduate students
- Design Media Arts: Consciousness (<http://classes.design.ucla.edu/Winter09/9-1/blog/a/?s=siddharth>); Class size: ~250; Senior undergraduate and graduate students

**UNIVERSITY OF ILLINOIS, CHICAGO**

Chicago, IL

**Lecturer (Won awards for teaching in 2003, 2004 & 2005, based on student/professor evaluations)**

2003-2005

- Animal Behavior & Neuroethology (2004, 2005) – Class size of ~10; senior undergraduates and graduates
- Cellular Neurobiology (2004, 2005) – Class size of ~15; senior undergraduates and graduates
- Hormones & Behavior (2004, 2005) – Class size of ~200; undergraduates
- Fundamental Neuroscience (2004, 2005); Class size of ~200; undergraduates and graduates
- Cellular Biology Laboratory (2003, 2004); Lab sizes of ~25-30; Undergraduates

**PUBLICATIONS AND PRESENTATIONS**

- **Journal Publications/Book Chapters:**

- 2015** Ramakrishnan, S. and Vesna V., Games of Chance: Explorations into Animal Senses and Potentials in *Handbook of Digital Games and Entertainment Technologies*, ed. Editors: Ryohei Nakatsu, Matthias Rauterberg and Paolo Ciancarini (accepted, under editorial process)
- 2014** Ramakrishnan, S., Arnett, B.C., Murphy, A.D., Contextual Modulation of Multifunctional Central Pattern Generator, *Journal of Experimental Biology*, doi: 10.1242/jeb.086751, September 2014
- 2013** Rosenstein J.K., Ramakrishnan S., Roseman J., and Shepard K., Single Ion Channel Recordings with CMOS-Anchored Lipid Membranes, *Nano Letters*, DOI: 10.1021/nl400822r, (Web): May 1, 2013
- 2013** Ramakrishnan, S., Morphogenesis, Morphology and Men: Pattern formation from embryo to mind, AI and Society, DOI 10.1007/s00146-013-0504-9, August 2013
- 2013** Vesna V., and Ramakrishnan, S., Patterns, bodies and metamorphosis: The Hox Zodiac, *Technoetic Arts*, Volume 10, Numbers 2-3, December 2012, pp. 197-206(10)
- 2011** Lei, N., Ramakrishnan, S., Shi, P., Orcutt, J., Kam, L., Shepard, K., High-resolution extracellular stimulation of dispersed hippocampal culture with high-density CMOS multielectrode array based on non-Faradaic electrodes, *Journal of Neural Engineering*, 8(4); DOI: [10.1088/1741-2560/8/4/044003](https://doi.org/10.1088/1741-2560/8/4/044003)

- 2010 Vesna, V. and **Ramakrishnan, S.**, Metamorphosis of the human animal: hox zodiac, Making Reality Really Real: Reflections on Art, technology and Consciousness, Ed. Ascott, R., Gangvik, E., and Jahrmann, M., **TEKS Publishing**, ISBN #978-82-998211-2-4
- 2010 **Ramakrishnan S.**, Lee W., Navarre S., Kozlowski D.J., Wayne N.L., Acquisition of spontaneous electrical activity during embryonic development of gonadotropin-releasing hormone-3 neurons located in the terminal nerve of transgenic zebrafish (*Danio rerio*), **Gen Comp Endocrinol.**, 168(3): 401-7
- 2009 **Ramakrishnan, S.** and Wayne, N.L., Social cues from conspecifics alter electrical activity of gonadotropin releasing hormone neurons in the terminal nerve via visual signals, **American J. Physiology Regul. Integr Comp Physiol.** 297(1):R135-41.
- 2009 Reed, J., **Ramakrishnan, S.**, Schmit, J., Gimzewski, J., Mechanical interferometry of nanoscale motion and local mechanical properties of living zebrafish embryos., **ACS Nano.**, 3(8):2090-4
- 2008 **Ramakrishnan, S.** and Wayne, N.L., Impact of Bisphenol A on embryonic development and sexual maturation, **Reproductive Toxicology**, 25(2):177-183
- **Peer Reviewed Conference Publications:**
- 2011 Roseman, J., **Ramakrishnan, S.**, Shepard, K., Hybrid biological-solid-state circuits based on integrated, solid-support lipid bilayers, Nanoelectronic Devices for Defense & Security (NANO-DDS) Conference
- 2011 Lei, N., **Ramakrishnan, S.**, Shi, P., Orcutt, J., Kam, L., Shepard, K., A High Density CMOS Multi-Electrode Array For High-Resolution Extracellular Stimulation Of Neurons, BMES Conference
- 2011 Lei, N., **Ramakrishnan, S.**, Shi, P., Orcutt, J., Kam, L., Shepard, K., An Electrically-Stimulate Optically-Record Microsystem Based on Active CMOS Multi-Electrode Array for Dissociated Cell Cultures, Proceedings of IEEE/NIH Life Science Systems & Applications Workshop 2011 (LiSSA'11)
- **Other Conference Publications /Posters (\* Denotes Undergraduate Student, ^ High School Student):**
- 2015 Smith, N.L.\*, Inagaki, T., **Ramakrishnan, S.**, Embryonic low dose BPA exposure in parents has transgenerational effects on GnRH neurons in the Japanese medaka, Abstract, Northwest Developmental Biology Meeting, Friday Harbor Labs, March 2015
- 2015 Skinner, D.\* and **Ramakrishnan. S.**, Bisphenol A disrupts snail embryonic development via a putative estrogen mediated catecholaminergic pathway, Abstract, Northwest Developmental Biology Meeting, Friday Harbor Labs, March 2015
- 2015 Stackhouse, S.\*, Martens, H.^, and **Ramakrishnan, S.**, RFRP-3 Affects GnRH3 Neuronal Development And Larval Social Behavior In The Teleost *Oryzias latipes*, Abstract, Endocrine Society Meeting, March 5-8, 2015.
- 2014 Inagaki, T., Lee, E.K.\*, and **Ramakrishnan, S.**, Impact of Bisphenol A on the developing GnRH3 Neural System and Locomotor Behavior in Japanese Medaka, Society for Neuroscience Annual Meeting, November 2014.
- 2014 Tetreau, S. \*, Skinner, D.\* and **Ramakrishnan, S.**, Bisphenol A affects early embryonic development in the pond snail *Helisoma trivolvis*, Annual Meeting of the Society for Developmental Biology, July 2014
- 2009 **Ramakrishnan, S.**, Navarre, S., Kozlowski, D., and Wayne, N.L., Targeted Inhibition of Electrical Activity Alters Axonal Pathfinding of Gonadotropin-Releasing Hormone-3 Neurons Located in the Terminal Nerve of Embryonic Transgenic Zebrafish (*Danio rerio*), Society for Neuroscience
- 2008 **Ramakrishnan, S.** and Wayne, N.L., Effect of social cues on the electrophysiology of terminal nerve (TN)- GnRH neurons in female medaka, Society for Behavioral Neuroendocrinology Conference † (Best Poster Award Winner)
- 2007 **Ramakrishnan, S.** and Wayne, N.L., Photoperiodic effects on reproduction and electrical activity of TN GNRH neurons in medaka (*Oryzias latipes*) Society for Behavioral Neuroendocrinology Conference
- 2006 **Ramakrishnan, S.** and Wayne, N.L., Impact of an endocrine disruptor on early embryonic development, Developmental Biology Conference, Santa Cruz

- 2006 Ramakrishnan S**, Arnett BC and Murphy AD, Electrotonic network as a context dependant switch of a multifunctional pattern generator resulting in distinct behavioral outputs, *Neural Control of Behavior, Abstract*
- 2005 Ramakrishnan .S**, and Murphy A. D., GnRH as a peptide switch in modulating the CPG underlying oral behaviors in snails, *Society for Behavioral Neuroendocrinology*
- 2004 Ramakrishnan .S**, and Murphy A. D., Investigation of the role of GnRH as a neuromodulator during egg-laying behavior in two pulmonate snails: *Helisoma* (Planorbidae) and *Lymnaea* (Lymnaeidae), *Society for Neuroscience*
- 2004 Ramakrishnan .S**, and Murphy A. D., GnRH as a possible neuromodulator during egg-laying behavior in two pulmonate snails: *Helisoma* (Planorbidae) and *Lymnaea* (Lymnaeidae), *Abstract, Midwest Neurobiology Meeting*
- 2003 Ramakrishnan .S**, and Murphy A. D., Modulation of the central pattern generator by the neuropeptide GnRH in the snail *Helisoma trivolvis*, *Society for Neuroscience*
- 1999 Siddharth R.**, Prashant M. and Kumar R., An algorithm for encryption using molecular genetics, *Proceedings of the 3<sup>rd</sup> international conference on Computational intelligence and Multimedia Application*

• **Other Student Presentations/ Talks:** (\* Denotes Undergraduate Student, ^ High School Student)

- 2014 Tetreau, S.\***, Investigating the mechanism by which Bisphenol A affects sustained movement in the pond snail *Helisoma trivolvis*, **Invited Talk**, Murdoch Research Symposium, Vancouver BC.
- 2014 Stackhouse, S.\***, Martens, H.^, and **Ramakrishnan, S.**, Modulation of Social Behavior by Gonadotropin Releasing Hormone Neurons in The Teleost *Oryzias Latipes*, *Science and Math Research Symposium, University of Puget Sound*
- 2014 Tetreau, S.\***, and **Ramakrishnan, S.**, Investigating the mechanism by which Bisphenol A affects sustained movement in the pond snail *Helisoma trivolvis*, *Science and Math Research Symposium, University of Puget Sound*<sup>s</sup>, *Winner Best Poster Award*.
- 2014 Kurth, E.M.\***, **Ramakrishnan S.**, and Hodum P., Reproductive and Neurophysiological Effects of Chronic Plastic Ingestion in Northern Fulmars and Sooty Shearwaters, *Science and Math Research Symposium, University of Puget Sound*

• **Invited Talks:**

- 2015 University of Washington, Seattle, DXArts**, Art and Brain: Science, Gender and Sexuality, April 2015
- 2014 Leonardo Art Science Education Rendezvous (LASER), UCLA**, “Hox genes and body patterns”, December 2014
- 2014 Gallaudet University, DC** “Of Merging Machines and Magic”, Talk and critique to deaf graduate students at Gallaudet, November 2014
- 2014 SciArt Nanolabs, University of California, Los Angeles, CA**, “Workshop on DIY microscopy and fish embryo development”, July 2014 (<http://vimeo.com/101642113>; <http://vimeo.com/102110833>)
- 2014 Willamette University, Salem OR**, “Dynamism during Development: Acquisition of electrical activity and axonal pathfinding in a developing neuroendocrine system”
- 2014 PIE Conference, University of Puget Sound, Tacoma, WA**, “What brains tell us about patterns and perfection”
- 2013 Museum of Contemporary Art, Taiwan**, “Hox Zodiac” Conference on Posthumanist Desire
- 2013 Thompson Hall Seminar, University of Puget Sound, Tacoma**, “Under the spell of the surroundings: How environmental factors affect brain physiology, behavior and reproduction”
- 2012 Turing Symposium, UCLA**, “Morphogenesis, Morphology and Men: Pattern Formation from Embryo to Mind” (<http://cnsi.ctrl.ucla.edu/streaming/art-sci/5252012-ramakrishnan>)
- 2012 College Art Association Panel, Los Angeles**, “Is It Time to Question the "Privileging" of Visual Art?”

- 2011 Hong Kong Microwave Festival** “New Generation Scientists Speak: Sci|Art: Connections, Art|Sci Networks” moderated by Prof. Victoria Vesna
- 2011 EdLab Seminar at Teachers College**, Columbia University, New York – “Sneak peeks into the brain: Tales that fish and snails can tell”; <http://edlab.tc.columbia.edu/index.php?q=node/6374>
- 2011 National Academy of Sciences (DASER)** – “Looking within and Without: Perspectives from Neuroscience and Art|Science” (<https://www.youtube.com/watch?v=Hf7eldwbmWs>)
- 2011** “Dual Perspectives in Neuroscience: Basic vs. Hybrid systems – In Vivo vs. cultures – Patch Clamp vs. Electrode arrays” at the Department of Biotechnology, Indian Institute of Technology, Chennai
- 2011** “A Window into Hormones and Development: Environmental Estrogens Shaping Ontogeny and the Development of the GnRH Neuroendocrine System” at Indian Institute of Science Education and Research, Thiruvananthapuram, India
- 2010** Invited critique for design-media art student projects at The New School of Design, Parsons, New York
- 2009** UCLA Brown Bag lunch series at the Design Media Art Center, Los Angeles - “Pattern generation and Pattern formation in Animal neural networks” - <http://artsci.ucla.edu/?q=node/271>
- 2007** National Brain Research Center and National Institute of Immunology, India- “Master Manipulators: How neurohormones shape our brain from development to adulthood”
- **Professional Memberships**  
Society for Neuroscience, Society for Developmental Biology, Biomedical Engineering Society, College Arts Association, Endocrine Society

### ADDITIONAL INFORMATION AND SKILLS

- **Grants and Awards**
  - 2014** **Keck Foundation Award – Initiative For NeuroCulture** (2014-2018)
  - 2013** **NSF Early CAREER Award** (2013-2018)
  - 2012** **Mellon Foundation Award** for Neuroscience Consortium (NW5C)
  - 2011** **Fellow Art|Sci Center UCLA**, Los Angeles
  - 2008** **Best Poster Award** at Society for Behavioral Neuroscience, Groningen
  - 2003-2005** **Awards for Excellence in Teaching (3 years)**, Department of Biological Sciences, University of Illinois, Chicago
  - 2000, 2001** **University Fellowship**, University of Illinois, Chicago  
**Dean’s Fellowship** in Computer Science, University of Illinois, Chicago
- **Science Education Outreach and Exhibitions**
  - 2015** [M\(y\)Crobos: Create your own Wearable Biosensor -- a Computational Fashion Workshop](#), Eyebeam, New York
  - 2015** **Food Systems, Surroundings, Sensibilities, M(y)crobos**, Cotard Syndicate (with Stefani Bardin and Toby Heys), Bronx River Art Center, NY, January 2015
  - 2014** **Hox Zodiac Dinner** at the Art Sci Center, University of California, Los Angeles (Dec 2014)
  - 2014** **Micronations** at the Asia Triennial (Cotard Syndicate), Manchester, England
  - 2013** **Hox Zodiac** at the Posthumanist Desire Exhibition MOCA, Taipei
  - 2012** **Art, Environment, Action** at the New School of Design Parsons: “Sensory Misperceptions” by the Cotard Syndicate
  - 2012** Harvest Works, New York, “**Dog Nose Knows: An interactive boardgame**” with Victoria Vesna and Adeline Ducker

- 2011 Microwave International New Media Arts Festival: Dog olfaction, beyond human smells & The Hox Project; <http://www.microwavefest.net/festival2011/index.html>
- 2011 “Art|Science: Conundrum or Confluence” - [http://www.thenewyorkoptimist.com/HeidiRussellPresentsSiddharthRamakrishnanArt\\_ScienceAug29\\_2011.html](http://www.thenewyorkoptimist.com/HeidiRussellPresentsSiddharthRamakrishnanArt_ScienceAug29_2011.html)
- 2011 9th Annual Symposium, Center for Society and Genetics, UCLA: The Sniffing Booth; <http://nanobioart.com/sniffingbooth>
- 2010 “The Secret of Snail Patterns” - <http://thenewyorkoptimist.com/secretsnailpatternsiddharthram071309.html>
- 2009-10 INDAF, Incheon International Digital Art Festival, Korea: “The Hox Zodiac Installation”; <http://artsci.ucla.edu/hox/>
- 2007 “Biomimicry and Ecology”, Documentary, Synchronous Design; Consultant on biomimicry

#### • Patents and Inventions

- 2013 [WO 2013154750](#), Systems and methods for biological ion channel interfaces, Roseman, J., **Ramakrishnan, S.**, Rosenstein, J., and Shepard, K.L.
- 2013 #cu12278, Single Molecule Sensor on Nanopore Platform for Ion Channel Studies, Rosenstein, J.K., **Ramakrishnan, S.**, and Shepard, K.
- 1999 "AEGIS" – *an Algorithm for Encryption using Molecular Genetics and Image Patterns* from De Penning & De Penning. **Ramakrishnan, S.**, and Murthy, P.

#### • University Service

- 2014 Chaired panel at Race and Pedagogy conference
- 2013-present Member Institutional Review Board
- 2013-present Member Institutional Animal Care and Use Committee
- 2014-present Board Member Gender and Queer Studies Program
- 2013-present Board Member Bioethics Program (Developed program and curriculum)
- 2013 Technology and Teaching Committee (Special committee to meet with trustees)
- 2013-present Art Science Salon Organizational Committee (Organize and plan monthly salons open to the public where artists and scientists converse)
- 2013 Search Committee for the Biophysics Chair

#### • Community Service

- 2015-ongoing Organizer of the “Symposium on Neuroethics: Interrogating Identities”, March 7<sup>th</sup> 2015
- 2014-ongoing Organizer and host of Town Hall seminars in Neuroscience. First event held on Oct 30<sup>th</sup>: Dr. Christof Koch, ; CSO Allen Institute of Brain Sciences. – Understanding Consciousness by Understanding the Brain
- 2014 Hosted and mentored a local high school student from the School of the Arts, Tacoma Public schools
- 2013-present Help with the McCarver elementary school visits to the labs
- 2013-present Teach at the Science and Math Institute of the Tacoma Public Schools on topics of Neuroscience
- 2013-present Have mentorship lunches and lab tours with the students from SAMI, Tacoma Public Schools on research and science

#### • Volunteer Activities

- 2010 Founder, FreeWriteNYC Youth New York; Conducted creative writing workshops for teenagers in public libraries
- 2009 Volunteer, Creative Art Workshops for Kids New York taught children to constructively use art and sculpture
- 2007- 09 Site Coordinator, Reading to Kids, Los Angeles; Organized English reading clubs in low income neighborhoods