

Robert H. Cudmore, Ph.D.

Solomon H. Snyder Department of Neuroscience
The Johns Hopkins University School of Medicine
725 North Wolfe Street, Hunterian 916
Baltimore, MD 21205

Email: cudmore@jhu.edu
Web: robertcudmore.org
GitHub: github.com/cudmore
Mobile: 443-695-2990

Professional Positions

- 2015-Present Research Associate
Solomon H. Snyder Department of Neuroscience
The Johns Hopkins University School of Medicine, Baltimore, MD
- 2009-2015 Postdoctoral Fellow
Solomon H. Snyder Department of Neuroscience
The Johns Hopkins University School of Medicine, Baltimore, MD
Advisor: Dr. David Linden
- 2005–2009 Postdoctoral Fellow
INSERM UMR/S 1072, L'Unité de Neurobiologie des canaux Ioniques et de la Synapse
Université Aix Marseille, Marseille FRANCE
Advisor: Dr. Dominique Debanne
- 1993–1998 Software Engineer
Roswell Park Cancer Institute, University at Buffalo, Buffalo, NY
Advisor: Dr. Kenneth Manly

Education

- 1998–2004 Brandeis University, Ph.D. Neuroscience
Advisor: Dr. Gina G Turrigiano
- 1996–1998 University of Pennsylvania, Graduate studies
School of Engineering, Department of Computer and Information Science
- 1988–1992 State University of New York at Buffalo
B.A. Computer Science, Joint degree Media Studies

Research Funding

- 2016-2020 American Heart Association, Scientist Development Grant (16SDG27130006).
- 2010-2012 Young Investigator Grant, NARSAD.
- 2010-2012 National Institute of Health, Loan Repayment Program Grant (NIH LRP).
- 2008-2009 Post-doctoral Research Fellowship, Fondation Singer-Polignac.
- 2006-2008 Post-doctoral Research Fellowship, Assoc. Française contre les Myopathies (AFM).
- 2005-2006 Post-doctoral Research Fellowship, IBRO/INSERM.

Publications

Cudmore RH (In Prep) Map Manager: Software to visualize, annotate, and analyze 3D image time-series.

Cudmore RH, Dougherty SE, Linden DJ (2017) Cerebral vascular structure in the motor cortex of adult mice is stable and is not altered by voluntary exercise. *Journal of Cerebral Blood Flow and Metabolism*. doi: 10.1177/0271678X16682508.

Jin Y, Dougherty SE, Wood K, Sun L, **Cudmore RH**, Abdallah A, Pletnikov M, Hashemi P, Linden DJ (2016) Regrowth of Serotonin Axons in the Adult Mouse Brain Following Injury. *Neuron*, 91(4):748-62.

Zhang Y*, **Cudmore RH***, Lin D, Linden DJ, Haganir RL (2015) Visualization of NMDA receptor-dependent AMPA receptor synaptic plasticity in vivo. *Nature Neuroscience*, 18(3):402-7.

* **Equal contribution, co-first authors**

Gastrein P, Campanac E, Gasselín C, **Cudmore RH**, Bialowas A, Carlier E, Fronzaroli-Molinieres L, Ankri N, Debanne D (2011) The role of hyperpolarization-activated cationic current in spike-time precision and intrinsic resonance in cortical neurons in vitro. *Journal of Physiology*, 589(15): 3753-3773.

Cudmore RH, Fronzaroli-Molinieres L, Giraud P, Debanne D (2010) Spike-time precision and network synchrony are controlled by the homeostatic regulation of the D-type potassium current. *Journal of Neuroscience*, 30(38):12885-95.

Debanne D, Boudkkazi S, Campanac E, **Cudmore RH**, Carlier E, Caillard O (2008) Paired-recordings from synaptically coupled hippocampal and cortical neurons in acute and cultured brain slices. *Nature Protocols*, 3(10):1559-68.

Cudmore RH, Turrigiano GG (2004) Long-term potentiation of intrinsic excitability in LV visual cortical neurons. *Journal of Neurophysiology*, 92:341-348.

Desai NS, **Cudmore RH**, Nelson SB, Turrigiano GG (2002) Critical periods for experience-dependent synaptic scaling in visual cortex. *Nature Neuroscience*, 5:783-789.

Manly KF, **Cudmore RH**, Meer JM (2001) Map Manager QTX, cross-platform software for genetic mapping. *Mammalian Genome*, 12:930-932.

Reviews

Prinz AA, **Cudmore RH** (2011) Dynamic Clamp. *Scholarpedia*, 6(5):1470.

Cudmore RH, Desai NS (2008) Intrinsic Plasticity. *Scholarpedia*, 3(2):1363.

Invited Seminars and Presentations

Cudmore RH (2017) In vivo structural plasticity of cerebral vasculature. University of New Mexico at Albuquerque, University of West Virginia, Virginia Tech, University of Maryland at Baltimore.

Cudmore RH, Cruz Diaz J, Linden DJ (2014) Exercise-induced neuronal and neurovascular micro-structural plasticity monitored using in vivo two-photon microscopy. *Imaging Synapse Structure and Function in the Vertebrate Brain*. Janelia Farm Research Campus, VA.

Cudmore RH (2013) Imaging AMPA receptor trafficking and regulation in vivo. Gordon Conference, Dendrites: Molecules, Structure & Function. Les Diablerets, Switzerland.

Cudmore RH, Linden DJ (2012) Time-lapse in vivo two photon imaging of adult cerebral vasculature. Blood Brain Barrier Meeting. Cold Spring Harbor Laboratories, NY.

Cudmore RH, Linden DJ (2011) Map Tracker: A software tool to track the structural dynamics of neurons. Multiphoton Imaging: The Next 6x10²³ Femtoseconds. Janelia Farm Research Campus, VA.

Selected Conference Abstracts

Brill J, **Cudmore RH**, Linden DJ (November 2017) Altered spine dynamics and dendritic damage in a mouse model of neuroprotective thermal torpor. Soc. Neurosci. Abstr., 136.18.

Cudmore RH, Dougherty SE, Linden DJ (2016) Long-term in vivo imaging of cerebral vascular structure and function in the adult mouse. Blood Brain Barrier Meeting. Cold Spring Harbor Laboratories, NY.

Zhang Y, **Cudmore RH**, Linden DJ, Hugarir RL (2012) Imaging AMPA receptor trafficking and regulation in vivo. Soc. Neurosci. Abstr., 523.10.

Cudmore RH, Giraud P, Debanne D (2008) Spike time precision and network synchrony are controlled by the homeostatic regulation of IA/ID. Soc. Neurosci. Abstr., 437.8.

Cudmore RH, Debanne D (2006) Spike timing precision in cultured hippocampal neurons: role of outward potassium currents. Federation of European Neurosciences Abstract (FENS), A153.152.

Cudmore RH, Turrigiano GG (2004) Long-term potentiation of intrinsic excitability in LV visual cortical neurons. Federation of European Neurosciences Abstract (FENS), A22.5.

Student Mentorship

- 2015 Clarissa Martin, Undergraduate, Department Neuroscience, JHU
Project Title: In vivo two-photon imaging to monitor the entry of pathogens into the brain.
- 2014 Christopher Micek, Undergraduate, Department of Biomedical Engineering, JHU
Project Title: Long-term in vivo cerebral vascular dynamics.
- 2013 Landy Sun, Undergraduate, Department of Biomedical Engineering, JHU
Project Title: Analytical tools to quantify the regeneration of cortical axons in vivo.
- 2012 Jahnavi Cruz Diaz, Undergraduate, Department of Biology, JHU
Project Title: How does exercise effect cortical spine dynamics?
- 2011 Chen Chen, Undergraduate, Department of Biomedical Engineering, JHU
Project Title: Algorithms to measure sub-micron spine properties from in vivo image intensity.

Service

Scientific review for PLoS ONE, Journal of Physiology, Journal of Cerebral Blood Flow and Metabolism, Computational and Systems Neuroscience (Cosyne).