

CURRICULUM VITAE

IAN G. DAVISON

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Department of Biology
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RESEARCH INTERESTS

Circuits underlying sensory perception and behavior in the olfactory system; neural pathways for regulating social behaviors; learning and plasticity in neural networks.

CITIZENSHIP

Canadian citizen
U.S. Lawful Permanent Resident

EDUCATION AND TRAINING

Ph. D. in Neurobiology 1995-2003
Dept. of Biological Sciences, Simon Fraser University, Vancouver, Canada

B.Sc., Joint Hons. Biology and Physics 1990-1994
St. Francis Xavier University, Antigonish, Canada

PROFESSIONAL EXPERIENCE

Assistant Professor, Boston University Dept. of Biology 2011-

Postdoctoral Research Associate 2004-2011
HHMI and Dept. of Neurobiology, Duke University Medical Center, Durham NC
Advisors, Drs. Larry Katz (2003-2005) and Michael Ehlers

Grass Fellowship in Neuroscience, Marine Biological Laboratory, Woods Hole MA 2003

FELLOWSHIPS AND AWARDS

Klingenstein Fellow in Neuroscience 2013-2016

Grass Fellowship in Neuroscience Marine Biological Lab, Woods Hole 2003

NSERC Postgraduate Scholarships A & B 1996-1999

Frank A. Linville Scholarship in Olfaction Simon Fraser University 2000, 2002

Graduate Fellowship SFU 1996, 2000

Canada Scholarship St. Francis Xavier University. 1990-1994

Dr. J.J. Carrol Memorial Scholarship St. F. X. 1990-1994

NSERC Undergraduate Research Scholarship St. F. X. 1993

GRANT SUPPORT

CURRENT:

Behavioral imprinting in the olfactory system

The Binational Science Foundation

07/2016 – 06/2020

co-PI: Davison, with S. Shea (Cold Spring Harbor) and Y. Ben-Shaul (Hebrew Univ. Jerusalem)

High dynamic range multiphoton microscopy for large-scale imaging

NIH (NEI)

09/2016 – 07/2017

co-PIs: J. Mertz (BME) and Davison

Circuit mechanisms for learned pattern recognition in olfactory cortex

The Whitehall Foundation

03/2014 – 03/2017

PI: Davison

\$75,000 / yr

PENDING:

Neural mechanisms for adaptive changes in social behavior (R01)

NIH (NIDCD)

Noncanonical signaling in olfactory circuits (R21)

NIH (NIDCD)

COMPLETED:

Neuronal mechanisms underlying olfactory imprinting

The Binational Science Foundation

07/2015 – 06/2016

co-PI: Davison, with S. Shea (Cold Spring Harbor) and Y. Ben-Shaul (Hebrew Univ. Jerusalem)

Synaptic and circuit mechanisms of pheromonal learning

NIH (NIDCD) 1R21DC013894

04/2014 – 03/2017

PI: Davison

Neural mechanisms of pheromonal imprinting

Klingenstein Award in the Neurosciences

06/2013 – 05/2017

PI: Davison

\$50,000 / yr

PUBLICATIONS

(in review) Gao Y, Budlong C, Durlacher E, and Davison I.G. *Neural mechanisms of social learning in the female mouse.*

(revised MS submitted) Yang R, Weber T, Witkowski ED, Davison IG, and Mertz J. *Ultrahigh dynamic range multiphoton microscopy with an electronic add-on.*

(revised MS in review) Sharma R, Ishimaru Y, Davison I, Ikegami K, Chien M-S, You H, Chi Q, Kubota M, Yohda M, Ehlers M, and Matsunami H. *Olfactory receptor accessory proteins play crucial roles in receptor function and gene choice.*

(in revision) Shlomai Y, Vinograd A, Mukherjee D, Gao Y, Citri A, **Davison IG**, and Mizrahi A. *Functional plasticity in the mouse olfactory bulb following motherhood.*

(in revision) Besnard A, Gao Y, Langberg T, Feng W, Xu X, Sauer D, Davison IG, and Sahay A. *Distinct lateral septal interneurons broadcast instructive and permissive hippocampal signals to calibrate fear responses.*

Dai R, Rossello R, Chen CC, Kessler J, **Davison I**, Hochgeschwender U, Jarvis ED (2014). Maintenance and neuronal differentiation of chicken induced pluripotent stem-like cells. *Stem Cells Int.* 2014: 182737.

Gao Y and Davison IG (2014). Hippocampal neurons wait their turn. *eLife* 3:e02590.

Mertz J, Gasecka A, Daradich A, **Davison I**, and Coté D (2014). Phase-gradient contrast in thick tissue with a scanning microscope. *Biomed. Opt. Express* 5:407-416.

Davison IG and Ehlers MD (2011). Neural circuit mechanisms for pattern detection and feature combination in olfactory cortex. *Neuron* **70**: 82-94 (previewed in *Neuron* **70**: 1-2)

Kennedy MJ, **Davison IG**, Robinson CG, and Ehlers MD (2010). Syntaxin-4 defines a domain for activity-dependent exocytosis in dendritic spines. *Cell* **141**: 524-535

Wang Z, Edwards JG, Riley N, Provance DW Jr, Karcher R, Li XD, **Davison IG**, Ikebe M, Mercer JA, Kauer JA, and Ehlers MD (2008). Myosin Vb mobilizes recycling endosomes and AMPA receptors for postsynaptic plasticity. *Cell* **135**: 535-48

Arenkiel BR, Klein ME, **Davison IG**, Katz LC, and Ehlers MD (2008). Genetic control of neuronal activity in mice conditionally expressing TRPV1. *Nature Methods* **5**(4): 299-302.

Arenkiel BR, Peca J, **Davison IG**, Feliciano C, Deisseroth K, Augustine GJ, Ehlers MD, and Feng G (2007). In vivo light-induced activation of neuroal circuitry in transgenic mice expressing channelrhodopsin-2. *Neuron* **54**: 205-18.

Davison IG and Katz LC (2007). Sparse and selective odor coding by mitral/tufted neurons in the main olfactory bulb. *J. Neurosci.* **24** (3): 8057-8067.

Davison IG, Boyd JD, and Delaney KR (2004). Dopamine inhibits mitral/tufted to granule cell synapses in the frog olfactory bulb. *J. Neurosci.* **24** (3): 8057-8067.

Delaney KR, **Davison IG**, and Denk W (2001). Odour-evoked $[Ca^{2+}]$ transients in mitral cell dendrites of frog olfactory glomeruli. *Eur. J. Neurosci.* **13** (9): 658-72.

Mulligan SJ, **Davison IG**, and Delaney KR (2001). Mitral cell presynaptic Ca^{2+} influx and synaptic transmission in frog amygdala. *Neuroscience* **104** (1):137-51.

Cheng J-Y, **Davison IG**, and DeMont ME (1996). Dynamics and energetics of scallop locomotion. *J. Exp. Biol.* **199**: 1931-19461

Davison IG, Wright GM, and DeMont ME (1995). The structure and mechanical properties of invertebrate and primitive vertebrate arteries. *J. Exp. Biol.* **198**: 2185-2196

Joshi YN, Tauheed A, and **Davison IG** (1992). The analysis of the $5s^25p^2$, $5s5p^3$, $5s^25p5d$, and $5s^25p6s$ configurations of Te III. *Can. J. Phys.* **70**: 740-744

CONFERENCE PRESENTATIONS

Gao Y, Budlong C, and Davison IG. Neuronal mechanisms underlying mating-induced pheromonal memory in the female mouse. Society for Neuroscience, 11/2015, Chicago IL

Shlomai Y, Vinograd A, Mukherjee D, Gao Y, Citri A, Davison I, and Mizrahi A. Functional plasticity in the mouse olfactory bulb following motherhood. Society for Neuroscience, 11/2015, Chicago IL

Witkowski E, DeWalt G, Foster A, Eldred W, and Davison IG. Chronic in vivo imaging of synaptic reorganization after traumatic brain injury. Society for Neuroscience, 11/2014, Washington DC

Sharma R, Ishimaru Y, Davison IG, Ehlers MD, and Matsunami H. Crucial role of olfactory receptor accessory proteins RTP1 and RTP2 in receptor gene choice, development, and odor detection. Society for Neuroscience, 11/18/2014, Washington DC

Gao Y and Davison IG. Neuronal mechanisms of mating-induced pheromonal memory in the female mouse accessory olfactory bulb. Association for Chemoreception Sciences, 04/10/2014, Bonita Springs FL

Herzog L and Davison IG. Innate odor avoidance for spoiled food categories in the mouse. Association for Chemoreception Sciences, 04/10/2014, Bonita Springs FL

INVITED LECTURES (past 3 years)

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| Symposium on mobile zinc and sensory perception, MIT, Boston MA | Oct 2016 |
| Brains and Roses International Symposium on Olfaction, Barcelona, Spain | Sep 2016 |
| Cold Spring Harbor Laboratory | Feb 2016 |
| New Jersey Institute of Technology | Dec 2015 |
| Brains and Roses International Symposium on Olfaction, University College London | Sep 2015 |
| European Chemoreception Research Organization Congress, Istanbul, Turkey | Sep 2015 |
| Dept. of Biology, Brandeis University | Aug 2015 |
| Kavli Institute for Theoretical Physics, Olfaction Meeting, UC Santa Barbara | Jul 2015 |
| Pfizer Neuroscience Unit, Cambridge MA | May 2015 |
| Dept. of Biology, Bowdoin College | Apr 2015 |
| Center for Systems Neuroscience, Boston University | Dec 2014 |

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| Brains and Roses International Symposium on Olfaction, Paris, France | Sep 2014 |
| European Chemoreception Research Organization Congress, Leuven, Belgium | Aug 2013 |
| Wellesley College, Wellesley MA | Nov 2012 |
| Canadian Association for Neuroscience, Symposium on Neural Coding, Vancouver | May 2012 |
| Dept. of Neuroscience, Baylor College of Medicine | May 2011 |
| Dept. of Neurobiology and Behavior, Cornell University | Mar 2011 |
| Dept. of Biology, Boston University | Feb 2011 |
| Dept. of Cell and Molecular Physiology, UNC Chapel Hill | Nov 2010 |

PROFESSIONAL ACTIVITY

Professional associations:

Society for Neuroscience
 Association for Chemoreception Sciences
 Canadian Association for Neuroscience

Ad hoc referee:

Journal of Neurophysiology
 Cerebral Cortex
 eLife,
 PLoS One
 Neuroscience Letters
 Science

Ad hoc reviewer:

National Science Foundation
 German-Israeli Science Foundation
 Agence Nationale de la Recherche, France

TEACHING

Boston University:

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|------------------------------------------------------------------------------------|---------|
| Neural Systems I: Functional Circuit Analysis (BI741/NE741) | 2016- |
| Sensory Neurobiology (BI520/NE520 4 credit hrs/wk) | 2012- |
| Readings in Biology (BI 472; 2-4 credits) | 2013 |
| Guest lecturer, Frontiers in Neuroscience (GRS NE500) | 2011 |
| Guest lecturer, Topics in the Mathematical Structure of Biological Systems (BI502) | 2011-12 |
| Guest lecturer, Cellular and Systems Neuroscience (BI755/GMS AN810) | 2012-15 |
| Guest lecturer, Food and the Senses (MET ML715) | 2012-16 |

TRAINEES

Postdoctoral:

Dr. Yuan Gao, Ph.D. 2012-

Graduate:

Kelsey Williford, Graduate Program in Neuroscience 2015-
 Ellen Witkowski, Graduate Program in Neuroscience 2012-

Undergraduate:

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|-----------------------------------------|---------|
| Jessica Lin | 2016-17 |
| Paul (Shuoyi) Yao | 2016-17 |
| Emily Durlacher | 2015-16 |
| Brian Cotten | 2015 |
| Robert Schulze | 2015 |
| Cory Dubois | 2012 |
| Anya Golkowski | 2012-13 |
| • UROP summer funding, July-August 2013 | |
| Jacob Gruber | 2012 |