

Daniel J. Christoffel, PhD

Stanford University
Psychiatry & Behavioral Sciences

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Education

Stanford University – Postdoctoral NRSA Fellow, Psychiatry Department 2013 – present
Mount Sinai School of Medicine - Ph.D., Neuroscience 2008 – 2013
New York University - B.A., Psychology 2000 – 2004

Research Experience

Postdoctoral training. Advisor: Dr. Robert C. Malenka, 2013 – present
Stanford University, Palo Alto, CA

- Delineating neural and behavioral adaptations induced by high-fat intake; focus on excitatory transmission in the nucleus accumbens

Pre-Doctoral training. Advisor: Dr. Scott J. Russo (degree granted 1/31/2014) 2008 – 2013
Mount Sinai School of Medicine, New York, NY

- Established the functional role of IκK on structural plasticity within microcircuitry associated with depression.
- Identified glutamatergic afferents with distinct effects on social avoidance behavior and nucleus accumbens function

Research Coordinator. Advisors: Drs. John Morrison & Patrick Hof 2005 – 2008
Mount Sinai School of Medicine, New York, NY

- Investigated the effects of estrogen replacement therapy on synaptic plasticity in macaque
- Mapped neuronal subtypes in mouse brain based upon filament type
- Dissection of sperm whale brain for histological analysis

Grants and Awards

Ruth L. Kirschstein National Research Award (NIMH) 2015–2017
T32 Training Fellow (NIDA & NIH) 2014–2015
Travel Award for 2012 FENS Forum (SFN) 2012
International Meeting Travel Award from (MSSM) 2012
Lindau Nobel Laureate Meeting Nominee (MSSM) 2011
Travel Award to SFN (MSSM) 2009-2012

Publications (first-author listed at top)

<https://www.ncbi.nlm.nih.gov/sites/myncbi/1Lkiw3JDfE/bibliography/40060870/public/?sort=date&direction=descending>

Christoffel DJ, Golden SA, Walsh JJ, Guise KG, Heshmati M, Friedman AK, Dey A, Smith M, Rebusi N, Pfau M, Ables JA, Aleyasin H, Khibnik LA, Hodes GE, Ben-Dor GA, Deisseroth K, Shapiro ML, Malenka RC, Ibanez-Tallon I, Han M-H, Russo SJ. Excitatory transmission at thalamo-striatal synapses mediates susceptibility to social stress. **Nature Neuroscience**. 2015 July; 18: 962-964

Christoffel DJ, Golden SA, Heshmati M, Graham A, Birnbaum S, Neve RL, Hodes GE, Russo SJ. Effects of Inhibitor of κB Kinase Activity in the Nucleus Accumbens on Emotional Behavior. **Neuropsychopharmacology** 2012 Nov; 37: 2615-23

Christoffel, DJ, Golden SA, Dumitriu D, Robison AJ, Janssen WG, Ahn HF, Krishnan V, Reyes CM, Han M, Ables JL, Eisch AJ, Dietz DM, Ferguson D, Neve RL, Greengard P, Kim Y, Morrison JH, Russo SJ. IκappaB kinase regulates social defeat stress induced synaptic and behavioral plasticity. **Journal of Neuroscience**. 2011 Jan; *31*: 314-21 TWIJ cover article & “Must Read” in F1000

Ibi D, de la Fuente Revenga M, Kezunovic N, Muguruza C, Saunders J, Gaitonde S, Moreno J, Ijaz M, Santosh V, Kozlenkov A, Holloway T, Seto J, Garcia-Bea A, Kurita M, Mosley G, Jiang Y, **Christoffel D**, Callado L, Russo S, Dracheva S, Lopez-Gimenez J, Ge Y, Escalante C, Meana J, Akbarian S, Huntley G, Gonzalez-Maseo J. A critical role for NF-κB in the HDAC2-dependent unfavorable effects of chronic antipsychotic treatment on synaptic remodeling and cognition. **Nat. Neuro**. 2017; *20*: 1247-1259

Giannarelli C, Rodriguez DT, Zafar MU, **Christoffel D**, Vialou V, Peña C, Badimon A, Hodes GF, Mury P, Rabkin J, Alique M, Villa G, Argmann C, Nestler EJ, Russo SJ, Badimon JJ. Susceptibility to chronic social stress increases plaque progression, vulnerability and platelet activation. **Thromb. Haemost.** 2017 Jan; *4*: 816-818

Golden SA, Hesmati M, Flanigan M, **Christoffel DJ**, Guise K, Pfau ML, Aleyasin H, Menard C, Zhang H, Hodes GE, Bregman D, Khibnik L, Tai J, Rebusi N, Krawitz, Chaudhury D, Walsh JJ, Han M-H, Shapiro ML, Russo SJ. Basal forebrain projections to the lateral habenula modulate aggression reward. **Nature** 2016 June; *534*: 688-92

Hodes GE, Pfau ML, Purushothaman I, Ahn HF, Golden SA, **Christoffel DJ**, Magida J, Brancato A, Takahashi A, Flanigan ME, Ménard C, Aleyasin H, Koo JW, Lorsch ZS, Feng J, Heshmati M, Wang M, Turecki G, Neve R, Zhang B, Shen L, Nestler EJ, Russo SJ. Sex Differences in Nucleus Accumbens Transcriptome Profiles Associated with Susceptibility versus Resilience to Subchronic Variable Stress. **Journal of Neuroscience** 2015 Dec; *35*: 16362-76.

Birey F, Kloc M, Chavali M, Hussein I, Wilson M, **Christoffel DJ**, Chen T, Frohman MA, Robinson JK, Russo SJ, Maffei A, & Aguirre A. Genetic and Stress-Induced Loss of NG2 Glia Triggers Emergence of Depressive-like Behaviors through Reduced Secretion of FGF2. **Neuron** 2015 Nov; *88*: 1-16.

Heshmati M, Golden SA, Pfau ML, **Christoffel DJ**, Seeley EL, Cahill ME, Khibnik LA, Russo SJ. Mefloquine in the nucleus accumbens promotes social avoidance and anxiety-like behavior in mice. **Neuropharmacology** 2016 Feb; *101*: 351–357.

Hodes GE, Pfau ML, Leboeuf M, Golden SA, **Christoffel DJ**, Bregman D, Rebusi N, Heshmati M, Aleyasin H, Warren BL, Lebonché B, Horn S, Lapidus KA, Stelzhammer K, Wong EH, Bahn S, Krishnan V, Bolaños-Guzman CA, Murrough JW, Merad M, Russo SJ. Individual differences in the peripheral immune system promote resilience versus susceptibility to social stress. **PNAS**. 2014 Oct; *111*: 16136-41

Walsh JJ, Friedman AK, Sun H, Heller EA, Ku SM, Juarez B, Burnham VL, Mazei-Robison MS, Ferguson D, Golden SA, Koo JW, Chaudhury D, **Christoffel DJ**, Pomeranz L, Friedman JM, Russo SJ, Nestler EJ, Han MH. Stress and CRF gate neural activation of BDNF in the mesolimbic reward pathway. **Nature Neuroscience**. 2014 Jan; *17*: 27-9

Golden SA, **Christoffel DJ**, Heshmati M, Hodes GE, Magida J, Davis K, Cahill ME, Dias C, Ribeiro E, Ables JL, Kennedy PJ, Robison AJ, Gonzalez-Maeso J, Neve RL, Turecki G, Ghose S, Tamminga CA, Russo SJ. Epigenetic regulation of RAC1 induces synaptic remodeling in stress disorders and depression. **Nature Medicine** 2013 Mar; *19*: 337-44

Chaudhury D*, Walsh JJ*, Friedman AK, Juarez B, Koo J, Ferguson D, Tsai HC, Pomeranz L, Ku S, **Christoffel DJ**, Mouzon E, Lobo MK, Neve RL, Friedman JM, Russo SJ, Deisseroth K, Nestler EJ, Han MH. Phasic firing of ventral tegmental area dopamine neurons promotes rapid induction of depression behaviors. **Nature** 2013 Jan; *493*: 532-6

Reviews

Steinberg, EE, **Christoffel, DJ**, Deisseroth, K & Malenka, R. Illuminating circuitry relevant to psychiatric disorders with optogenetics. **Current opinion in neurobiology** 2014 *30*: 9–16

Christoffel DJ, Golden SA, Russo SJ. Structural and Synaptic Plasticity in Stress-Related Disorders. **Reviews in the Neurosciences** 2011 *5*: 535-49

Publications in preparation

Heshmati M, Aleyasin H, Menard C, Flanigan ME, Pfau ML, Goff PH, Hodes GE, **Christoffel DJ**, Lepack AE, Bicks L, Takahashi A, Chandra R, Turecki G, Lobo MK, Maze I, Golden SA, Russo SJ. Cell-type specific role for nucleus accumbens neuroligin-2 in depression and stress susceptibility (in revision at PNAS)

Walsh JJ, **Christoffel DJ**, Ben-Dor GA, Selimbeyoglu A, Taylor M, Hung LW, Deisseroth K, Malenka RC. 5-HT release in nucleus accumbens rescues social deficits in 16p11.2 mice (in revision at Nature)

Wu H, Miller KJ, Blumenfeld Z, Williams NR, Ravikumar VK, Lee KE, Kakusa B, Sacchet MD, Wintermark M, **Christoffel DJ**, Rutt BK, Bronte-Stewart H, Knutson B, Malenka RC, and Halpern CH. Closing the Loop on Impulsivity via Nucleus Accumbens Delta Oscillations in Mice and Man, (in revision at PNAS)

Christoffel DJ, Walsh JJ, Hoerbelt P, Sun G, Ravikumar VK, Halpern CH, Malenka RC. Divergent effects of glutamatergic afferents in the nucleus accumbens on palatable food consumption (in preparation)

Giardino WJ, Evban-Rothschild A, Li S-H, **Christoffel DJ**, Malenka RC, de Lecea L. Parallel extended amygdala -> lateral hypothalamic circuits for opposing emotional states. (in preparation)

Invited Talks

“The progression to pathological reward processing: function of the nucleus accumbens in natural reward approach” NYU Neuroscience Seminar, April 2017

Conference Presentations

Christoffel DJ, Walsh JJ, Golden SA, Heshmati M, Friedman AK, Hodes GE, Pfau ML, Ables JL, Deisseroth K, Ibanez-Tallon I, Han M-H, Russo SJ. Modulation of thalamic inputs to the nucleus accumbens regulates stress-induced adaptations. Annual Meeting of the Society for Neuroscience 2013

Christoffel DJ, Golden SA, Davis K, Walsh JJ, Heshmati M, Hodes GE, Ables JL, Deisseroth K, Ibanez-Tallon I, Han M-H, Russo SJ. Glutamatergic microcircuits regulate stress-induced alterations in social behavior. Annual Meeting of the Society for Neuroscience 2012

Christoffel DJ, Golden SA, Walsh JJ, Hodes GE, Heshmati M, Deisseroth K, Russo SJ. Neural Mechanisms of Hypofrontality in Depression. Annual Forum of Neuroscience 2012

Christoffel DJ, Golden SA, Hodes GE, Ahn F, Birnbaum S, Russo SJ. Inhibitor of kappaB kinase regulates mood and anxiety-related behavior. Annual Meeting of the Society for Neuroscience 2011

Christoffel DJ, Golden SA, Dimitriu D, Ahn HF, Reyes C, Ferguson D, Dietz D, Janssen WG, Morrison JH, Russo SJ. Essential role for NFkB in stress-induced synaptic plasticity and behavior. Annual Meeting of the Society for Neuroscience 2010

Christoffel DJ, Hao J, Rapp PR, Janssen WGM, Lasley BL, Hof PR, Morrison JH. Effects of aging and estrogen on the microvasculature of hippocampal ca1 and the prefrontal cortex in rhesus monkey. Annual Meeting of the Society for Neuroscience 2007.

Research Support

Ruth L. Kirschstein National Research Service Awards for Individual Postdoctoral Fellow

National Institute of Mental Health

F32 MH106206 Christoffel (PI) 07/01/15-12/31/16 \$80,544

Function of thalamic excitatory synapses in social reward processing

Investigated how stress impacts social reward processing interaction using social and non-social stressors. By using these two distinct stressors, in conjunction with electrophysiology and expression of exogenous proteins to modulate cell activity, we will be able to dissect out which adaptations are specific to impaired social behavior as opposed to more general stress effects.

Anesthesia Training Grant in Biomedical Research

National Institute of Health

5T32GM089626-05 Rona Gifford (Director) 7/1/14- 6/30/15

This training fellowship was awarded to me to begin my studies of electrophysiology with a focus on a synaptic plasticity mechanisms.

Interdisciplinary Research Training in Pain and Substance Use Disorders Fellow

National Institute of Drug Abuse, Baltimore, Maryland T32DA035165.

T32DA035165 Sean Mackey (Director) 10/1/13-6/30/14

This training fellowship was awarded to allow me to begin my studies on reward processing. It has funded my training in the conditioned place preference behavioral assay.

Skills

ex vivo slice physiology, stereotaxic surgery, optogenetics, viral mediated gene transfer, microscopy (electron, brightfield, confocal), 3D analysis of dendritic spine morphology, immunohistochemistry, behavioral testing, microdissection, qPCR, genotyping, subcellular fractionation, western blotting, cell culture, ionophoretic injection of neurons.

Teaching Experience

Grant Writing Academy Coach, Stanford University Fall, 2013

- Taught graduate students and postdocs the skills necessary to develop a write a successful NIH grant; training based on rhetoric method of writing

Graduate teaching assistant, Mount Sinai School of Medicine 2009

- Mol. & Cell. Neurobiology - Assisted in teaching daily classes, creating exams and held monthly review sessions

Research coordinator, Mount Sinai School of Medicine 2005 – 2008

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- Trained Ph.D. and summer students in theoretical and technical aspects of neurobiology & microscopy

Professional Memberships

Society for Neuroscience	2008 – present
Molecular and Cellular Cognition Society	2006 – present
New York Academy of Sciences	2008 – 2013

Ad hoc referee

Psychiatry Journal, Nature Communications	2017
Neuropharmacology, Scientific Reports, Frontiers in Behavioral Neuroscience	2016
Biological Psychiatry	2015
Plos One	2014