

BIOGRAPHICAL SKETCH

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NAME: Dupre, Christophe

eRA COMMONS USER NAME (credential, e.g., agency login): christophedupre

POSITION TITLE: Graduate Student

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	START DATE MM/YYYY	END DATE MM/YYYY	FIELD OF STUDY
EPFL, Lausanne, Switzerland	BS	09/2003	07/2006	Life Sciences
EPFL, Lausanne, Switzerland	MS	09/2006	07/2008	Neuroscience
Columbia University, New York, NY	PHD	09/2011	09/2017	Neurobiology and Behavior

A. Personal Statement

Hydra belongs to the phylum of cnidarians which are representative of the earliest nervous systems in evolution. There is renewed interest in the use of Hydra as an animal model since it is now possible to create stable transgenic lines in this species. Accordingly, I created a line that expresses a calcium indicator in neurons and developed tools to study this new preparation. I was surprised by the advantages offered by this animal model when using calcium imaging, as it allows to monitor neuronal activity over entire animals simultaneously, at high temporal resolution and over hours. For the upcoming years, I want to take advantage of this preparation to study how the various circuits that I discovered in the nervous system of Hydra coordinate their activity to control the behavior of the animal. I believe that this approach will help us understand some of the most fundamental principles by which the nervous system is organized.

1. Dupre C, Yuste R. Non-overlapping Neural Networks in Hydra vulgaris. *Curr Biol.* 2017 Apr 24;27(8):1085-1097. PubMed PMID: [28366745](#); PubMed Central PMCID: [PMC5423359](#).
2. Ji N, Flavell SW. Hydra: Imaging Nerve Nets in Action. *Curr Biol.* 2017 Apr 24;27(8):R294-R295. PubMed PMID: [28441559](#).

B. Positions and Honors**Positions and Employment**

2005 - 2007	Undergraduate research assistant, EPFL, Lausanne
2006 - 2006	Undergraduate research intern, Michigan State University, East Lansing, MI
2007 - 2009	Research Intern, The Rockefeller University, New York, NY
2009 - 2011	Research Assistant, The Rockefeller University, New York, NY
2011 -	Graduate Student, Columbia University, New York, NY
2012 - 2012	Teaching Assistant, Neurobiology course, The Marine Biological Laboratory, Woods Hole, MA
2013 - 2013	Summer Student, The Marine Biological Laboratory, Neurobiology course, Woods Hole, MA
2014 - 2014	Summer Student, The Marine Biological Laboratory, Methods in Computational Neuroscience course, Woods Hole, MA
2015 - 2015	Teaching Assistant, Neural Systems and Behavior course, The Marine Biological Laboratory, Woods Hole, MA
2016 - 2016	Grass Fellow, The Marine Biological Laboratory, Woods Hole, MA

Other Experience and Professional Memberships

- 2008 - Member, American Association for the Advancement of Science
- 2014 - Member, Organization for Computational Neuroscience
- 2014 - 2014 Invited speaker, Neurobiology and Behavior Graduate Program Retreat, New Paltz, NY
- 2015 - Member, Society for Neuroscience
- 2015 - 2015 Invited speaker, Interdisciplinary Neuroscience Graduate Program Seminar Series, University of Rhode Island, Kingston, RI
- 2015 - 2015 Session chair and poster judge, International Workshop on animal evolution, Munich, Germany
- 2016 - 2016 Invited speaker, Neural and Behavioral Science Seminar, SUNY Downstate Medical Center, Brooklyn, NY
- 2016 - 2016 Organizing committee member, Hydroidfest: North American Meeting of Hydroid Biologists, Bodega Bay, CA
- 2017 - 2017 Invited speaker, Gordon Research Conference on Neuroethology, Les Diablerets Conference Center, Les Diablerets, Switzerland.

Honors

- 2003 Best GPA in Biology and Chemistry major, High School
- 2013 Charles A. Huebschman Prize, Columbia University
- 2013 Milton L. Schiffman Endowed Scholarship for the Neurobiology course at Woods Hole, MA, The Marine Biological Laboratory
- 2014 Travel grant for the Evolution of the First Nervous Systems II meeting (St Augustine, FL), NSF
- 2015 Kavli travel grant for the 2015 SfN meeting, Kavli Institute for Brain Science
- 2016 Kavli travel grant for the 2016 SfN meeting, Kavli Institute for Brain Science
- 2016 Grass Fellowship, Grass Foundation

C. Contribution to Science

1. I created a transgenic line of the freshwater invertebrate *Hydra vulgaris* where neurons express a calcium indicator. This made it possible to record the activity of its entire nervous system simultaneously, and start describing its organization. We found that multiple networks of neurons can coexist within a single nerve net. Also, we could associate a behavioral function to each of them, such as body contraction and response to light (Dupre et al, 2017). Thanks to these studies, it is now possible to test how these circuits interact and whether this organization is conserved in higher animals. This work was highlighted in a dispatch in *Current Biology* (Ji and Flavell, 2017) and recommended twice in F1000Prime as being of special significance in its field.
 - a. Dupre C, Yuste R. Non-overlapping Neural Networks in *Hydra vulgaris*. *Curr Biol.* 2017 Apr 24;27(8):1085-1097. PubMed PMID: [28366745](#); PubMed Central PMCID: [PMC5423359](#).
 - b. Ji N, Flavell SW. *Hydra*: Imaging Nerve Nets in Action. *Curr Biol.* 2017 Apr 24;27(8):R294-R295. PubMed PMID: [28441559](#).
2. During graduate school, I have been engaged in several outreach activities in order to share my knowledge about imaging and the nervous system of *Hydra*. I helped elementary school children learn about invertebrates by teaching them how to use dissecting microscopes to look at live samples. This was done during the Brain Awareness Week at the American Museum of Natural History and during the Fall Family Day at the Black Rock Forest Consortium. Additionally, I helped another not-for-profit organization (Biobus) use *Hydra* to teach biology to young students by training their instructors to maintain *Hydra* colonies. These experiences were very fulfilling because they allowed me to give back by helping the next generation follow their curiosity and learn more about science.

3. I helped organize a meeting on hydrozoans and other cnidarian animal models, Hydroidfest 2016 (<https://www.hydroidfest.org/>). The meeting hosted 59 participants for 3 days at the Bodega Marine Laboratory in California. This experience helped me get integrated in the Hydra community and understand what it takes to organize such meetings. Moreover, I was in charge of writing the official meeting report (Dupre et al, 2017).
 - a. Dupre C, Grasis JA, Steele RE, Schnitzler CE, Juliano CE. Hydroidfest 2016: celebrating a renaissance in hydrozoan research. *EvoDevo*. 2017 April 27;
4. Brain centers for arousal such as the tuberomammillary nucleus project to the hypothalamus and modulate behaviors such as feeding and reproduction. I have participated in multiple studies aimed at understanding how this modulation occurs by using electrophysiology, molecular biology and behavioral paradigms. In particular, I mapped the expression of histamine and estrogen receptors in the ventromedial nucleus of the hypothalamus and tested the effect of a food-related hormone on arousal. These studies have been cited by other groups in various journals.
 - a. Kow LM, Pataky S, Dupré C, Phan A, Martin-Alguacil N, Pfaff DW. Analyses of rapid estrogen actions on rat ventromedial hypothalamic neurons. *Steroids*. 2016 Jul;111:100-112. PubMed PMID: [27017919](#); PubMed Central PMCID: [PMC4965276](#).
 - b. Ribeiro AC, Ceccarini G, Dupré C, Friedman JM, Pfaff DW, Mark AL. Contrasting effects of leptin on food anticipatory and total locomotor activity. *PLoS One*. 2011;6(8):e23364. PubMed PMID: [21853117](#); PubMed Central PMCID: [PMC3154408](#).
 - c. Dupré C, Lovett-Barron M, Pfaff DW, Kow LM. Histaminergic responses by hypothalamic neurons that regulate lordosis and their modulation by estradiol. *Proc Natl Acad Sci U S A*. 2010 Jul 6;107(27):12311-6. PubMed PMID: [20562342](#); PubMed Central PMCID: [PMC2901472](#).
 - d. Ribeiro AC, LeSauter J, Dupré C, Pfaff DW. Relationship of arousal to circadian anticipatory behavior: ventromedial hypothalamus: one node in a hunger-arousal network. *Eur J Neurosci*. 2009 Nov;30(9):1730-8. PubMed PMID: [19863654](#); PubMed Central PMCID: [PMC3257877](#).

D. Additional Information: Research Support and/or Scholastic Performance