Jill R. Crittenden

BUSINESS ADDRESS

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EDUCATION

1993-1998 **Baylor College of Medicine**, Houston, TX
Ph.D. Dept. of Cell Biology
Thesis with Prof. Ronald L. Davis: Neuroanatomical dissection of *Drosophila* mushroom bodies, and the identification of *D-mef2* as critical to their formation

1991-1993 **Cold Spring Harbor Laboratory,** Cold Spring Harbor, NY
Graduate research with Nobel prize-winning Prof. Carol W. Greider and with Prof. Ronald L. Davis

1988-1991 **Indiana University**, Bloomington, IN
B.S. Microbiology
Undergraduate research with Prof. Miriam E. Zolan

RESEARCH EXPERIENCE

2005-current **Massachusetts Institute of Technology**, Cambridge, MA
Research Scientist with Prof. David E. Housman and Institute Prof. Ann M. Graybiel
Development and characterization of mouse models of movement and psychiatric disorders.

2000-2005 **Massachusetts Institute of Technology**, Cambridge, MA
Postdoctoral Associate and Fellow with Profs. Ann M. Graybiel and David E. Housman

1998-2000 **Baylor College of Medicine**, Houston, TX
Postdoctoral Associate with Prof. Ronald L. Davis

TEACHING and COMMUNITY OUTREACH

2016	Guest Instructor for Neurobiology of Learning & Memory with Prof. Martha Paton, MIT
2014	Guest lecturer for North Cambridge Senior Center
2014	Guest lecturer for North Cambridge Senior Center
2012	Guest lecturer in MIT's Junction Education Studies Program for high school students
2011-present	Volunteer laboratory instructor for public elementary school (Cambridge, MA)
1991	Instructor for Introductory Biology Laboratory with Prof. Carl Moos, SUNY Stony Brook
1991	Assistantship for Introductory Genetics with Prof. J. Peter Gergen, SUNY Stony Brook

SUPERVISOR FOR MIT UNDERGRADUATE RESEARCHERS (IN CHRONOLOGICAL ORDER):

Urvashi Upadhyay, Sudeb Dalai, Farhan Merali, Catherine Smith, Lara Hershcovitch, Mariam Shaikh, Jin Suk Calvin Kim, Seema Verma, Tao Liu, George Zhengliang Li, Lulu Wang, Zachary Nash, Judy Deng, Soraya Shehata, Brianna Coston, Maximilian Tang, Katharine O'Neal, Jillian Katz, Sarah Osmulski, Berj Chillingirian, Maiko Kitaoka, Priscilla Yu, Molly McNamara, Anne Huang, Catherine Garrison, Jessica Blumenfeld, Cordelia Tuan, Jungjoo (Julia) Cha, Christine Li, Sarah Nathaniel, Jae Hyun Kim, Mercedes Ondik, Stephanie Hu, Leah Hobert.

EDITORIAL BOARD MEMBERSHIP

Review Editor for *Frontiers in Neuropharmacology*

AD HOC MANUSCRIPT REVIEWS

ACS Chemical Neuroscience
Acta Neuropathologica
Addiction Research
Brain Research
Expert Opinion on Investigational Drugs
Frontiers in Neuroanatomy
Frontiers in Neuroscience
Handbook of Basal Ganglia Structure and Function, 2nd edition
International Journal of Molecular Sciences
Neurobiology of Aging
Neurobiology of Disease
Neuropsychopharmacology
Neuroscience
Journal of Neurodevelopmental Disorders
Journal of Neuroscience

AWARDS, FELLOWSHIPS and GRANTS

2016	Travel Award for the Dopamine 2016 Conference
2014	XDP Center Grant, Co-PI
2014	Travel Award for the Basal Ganglia Gordon Research Conference
2013	Massachusetts Neuroscience Consortium Grant, Co-PI
2010	Travel Award for the 10th International Basal Ganglia Society Meeting (IBAGSX)
2009	Osaka University Global Center of Excellence Travel Award
2008-2010	Michael J Fox Foundation for Parkinson's Research, Target Validation Grant, Co-PI
2006	Outstanding MIT Undergraduate Research Mentorship Award
2005-2010	Simons Grant for Autism Research, Key Personnel
2002-2005	Postdoctoral NIMH F32 Research Fellowship
1993-1996	Predoctoral NIMH F31 Research Fellowship
1991-1992	Predoctoral NIH T32 Research Fellowship SUNY Stony Brook
1990-1991	Undergraduate Howard Hughes Medical Initiative Award
1990	Undergraduate Honors Research Award (Indiana University)

INVITED TALKS

Differential cholinergic control of striosomal and matrix projection neurons in mice with amphetamine-induced repetitive behavior. *Dopamine 2016*, Vienna, Austria, September 8, 2016.

Basic Research Applied to Parkinson's disease. *Cambridge Senior Center WOW Program,* Cambridge, MA, December 3, 2014.

Huntington's disease and signaling in the basal ganglia. *Huntington's Disease Society of America MA Education Day*, Boston, MA, November 1, 2014.

Huntington's disease and functions of the basal ganglia. *MIT BrainTrust Outreach Program*. Cambridge, MA, March 19, 2014.

Cholinergic interneurons modulate striatal neuron activation and behavior through M1 acetylcholine receptor and CalDAG-GEFI signaling. *Gordon Research Conference,* Ventura, CA, February 6, 2014.

CalDAG-GEFI resets neuronal activity in the striatum and controls repetitive behaviors. Plenary lecture at *NeuroStemc Symposium*, Cajal Institute, Madrid, Spain, June 28, 2013.

CalDAG-GEFI is required for cholinergic modulation of neuronal activity and repetitive behavior. *Simons Center for the Social Brain at MIT*, Cambridge, MA, January 18, 2013.

Control of mouse motor behaviors with regulators of Ras/Rap signaling. *Neuroscience Departmental Seminar at Brown University*, Providence, RI, March 19, 2012.

Evaluation of CalDAG-GEFI and CalDAG-GEFII as targets for the treatment of L-DOPA induced dyskinesias. *1st Annual MIND Symposium*: Molecular Mechanisms of Neurodegeneration, Boston, MA, Nov. 9, 2011.

Captive animals' stereotypic behaviours: Signs of brain dysfunction, poor welfare, or both? *Biotechnology & Biological Sciences Research Council International Workshop*, Lanzarote, Spain, Sept. 14, 2010.

Striatal dysregulation of CalDAG-GEFI and CalDAG-GEFII in movement disorders. *Massachusetts General Hospital Movement Disorders Seminar Series,* Boston, MA, Nov. 12, 2009.

CalDAG-GEFI modulates motor behaviors and neuropathology in models of movement disorders. *Osaka University Special Seminar*, Osaka, Japan, Sept. 4, 2009.

CalDAG-GEFI modulates behavioral sensitization to psychomotor stimulants and is required for cortico-striatal long-term potentiation. *University of Connecticut Behavioral Neuroscience Seminar Series*, Storrs, CT, April 3, 2008.

Toward a molecular basis of repetitive behaviors. *Tufts University Neuroscience Seminar Series*, Boston, MA, March 5, 2008.

The striatum-enriched molecule, CalDAG-GEFI, modulates behavioral responses to amphetamine and cocaine. *Stanley Center Seminar Series at the Broad Institute*, Cambridge, MA, Oct. 24, 2007.

The striatal signaling molecules CalDAG-GEFI and CalDAG-GEFII modulate repetitive and locomotor behaviors induced by psychostimulants. *NIMH Workshop on Translational Approaches to Studying Repetitive Behavior and Resistance to Change in Autism,* Washington, D.C., Sept. 7, 2007.

PATENT APPLICATION

Crittenden, J.R., Housman, D.E. and Graybiel. A.M. The use of protein inhibitors as antithrombotic agents. Filed June 2, 2003.

PUBLICATIONS

Crittenden, J. R. and Graybiel, A. M. Disease-associated changes in the striosome and matrix compartments of the dorsal striatum. Chapter for ***Handbook of Basal Ganglia Structure and Function*, 2e,** edited by H. Steiner and K-Y Tseng (2016).

Crittenden, J. R., Tillberg, P. W., Riad, M. H., Shima, Y., Gerfen, C. R., Curry, J., Housman, D. E., Nelson, S. B., Boyden, E. S., and Graybiel, A. M. Striosome-dendron bouquets: a unique striatonigral circuit targeting dopamine-containing neurons. ***Proc Natl Acad Sci USA*** (2016).

Crittenden, J. R., Lacey, C. J., Lee, T., Bowden, H. A., and Graybiel, A. M. Severe drug-induced repetitive behaviors and striatal overexpression of VAChT in ChAT-ChR2-EYFP BAC transgenic mice. ***Frontiers in Neural Circuits*** 8:57 (2014).

Crittenden, J. R. Designing Phase I/IIA Clinical Trials for Huntington's Disease, Hereditary Disease Foundation Workshop Report. ***http://www.hdfoundation.org/workshops/workshoppast.php*** (2011).

Crittenden, J. R. and Graybiel, A. M. Basal ganglia disorders associated with imbalances in the striatal striosome and matrix compartments. ***Frontiers in Neuroanatomy*** 5:59 (2011).

Cantuti-Castelvetri, I., Hernandez, L. F., Keller-McGandy, C. E., Kett, L. R., Landy, A., Hollingsworth, Z. R., Saka, E., **Crittenden, J. R.,** Nillni, E. A., Young, A. B., Standaert, D. G., and Graybiel, A. M. Levodopa-induced dyskinesia is associated with increased thyrotropin releasing hormone in the dorsal striatum of hemi-parkinsonian rats. ***PLoS One*** 5(11), e13861 (2010).

Crittenden J. R., Dunn D. E., Merali F. I., Woodman B., Yim M., Borkowska A. E., Frosch M. P., Bates G. P., Housman D. E., Lo D. C., and Graybiel A. M. CalDAG-GEFI down-regulation in the striatum as a neuroprotective change in Huntington's disease. ***Hum Mol Genet*** 19(9), 1756-65 (2010).

Crittenden, J. R., Cantuti-Castelvetri, I., Saka, E., Keller-McGandy, C., Fernandez-Hernandez, L., Kett, L. R., Young, A. B., Standaert, D. G., and Graybiel, A. M. Dysregulation CalDAG-GEFI and CalDAG-GEFII predicts the severity of motor side-effects induced by anti-Parkinsonian therapy. ***Proc Natl Acad Sci USA*** 106, 2892-6 (2009).

Bergmeier W., Goerge T., Wang H. W., **Crittenden J. R.,** Baldwin A. C., Cifuni S. M., Housman D. E., Graybiel A. M., and Wagner D. D. Mice lacking the signaling molecule CalDAG-GEFI represent a model for leukocyte adhesion deficiency type III. ***J Clin Invest*** 117, 1699-707 (2007).

Crittenden, J. R., Heidersbach, A. and McManus, M. T. Lentiviral strategies for RNAi knockdown of neuronal genes. ***Current Protocols in Neuroscience*** (2007).

Bernadi, B., Guidetti, G. F., Campus, F. **Crittenden, J. R.,** Graybiel, A. M., Balduini, C. and Torti. M. The small GTPase Rap1b regulates the cross-talk between platelet integrin a_2b_1 and integrin $a_{IIb}b_3$. ***Blood*** 107, 2728-2735 (2006).

Crittenden, J. R., Bergmeier*, W., Zhang, Y., Piffath, C. L., Liang, Y., Wagner, D. D., Housman, D. E. and Graybiel, A. M. CalDAG-GEFI integrates signaling for platelet aggregation and thrombus formation. ***Nature Medicine*** 10, 982-986 (2004).

Crittenden, J. R. RNA Modalities of Huntington's Disease Therapy, Hereditary Disease Foundation Workshop Report ***http://www.hdfoundation.org/workshops/workshoppast.php*** (2002).

Crittenden, J. R., Skoulakis, E. M. C., Han, K. A., Kalderon, D. and Davis, R. L. Tripartite mushroom body architecture revealed by antigenic markers. ***Learning and Memory*** 5, 38-51 (1998).

Harrington, L. A., Hull, C. M., **Crittenden, J. R.** and Greider, C. W. Gel shift and UV cross-linking analysis of *Tetrahymena* telomerase. ***J Biol Chem*** 270, 8893-8901 (1995).

Zolan, M. E., **Crittenden, J. R.,** Heyler, N. K. and Seitz, L. C. Efficient isolation and mapping of *rad* genes of the fungus *Coprinus cinereus* using chromosome-specific libraries. ***Nucleic Acids Research*** 20, 3993-3999 (1992).

SCIENTIFIC CONFERENCE POSTER PRESENTATIONS

Crittenden, J. R., Lee, J., Riad, M., Garrison, C., Venu, S., and Graybiel, A. M. Advancements for the study of striosome and matrix compartments in Huntington's Disease. **Cure Huntington's Disease Initiative,** Palm Springs, CA (2016).

Crittenden, J. R., Yildirim, F., Bowden, H.A., Gipson, T. A., Ng, C. W., Fraenkel, E., Housman, D. E. and Graybiel, A. M. CalDAG-GEFI and CalDAG-GEFII are down-regulated in the R6/2 Huntington's disease mouse model and show reduced H3K4 trimethylation in a pattern typical of dysregulated neuronal genes. **Society for Neuroscience Annual Meeting,** Washington, D.C. (2014).

Yildirim, F.*, **Crittenden, J. R.*,** Bowden, H.A., Graybiel, A. M., Fraenkel, E., and Housman, D. E. Comparative genome-wide transcription analysis in mouse models of Huntington's disease and drug abuse. **The Hereditary Disease Foundation Milton Wexler Celebration Meeting,** Cambridge, MA (2014).

Crittenden, J. R., Lacey, C. J., Thomsen, M., Weng, F. J., Caine, S. B., Line, Y., Feng, G. and Graybiel, A. M. Cholinergic interneurons modulate striatal neuron activation and behavior through M1 acetylcholine receptor and CalDAG-GEFI signaling. **Basal Ganglia Gordon Research Conference,** Ventura, CA (2014).

Crittenden, J. R., Lacey, C. J., Feng, G. and Graybiel, A. M. Cholinergic interneurons in ChATChR2 BAC mice differentially affect spiking in direct and indirect striatal pathways through M1 acetylcholine receptor and CalDAG-GEFI signaling. **Society for Neuroscience Annual Meeting,** San Diego, CA (2013).

Crittenden, J. R., Sauvage, M., Burguiere, E., Yim, M. J., Costa,C., Martella, G., Ghiglieri, V., Zhang, H., Pescatore, K. A., Liu, T., Unterwald, E. M., Picconi, B., Sulzer, D., Calabresi P. and Graybiel, A. M. CalDAG-GEFI is required for normal striatum-based egocentric maze learning in mice and the balance between cholinergic and dopaminergic signaling in the striatum. **Society for Neuroscience Annual Meeting,** San Diego, CA (2010).

Crittenden J. R., Dunn D. E., Merali F. I., Woodman B., Yim M., Borkowska A. E., Frosch M. P., Bates G. P., Housman D. E., Lo D. C., and Graybiel A. M. CalDAG-GEFI down-regulation in the striatum as a neuroprotective change in Huntington's disease. **The Hereditary Disease Foundation Milton Wexler Celebration Meeting**, Cambridge, MA (2010).

Crittenden J. R., Yim, M. J., Fischer, K. B. and Graybiel, A. M. Sensitization and tolerance to amphetamine-induced behaviors in mice are differentially maintained during withdrawal. **International Basal Ganglia Society X meeting**, Long Branch, NJ (2010).

Crittenden, J. R., Dunn, D., Borkowska, A., Woodman, B., Merali, F. I., Frosch, M., Housman, D. E., Bates, G. P., Lo, D. C. and Graybiel, A. M. Down-regulation of CalDAG-GEFI is neuroprotective in a Huntington disease model. **Society for Neuroscience Annual Meeting**, Chicago, IL (2009).

Crittenden, J. R., Fernandez-Hernandez, L., Yim, M. J., Keller-McGandy, C., Cantuti-Castelvetri, I., Standaert, D. G., and Graybiel, A. M. Evaluation of the striatum-enriched genes, CalDAG-GEFI and CalDAG-GEFII, for the treatment and prevention of L-DOPA-induced dyskinesias. **Michael J. Fox Foundation Parkinson's Disease Therapeutic Conference**, New York, NY (2009).

Crittenden, J. R., Dunn, D., Merali, F. I., Woodman, B., Bates, G. P., Housman, D. E., Lo, D. C. and Graybiel, A. M. Down-regulation of the striatum-enriched signaling molecule, CalDAG-GEFI/RasGRP2, is protective in a model of mutant Htt-induced neurodegeneration. **The Hereditary Disease Foundation Milton Wexler Celebration Meeting**, Cambridge, MA (2008).

Crittenden, J. R., Sauvage, M., Cepeda, C., Andre, V., Costa, C., Martella, G., Liu, T., Verma, S., Levine, M., Calabresi, P., Housman D.E., and Graybiel, A. M. CalDAG-GEFI modulates behavioral sensitization to psychomotor stimulants and is required for cortico-striatal long-term potentiation. **The American College of Neuropsychopharmacology Annual Meeting**, Boca Raton, FL (2007).

Crittenden, J. R., Cantuti-Castelvetri, I., Saka, E., Fernandez-Hernandez, L., Keller-McGandy, C., Harlan, P., Kett, L. R., Housman, D. E., Standaert, D. G., Young, A. B., and Graybiel, A. M. The striatal signaling molecule, CalDAG-GEFII, is up-regulated in the dopamine-depleted striatum of hemi-parkinsonian rats. **Society for Neuroscience Annual Meeting**, San Diego, CA (2007).

Crittenden, J. R., Picconi, B., Ghiglieri, V., Calabresi, P., Harlan, P., Housman D. E., and Graybiel A. M. CalDAG-GEFI is required for sensitization to amphetamine-induced stereotypy and cortico-striatal LTP, but not for locomotor sensitization and LTD. **Society for Neuroscience Annual Meeting**, Washington, D.C. (2006).

Crittenden, J. R., Sauvage, M., Picconi, B., Costa, C., Martella, M., Andre, V., Cepeda, C., Levine, M., Calabresi, P. Housman D. E., and Graybiel, A. M. The striatum-enriched signaling molecule, CalDAG-GEFI, is essential for cortico-striatal LTP and sensitization of drug-induced stereotypies. **Cellular and Molecular Treatments of Neurological Diseases Meeting**, Cambridge, MA (2006).

Crittenden, J. R., Sauvage, M., Picconi, B., Costa, C., Martella, M., Andre, V., Cepeda, C., Levine, M., Calabresi, P. Housman D. E., and Graybiel, A. M. The striatum-enriched signaling molecule, CalDAG-GEFI, is essential for cortico-striatal LTP and sensitization of drug-induced stereotypies. **The Hereditary Disease Foundation HD $(CAG)_n$ Meeting**, Cambridge, MA (2006).

Crittenden, J. R., C. Costa, G., Martella, G., Calabresi, P., Harlan, P., Sauvage, M., Housman D. E., and Graybiel, A. M. CalDAG-GEFI is critical for striatal plasticity. **Society for Neuroscience Annual Meeting**, Washington, D.C. (2005).

Crittenden, J. R., Bergmeier, W., Zhang, Y., Liang, Y., Wagner, D. D., Housman, D. E. and Graybiel, A. M. Calcium and diacylglycerol signal through CalDAG-GEFI to control platelet aggregation. **Gordon Research Conference**, Newport, RI (2004).

Crittenden, J. R. and Davis, R.L. The role of *D-mef2* in developing mushroom bodies. **40th Annual Drosophila Research Conference**, Bellevue, WA (1999).