

Katherine M. Nautiyal, PhD

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Education and Training

<i>Degree</i>	<i>Institution</i>	<i>Field of Study</i>	<i>Completed</i>
Postdoc	Columbia University Medical Center	Psychiatry and Neuroscience	2018
Ph.D.	Columbia University	Psychology (Behavioral Neuroscience)	2011
M.A.	Columbia University	Psychology (Behavioral Neuroscience)	2008
B.A.	University of Pennsylvania	Psychology	2004
B.S.	University of Pennsylvania	Cognitive and Computer Science	2004

Research Positions

Assistant Professor Department of Psychological and Brain Sciences Graduate Program in Experimental and Molecular Medicine Dartmouth College	2018-current
Postdoctoral Fellow, Assistant Professor of Clinical Neurobiology Mentor: Dr. René Hen Department of Psychiatry, Columbia University Medical Center Division of Integrative Neuroscience, New York State Psychiatric Institute	2012-2018
Graduate Research Fellow Mentor: Dr. Rae Silver Department of Psychology, Columbia University	2005-2011
Research Assistant, Technician Mentor: Dr. Harvey Grill Feeding Systems Neuroscience Laboratory, University of Pennsylvania	2003-2005
Research Assistant Mentors: Drs. Aravind Joshi and Lila Gleitman Institute for Research in Cognitive Science, University of Pennsylvania	2001-2003

Research Grants and Fellowships

R01 NIMH126178 <i>Serotonin modulation of the development of neural circuits underlying reward processing and impulsivity in adolescents</i>	\$2,901,583	2021-2026
K99/R00 NIMH106731 <i>Dissecting serotonergic and dopaminergic contributions to the neural circuits underlying impulsive behavior</i>	\$1,006,729	2015-2021
NIMH-19-004 Supplement for Advancing Computational Modeling and Data Analytics Relevant to Mental Health <i>Computational modeling of the neural encoding of impulsivity</i>	\$93,190	2019-2021
Neukom CompX Faculty Grant <i>Computational approaches to understanding the neural basis of Impulsivity</i>	\$20,000	2019-2020
NARSAD Young Investigator Award, BBRF <i>Serotonin modulation of the development of impulsivity in mice and men</i>	\$70,000	2016-2018
Sackler Institute Award <i>Dissecting the role of the serotonin 1B receptor in aggression using basic science and epidemiological approaches</i>	\$50,000	2015-2016

Early Stage Investigator Award, National Center for Responsible Gaming <i>Developing a mouse model of pathological gambling using an inducible and tissue specific serotonin 1B receptor knock-out</i>	\$147,706	2013-2015
Post-doctoral NRSA Fellowship, NIH F32 MH100888 <i>Using genetic and optogenetic models to study the role of the serotonin 1B receptor in aggression</i>	\$106,132	2013-2015
Post-doctoral NRSA Institutional Training Grant, NIH T32 MH015174	\$45,264	2012-2013
Pre-doctoral NRSA Fellowship, NIH F31 MH084384 <i>Beyond allergy: Mast cells mediate brain-behavior-immune interactions</i>	\$57,781	2009-2011

Honors and Awards

Class of 1962 Faculty Fellowship, Dartmouth College	2021
NIMH Biobehavioral Research Award for Innovative New Scientists	2021
Election to Associate Membership of American College of Neuropsychopharmacology (ACNP)	2020
Winter Conference on Brain Research (WBBR) Panel Travel Fellowship	2017
American College of Neuropsychopharmacology (ACNP) Travel Award	2015
Sackler Institute Young Investigator Award	2015
Best Poster Award, National Center for Responsible Gaming Annual Conference	2014
Travel Award for the International Society of Serotonin Research	2014
NIDA Award, Genetics of Addiction Course, Jackson Laboratory	2013
MBL/USP Award, Joint Course in Neural Systems and Behavior	2012
Trainee Scholar Award, Psychoneuroimmunology Research Society	2009, 2011
SfN Graduate Student Travel Award, Society for Neuroscience	2010
Faculty Fellowship, Columbia University	2005-2009

Teaching and Mentoring

Psychological and Brain Sciences, Dartmouth College	
Behavioral Neuroscience	2019W, 2019F
Neuroscience of Stress	2020F
Department of Psychology, Columbia University	
Topics in Neurobiology and Behavior	2012, 2014, 2015
Graduate and Undergraduate Senior Seminar (12 students)	
Mind, Brain and Behavior	2011, 2012, 2015
Introductory course in Biopsychology (~150-200 students)	
Statistics for Behavioral Scientists	2009
Introductory statistics course for Psychology and Neuroscience Majors (12 students)	
Mentoring of Graduate Students	
Stephen Pike, Rotation Student, PEMM PhD, Dartmouth College	2021
Arati Sharma, PhD in Psych and Brain Sciences, Dartmouth College	2020-current
Simone Evans, Rotation Student, PEMM PhD, Dartmouth College	2020
Stephanie Desrochers, PhD in Psych and Brain Sciences, Dartmouth	2018-current
Jaena Han, co-advisor with Rene Hen, PhD in Biology, Columbia University	2016-current
Lara Boyle, Rotation Student, MD/PhD in Neuroscience, Columbia University	2016
Salomon Muller, Rotation Student, PhD in Biology, Columbia University	2014
Jessica DeLalio, MA in Biotechnology, Columbia University	2012-2013
Mentoring of Undergraduate Students for Thesis or Independent Research Study	
14 at Dartmouth College	2018 - current
10 at Columbia University and Barnard College	2006-2018
Mentoring of Postdoctoral Fellows and Research Assistants at Dartmouth	
Jun Ho Lee, Research Assistant	2018-2020
Min Oh, Research Assistant	2019-2020
Ka Ng, Postdoctoral Fellow	2020-current
Mitch Spring, Postdoctoral Fellow	2021-current

Publications and Presentations

Pre-prints and manuscripts under review

Han, J., Andreu, V., Pintar, J., Allain, F., Kieffer, B., Harris, A., Hen, R., **Nautiyal, K.M.** Mu opioid receptors on GABAergic interneurons are critical for the antidepressant effects of tianeptine. Under review at *Neuropsychopharmacology*.

Carazo Arias, C., Kass, M.D., Jee, S., **Nautiyal, K.M.**, Magalong, V., Coie, L.A., Andreu, V., Khalil, H., Akil, H., Arcego, D.M., Meany, M.J., Samuels, B.A., Pintar, J.E., Morozova, I., Kalachikov, S., Hen, R. Contribution of the opioid system to the antidepressant effects of fluoxetine. Under review at *Biological Psychiatry*.

Peer-reviewed publications:

Li, Y., Simmler, L.D., Zessen, R.V., Flakowski, J., Wan, J.-X., Deng, F., Li, Y.-L., **Nautiyal, K.M.**, Pascoli, V., and Lüscher, C. (2021). Synaptic mechanism underlying serotonin modulation of transition to cocaine addiction. *Science* 373, 1252-1256.

Desrochers, S.S., Lesko, E.M., Magalong, V.M., Balsam, P.D., **Nautiyal, K.M.** A role for reward valuation in the serotonergic modulation of impulsivity. *Psychopharmacology (Berl)*. 2021 Aug 14. doi: 10.1007/s00213-021-05944-2. Epub ahead of print. PMID: 34390360.

Lee, J.H., Capan, S., Lacefield, C., Shea, Y.M., **Nautiyal, K.M.** (2020) DIY-NAMIC Behavior: A High-Throughput Method to Measure Complex Phenotypes in the Homecage. *eNeuro* 7(4)

Nautiyal, K.M., Okuda, M., Hen, R., Blanco, C. (2017) Gambling Disorder: An integrative review of animal and human studies. *Ann N Y Acad Sci* 1394(1):106-127.

Zike, I.D., Chohan, M.O., Kopelman, J.M., Krasnow, E., Flicker, D., **Nautiyal, K.M.**, Bubser, M., Kellendonk, C., Jones, C.K., Stanwood, G.D., Tanaka, K.F., Moore, H., Ahmari, S.E., Veenstra-VanderWeele, J. (2017) OCD candidate gene SLC1A1/EAAT3 impacts basal ganglia-mediated activity and stereotypic behavior. *Proc Natl Acad Sci U S A* 114(22):5719-5724

Samuels, B.A.*, **Nautiyal, K.M.***, Kruegel, A. C., Levinstein, M.R., Magalong, V.M., Gassaway, M.M., Grinnell, S.G., Han, J., Ansonoff, M.A., Pintar, J.E., Javitch, J.A., Sames, D., Hen, R. (2017) The behavioral effects of the antidepressant tianeptine require the mu-opioid receptor. *Neuropsychopharmacology* 42(10):2052-2063 *co-first authors

Nautiyal, K.M., Hen, R. (2017) Serotonin receptors in depression: From A to B. *F1000 Faculty Reviews* 6:123.

Nautiyal, K.M., Wang, S., Wall, M.W., Ahmari, S.E., Balsam, P.D., Blanco, C., Hen, R. (2017) Genetic and modelling approaches reveal distinct components of impulsive behavior. *Neuropsychopharmacology* 42(6):1182-1191.

Nautiyal, K.M., Tritschler, L., Ahmari, S.E. David, D.J., Gardier, A.M., Hen, R. (2016) A lack of serotonin 1B autoreceptors results in a decrease in anxiety and depression-related behaviours. *Neuropsychopharmacology* 41(12):2941-2950.

Nautiyal, K.M., Tanaka, K.F., Barr, M.M., Tritschler, L., LeDantec, Y., David, D.J., Gardier, A.M., Blanco, C., Hen, R., Ahmari, S.E. (2015) Distinct circuits underlie the effects of serotonin 1B receptors on aggression and impulsivity. *Neuron* 86(3):813-26.

Knolhoff, A.M., **Nautiyal, K.M.**, Nemes P., Kalachikov, S., Morozov, I., Silver, R., Sweedler, J.V. (2013) Combining small-volume metabolomic and transcriptomic approaches for assessing brain chemistry. *Anal Chem* 85(6):3136-43.

Donaldson, Z.R., **Nautiyal, K.M.**, Ahmari, S.E., Hen, R. (2013) Genetic approaches for understanding the role of serotonin receptors in mood and behavior. *Curr Opin Neurobiol* 23:1-8.

Nautiyal, K.M., Dailey, C., Jahn, J.L., Rodriguez, E., Sweedler, J.V., Silver, R. (2012) Serotonin of mast cell origin contributes to hippocampal function. *Eur J Neurosci* 36(3):2347-59.

Nautiyal, K.M., Liu, C., Dong, X., Silver, R. (2011) Blood-borne donor mast cell precursors migrate to mast cell-rich brain regions in the adult mouse. *J Neuroimmunol* 240-241:142-6

- Nautiyal, K.M.**, McKellar, H., Silverman, A.J., Silver, R. (2009) Mast cell involvement in the hypothermic response to sepsis. Am J Physiol 296(3):R595-602
- Nautiyal, K.M.**, Ribeiro, A., Pfaff, D.W., Silver, R. (2008) Brain mast cells link the immune system to anxiety-like behavior. Proc Natl Acad Sci U S A; 105(46): 18053-57.
- Nautiyal, K.M.**, Dailey, M., Brito, N., Brito, M.N., Harris, R.B, Bartness, T.J., Grill, H.J. (2008) Energetic responses to cold temperatures in rats lacking forebrain-caudal brainstem connections. Am J Physiol 295(3): R789-98.

Chapters and Editorials

K.M. Nautiyal. Paid Family Leave for Postdocs. (2019) Scientific American.

K.M. Nautiyal. Immune cells in the brain. (2012) In: Neuroscience in the 21st Century, Ed. Donald Pfaff, Springer Link.

Select Invited Lectures:

Amherst College, Department of Biology Seminar [virtual due to COVID-19]	March 2021
Fordham University, Department of Biology Colloquium [virtual due to COVID-19]	Feb 2021
Pavlovian Society [virtual due to COVID-19]	Sept 2020
International Society for Serotonin Research [rescheduled due to COVID-19]	July 2020
Eastern Psychological Association Annual Meeting [cancelled due to COVID-19]	March 2020
Neuroscience Day, Dartmouth College	April 2019
Center for Cognitive Neuroscience Annual Retreat, Dartmouth College	Oct 2018
International Society of Serotonin Research	July 2018
Barrow Neurological Institute, Neuroscience Seminar	April 2018
American Psychiatric Association Annual Meeting	May 2017
University of Pennsylvania, Department of Psychiatry	March 2017
University of Connecticut, Department of Psychology	Feb 2017
Fordham University, Department of Biology	Feb 2017
Dartmouth College, Department of Psychological and Brain Sciences	Jan 2017
Mt. Sinai School of Medicine, Department of Neuroscience	Dec 2016
Vassar College, Department of Psychology	Dec 2016
International Society for Serotonin Research	July 2014
Psychoneuroimmunology Research Society	June 2011
Society for the Study of Ingestive Behavior Annual Meeting	July 2005

Recent Conference Presentations

Eastern Psychological Association [CANCELLED due to COVID-19]
Behavioral and neural substrates of behavioral inhibition
 Boston, MA; March 2020

Winter Conference on Brain Research
A role for reward sensitivity in the serotonergic modulation of impulsivity
 Big Sky, MO; January 2020

American College of Neuropsychopharmacology
I Can't Wait: Challenges and Successes in Translational Research on Impulsivity.
 Hollywood, FL; December 2018

International Society for Serotonin Research
A lack of serotonin 1B autoreceptors results in decreased anxiety and depression-related Behaviours. Cork, Ireland; July 2018

Chaired Symposia:

International Society for Serotonin Research (Chair), July 2020 [RESCHED FOR 2022 due to COVID-19]
Towards a better understanding of how serotonin modulates impulsivity

Winter Conference on Brain Research (Chair), January 2020
It's not all dopamine: The role of serotonin in the modulation of impulsive behavior

American College of Neuropsychopharmacology (Co-chair, speaker), December 2018

I Can't Wait: Challenges and Successes in Translational Research on Impulsivity.

Winter Conference on Brain Research (Co-chair), January 2017

Novel Approaches to identifying monoamine circuits in aggression

Society for Neuroscience Minisymposium (Chair, speaker), October 2009

Behavioral Neuroimmunology: Linking the immune system to emotionality and cognition

Recent Conference Poster Presentations:

Desrochers, S.S., Lesko, E.M., Magalong, V.M., Balsam, P.D., **Nautiyal, K.M.** *A Role for Reward Sensitivity in the Serotonergic Modulation of Impulsivity.* American College of Neuropsychopharm. (Virtual) Dec 2020.

Desrochers, S.S., & **Nautiyal, K.M.** *Mice lacking the serotonin 1B receptor have deficits in response inhibition despite intact inhibitory learning.* Annual Meeting of the Pavlovian Society (virtual) Sept 2020.

Desrochers, S.S., Lesko, E.M., Magalong, V.M., Balsam, P.D., **Nautiyal, K.M.** *Serotonin 1B may influence impulsive action through effects on reward sensitivity.* American College of Neuropsychopharmacology. Orlando, FL, Dec 2019

Desrochers, S.S., Magalong, V.M., Lee, J.H., Balsam, P.D., **Nautiyal, K.M.** *The role of the serotonin 1B receptor in impulsivity and related behavioral constructs.* Society for Neuroscience. Chicago, IL Oct 2019.

Han, J., Andreu, J.E., Pintar, B.L., Kieffer, B.L., Harris, A., Hen, R., **Nautiyal, K.M.** *Role of the mu opioid receptor in the antidepressant action of tianeptine.* Society for Neuroscience. Chicago, IL, Oct 2019.

Desrochers SS, **Nautiyal KM.** *The convergent role of serotonin signaling in conditioned inhibition and instrumental response inhibition.* Pavlovian Society. Vancouver, BC, Oct 2019

Kass, M.D., Samuels, B.A., **Nautiyal, K.M.**, Carazo, E., Pintar, J., Hen, R. *Investigating the role of the opioid system in mediating the antidepressant-like behavioral effect of fluoxetine.* International Behavioral Neuroscience Society. July 2019

Magalong, V.M., Sultana, M., Balsam, P.D., Hen, R., **Nautiyal, K.M.** *Serotonin 1B receptors modulate impulsive action but not impulsive choice via GABAergic signaling.* American College of Neuropsychopharmacology. Hollywood, FL. Dec 2018

Society Membership, Service, and Outreach

Society Memberships:

Society for Neuroscience (2005-current)

Psychoneuroimmunology Research Society (2006-2011)

Society for Behavioral Neuroendocrinology (2006-2011)

International Society for Serotonin Research (2014-current)

International Society for Research on Impulsivity (2017-current)

Pavlovian Society (2018-current)

American College of Neuropsychopharmacology (2020-current)

Executive Committee of the International Society for Research on Impulsivity (2021-current)

Reviewing editor for *Frontiers in Behavioral Neuroscience* (2020-current)

Member of the Editorial Board of *Motivation and Reward*

Winter Conference for Brain Research Mentor (2020)

Public/Outreach Lectures - Brain Bee, STEM@TheNugget, STEM at Hanover High (2019)

Women in Science Project Mentor, Dartmouth College (2018-current)

Ad hoc grant and manuscript reviewer for:

Molecular Psychiatry, Neuropsychopharmacology; *European Journal of Neuroscience*; *eNeuro*;

Psychopharmacology; *Hormones and Behavior*; *Genes, Brain, and Behavior*, Collaborative Incentive

Research Grant from CUNY, Seed Grant from National Center for Responsible Gaming

Faculty of 1000, Associate Faculty Member (2017-current)

Press conference participant, Society for Neuroscience 2009, 2013