

Daniel J. Christoffel, PhD

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Education

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

Research Experience

Stanford University, Postdoctoral Fellow, Advisor: Dr. Robert C. Malenka	2013 – present
<ul style="list-style-type: none">• Awarded 4 NIH grants to investigate neural circuit regulation of feeding, reward & stress behaviors• Published 1st author <i>Nat. Neuro.</i> paper delineating circuit mechanisms regulating depressive behavior• Current focus - neural circuit regulation of hedonic feeding and overeating	
Icahn School of Medicine at Mount Sinai, Pre-Doctoral Fellow, Advisor: Dr. Russo	2008 – 2013
<ul style="list-style-type: none">• Published two 1st author papers delineating a molecular mechanism regulating depressive behavior	
Research Coordinator, Advisors: Drs. John Morrison & Patrick Hof	2005 – 2008
<ul style="list-style-type: none">• Investigated the effects of estrogen replacement therapy on synaptic plasticity in aged monkey	

Honors and Awards

Pathway to Independence Award K99/R00 (NIDDK)	2018- 2023
F32 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 (ISMMS)	2012
Lindau Nobel Laureate Meeting Nominee (ISMMS)	2011
Travel Award to SFN (ISMMS)	2009-2012

Leadership and Teaching Experience

Postdoctoral Fellow	2013 – present
<ul style="list-style-type: none">• Mentored 5 student volunteers in experimental design, optogenetic techniques, and behavioral assays. 3 currently in medical school, 1 in graduate school, and 1 in industry• Mentored 2 postdocs and 1 graduate student in electrophysiology and optogenetics• Stanford. Preparing for Faculty Careers (2018)• Stanford Ignite, Certificate Program in Innovation and Entrepreneurship (2018)• Novartis, Drug Discovery and Development Project Simulation (2016)	
Grant Writing Academy Coach, Stanford University	Fall, 2013
<ul style="list-style-type: none">• Employed rhetoric method to teach skills necessary to write a successful NIH grant	
Pre-doctoral Fellow	2008 – 2013
<ul style="list-style-type: none">• Mentored students, and postdocs in experimental design, behavioral assays and microscopy	
Graduate teaching assistant, Mount Sinai School of Medicine	2009
<ul style="list-style-type: none">• Mol. & Cell. Neurobiology - Assisted in lectures, creating exams and review sessions	
Research coordinator, Mount Sinai School of Medicine	2005 – 2008
<ul style="list-style-type: none">• Trained students in theoretical and technical aspects of neurobiology & microscopy	

Publications and Citation Information (Google Scholar, July 17th 2019)

Papers: 4 first author, 21 primary, 2 reviews,

Total papers: 23, Total citations: 2,399, from 1st author publications: 502, h-index: 19; i10-index: 21

Publications per journal (1st author in bold, 2nd author italicized): **Nature Neuroscience** (5), *Nature* (3), PNAS (3), **Journal of Neuroscience** (3), **Neuropharmacology** (2), *Nature Medicine* (1), *Neuron* (1), *Current Opinions in Neurobiology* (1), **Reviews in the Neurosciences** (1), *Neurobiology of Aging* (1), *Thrombosis and Haemostasis* (1), *Journal of Neuroscience Methods* (1)

All manuscripts here: <https://www.ncbi.nlm.nih.gov/pubmed/?term=christoffel+D>

Original research reports

1. Walsh JJ, **Christoffel DJ**, Heifets B, Ben-Dor GA, Selimbeyoglu A, Hung LW, Deisseroth K, Malenka RC. 5-HT release in nucleus accumbens rescues social deficits in an autism mouse model *Nature* 2018 Aug: 560 589-594.
 - a. Citations - 14
 - b. Performed all electrophysiological experiments, assisted in fiber photometry experiments and data analysis, and writing manuscript

2. Giardino WJ, Evban-Rothschild A, **Christoffel DJ**, Li S-H, Malenka RC, de Lecea L. Parallel bed nuclei of stria terminalis → lateral hypothalamic circuits for opposing emotional states. *Nature Neuroscience* 2018 July: 21 1084-1095.
 - a. Citations - 21
 - b. Performed and analyzed all electrophysiological experiments, and edited manuscript

3. Heshmati M, Aleyasin H, Menard C, **Christoffel DJ**, Flanigan ME, Pfau ML, Goff PH, Hodes GE, 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 *PNAS* 2018 Jan: 115 1111-1116.
 - a. Citations - 11
 - b. Collected and analyzed all electrophysiological data and assisted in interpretation of results

4. 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, Halpern CH. Closing the loop on impulsivity via nucleus accumbens delta-band activity in mice and man. *PNAS* 2018 Jan: 115 192-197
 - a. Citations - 19
 - b. Assisted in design of experiments, analysis & interpretation of results, and writing manuscript

5. 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. Antipsychotic-induced Hdac2 transcription via NF-κB leads to synaptic and cognitive side effects. *Nature Neuroscience* 2017 Sept 20 1247-1259
 - a. Citations - 20
 - b. Provided viral constructs for NF-κB activity manipulation and helped design & analyze synapse structure studies

6. 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.
 - a. Citations - 5
 - b. Performed stress behavioral assays
7. 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
 - a. Citations - 72
 - b. Assisted in execution and analysis of behavioral data, collection and processing of brain tissue
 - c. Scientific American: G. Stix, June 2016; F1000prime: K. Miczek, August 2016; Wall Street Journal: R. Sapolsky, February 2017
8. 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. *J Neurosci* 2015 Dec; 35:16362-76.
 - a. Citations - 115
 - b. Assisted in execution and analysis of behavioral data
9. 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
 - a. Citations - 55
 - b. Performed stress behavioral studies and provided tissue
10. 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.
 - a. Citations - 3
 - b. Assisted in surgeries, behavioral assays and data interpretation
11. **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
 - a. Citations - 51
 - b. Designed all experiments, performed most behavioral & electrophysiology experiments, wrote manuscript
12. Hodes GE, Pfau ML, Leboeuf M, Golden SA, **Christoffel DJ**, Bregman D, Rebusi N, Heshmati M, Aleyasin H, Warren BL, Lebonté 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

- a. Citations - 288
- b. Assisted in surgeries, behavioral assays and data interpretation

13. 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

- a. Citations - 128
- b. Assisted in surgeries, behavioral assays, and data interpretation, validated retrovirus function

14. Wang X, Cahill ME, Werner CT, **Christoffel DJ**, Golden SA, Xie Z, Loweth JA, Marinelli M, Russo SJ, Penzes P, Wolf ME. Kalirin-7 Mediates Cocaine-Induced AMPA Receptor and Spine Plasticity, Enabling Incentive Sensitization. *J.Neuro.* 2013 July;33(27):11012–11022 PMID:PMC3718375

- a. Citations - 32
- b. Designed & assisted in performing and analyzing dendritic spine morphological studies

15. 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

- a. Citations - 189
- b. Assisted in surgeries, behavioral assays, data interpretation, and manuscript editing
- c. News/Views: R. S. Duman. *Nat. Med.* 19, 267–268 (2013); Editor's Choice: W. Wong. *Sci. Signal.* 6, ec71 (2013); In Brief: S. Lewis. *Nat. Rev. Neuro.* 14, 226 (2013); F1000Prime: M. Heilig, May 2013

16. 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

- a. Citations - 627
- b. Assisted in surgeries, behavioral assays, and data interpretation

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

- a. Citations - 55
- b. Designed all experiments, performed behavioral & microscopy experiments, wrote manuscript

18. Dietz DM, Sun H, Lobo M, Cahill M, Chadwick B, Gao V, Koo J, Mazei-Robison M, Dias C, Maze I, Damez-Werno D, Dietz K, Scobie K, Ferguson D, **Christoffel D**, Ohnishi Y, Hodes GE, Zheng Y, Neve R, Hahn K, Russo SJ, Nestler EJ. Essential Role for Rac1 in Cocaine-Induced Structural Plasticity of Nucleus Accumbens Neurons. *Nat. Neuro.* 2012 Apr 22;15(6):891–896 PMID:PMC3565539

- a. Citations - 118
- b. Designed & assisted in performing and analyzing dendritic spine morphological studies

19. **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. IkappaB kinase regulates social defeat stress induced synaptic and behavioral plasticity. *J. Neuro.* 2011

Jan; 31:314-21

- a. Citations - 205
- b. Designed all experiments, performed most behavioral & microscopy experiments, wrote manuscript
- c. This Week in the Journal cover article; “Must Read” in F1000prime: Y. Shaham, F. Theberge & D. Calu, Feb 2011

20. Akram A, **Christoffel D**, Rocher AB, Bouras C, Kövari E, Perl DP, Morrison JH, Herrmann FR, Haroutunian V, Giannakopoulos P, Hof PR. Stereologic estimates of total spinophilin-immunoreactive spine number in area 9 and the CA1 field: Relationship with the progression of Alzheimer's disease.

Neurobiology of Aging. 2008 Sep; 29(9):1296-307

- a. Citations - 63
- b. Carried out stereological analysis for CA1 field

21. Franciosi S, De Gasperi R, Dickstein DL, English DF, Rocher AB, Janssen WG, **Christoffel D**, Sosa MA, Hof PR, Buxbaum JD, Elder GA. Pepsin pretreatment allows collagen IV immunostaining of blood vessels in adult mouse brain *J Neurosci Methods*. 2007 Jun 1; 163(1):76-82.

- a. Citations - 48
- b. Developed pepsin pretreatment protocol

Reviews

1. Steinberg, EE, **Christoffel, DJ**, Deisseroth, K & Malenka, R. Illuminating circuitry relevant to psychiatric disorders with optogenetics. *Current opinion in neurobiology* 30C, 9–16 (2014).
 - a. Citations - 68
2. **Christoffel DJ**, Golden SA, Russo SJ. Structural and Synaptic Plasticity in Stress-Related Disorders. *Reviews in the Neurosciences* 2011 Oct 4: 22(5):535-49
 - a. Citations - 191

Invited Presentations

“Differential Control of Hedonic Feeding by Specific Excitatory Accumbal Inputs “
Neuroimaging and Modulation in Obesity and Diabetes Research, April 2019

“Differential Control of Hedonic Feeding by Specific Excitatory Accumbal Inputs “
Keystone Functional Neurocircuitry of Feeding Short Talk, February 2019

“The progression to pathological reward processing: a role for the nucleus accumbens in natural reward”
NYU Neuroscience Seminar, April 2017

Research Support

Ongoing

Pathway to Independence Award

National Institute of Diabetes and Digestive and Kidney Disease, Bethesda, Maryland

K99DK115985

Christoffel (PI)

07/1/18-6/30/2023

Role of Nucleus Accumbens and Its Glutamatergic Inputs in High-Fat Intake

The goal of this project is to understand the neural basis of compulsive intake of a high-fat food, by focusing on the nucleus accumbens, a brain region involved in motivated feeding behavior and reward-seeking in general. A

detailed understanding of how the neural pathways governing motivation to eat go awry will aid in the development of treatments for overeating behaviors and the development of obesity.

Completed

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

National Institute of Mental Health, Bethesda, Maryland

F32 MH 106206

Christoffel (PI)

07/01/15-12/31/16

Function of thalamic excitatory synapses in social reward processing

This project seeks to understand how severe stress disrupts the processing of rewarding social interaction through the use of a social and non-social stress. 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, Bethesda, Maryland

5T32GM089626-05

Rona Gifford (Director)

7-1-2014 to 6-30-2015

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

Postdoc Trainee

Interdisciplinary Research Training in Pain and Substance Use Disorders Fellow

National Institute of Drug Abuse, Baltimore, Maryland T32DA035165.

T32DA035165

Sean Mackey (Director) 10-1-2013 to 6-30-2014

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.

Postdoc Trainee

Skills

ex vivo slice physiology, optogenetics, *in vivo* calcium imaging (fiber photometry), microscopy (electron, brightfield, confocal), MATLAB, social and reward behavioral assays, 3D analysis of dendritic spine morphology, immunohistochemistry, microdissection, qPCR, genotyping, subcellular fractionation, western blotting, cell culture

Professional Memberships

2008 – present

Society for Neuroscience

2008 – 2013

New York Academy of Sciences

2006 – present

Molecular and Cellular Cognition Society

Ad hoc referee

Scientific Reports, Psychiatry Journal, Nature Communications, Biological Psychiatry, Neuropharmacology, Frontiers in Behavioral Neuroscience