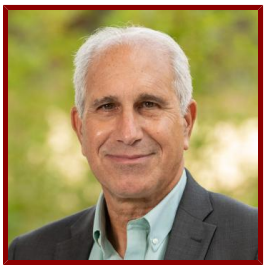
Stanford



Robert Malenka

Nancy Friend Pritzker Professor of Psychiatry and Behavioral Sciences

NIH Biosketch available Online Curriculum Vitae available Online

Bio

BIO

Dr. Robert C. Malenka is the Pritzker Professor of Psychiatry and Behavioral Sciences, Director of the Nancy Pritzker Laboratory and Deputy Director of the Wu Tsai Neurosciences Institute. After graduating from Harvard College he received an M.D. and a Ph.D. in neuroscience in 1983 from Stanford University School of Medicine. Over the ensuing 6 years he completed residency training in psychiatry at Stanford and 4 years of postdoctoral research at the University of California, San Francisco (UCSF). In 1989, he was appointed Assistant Professor of Psychiatry and Physiology at UCSF, at which he reached the rank of Full Professor in 1996. In addition to running an active research program at UCSF he was the Director of the Center for the Neurobiology of Addiction and Associate Director of the Center for Neurobiology and Psychiatry. He returned to the Stanford University School of Medicine in 1999.

He is an elected member of the National Academy of Sciences and the National Academy of Medicine as well as an elected fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the American College of Neuropsychopharmacology. He has served on the National Advisory Council on Drug Abuse and as a Councilor for the Society for Neuroscience and the American College of Neuropsychopharmacology. He is on the scientific advisory boards of numerous non-profit foundations and biotechs. He has been the recipient of several awards including: the Society for Neuroscience Young Investigator Award (1993); the Daniel Efron Award from the American College of Neuropsychopharmacolgoy (1998); the Kemali Foundation International Prize in Neuroscience (2000); the CINP-Lilly Neuroscience Basic Research Award (2002), the Perl/UNC Neuroscience Prize (2006), the NARSAD Goldman-Rakic Prize for Outstanding Neuroscience Research (2010), the Pasarow Foundation Award for Extraordinary Accomplishment in Neuropsychiatry Research (2011), and the Society for Neuroscience Julius Axelrod Prize (2016). His laboratory continues to conduct research on the molecular mechanisms of neural communication as well as the role of circuit dysfunction in brain disorders including addiction, Alzheimer’s, autism, and depression.

ACADEMIC APPOINTMENTS

- Professor, Psychiatry and Behavioral Sciences
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Director, Nancy Pritzker Laboratory, (1999- present)
- co-Director, Stanford Institute for Neuro-Innovation and Translational Neurosciences, (2008-2013)
- Associate Chair, Dept. of Psychiatry & Behavioral Sciences, (2008- present)
- Deputy Director, Wu Tsai Neurosciences Institute, (2013- present)

HONORS AND AWARDS

- Peter Seeberg Integrative Neuroscience Prize, Society for Neuroscience and Federation of European Neuroscience Societies (2022)
- Julius Axelrod Prize, Society for Neuroscience (2016)
- Julius Axelrod Mentorship Award, American College of Neuropsychopharmacology (2011)
- Medical Research Award in Neuropsychiatry, Robert and Claire Pasarow Foundation (2011)
- Member, National Academy of Sciences (2011)
- Fellow, American Association for the Advancement of Science (2009)
- Fellow, American Academy of Arts and Sciences (2005)
- Member, National Academy of Medicine (2004)
- Basic Neuroscience Research Award, Collegium Internationale Neuropsychopharmacologicum-Lilly (2002)
- International Prize in Neuroscience, Dargut and Milena Kemali Foundation (2000)
- Associate, Neurosciences Research Program (1999-2006)
- Daniel Efron Award, American College of Neuropsychopharmacology (1998)
- Distinguished Alumni Award, Stanford Medical School (1998)
- Young Investigator Award, Society for Neuroscience (1993)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Program Committee, Society for Neuroscience (1999 - 2004)
- Scientific Advisory Board, Renovis, Inc. (2000 - 2008)
- Scientific Advisory Board, Merck, Inc. (2000 - 2008)
- Scientific Council, NARSAD, Brain and Behavior Research Foundation (2001 - present)
- Council, Society for Neuroscience (2006 - 2010)
- Scientific Advisory Board, Seaside Therapeutics, Inc. (2006 - 2015)
- Scientific Advisory Board, Stanley Center for Psychiatric Research, Broad Institute, Harvard/MIT (2006 - 2016)
- Scientific Advisory Board, Pfizer, Inc. (2008 - 2011)
- Board of Directors, The Brain Research Foundation (2010 - present)
- Scientific Advisory Board, International Mental Health Research Organization (2010 - present)
- Council, American College of Neuropsychopharmacology (2012 - 2015)
- Scientific Advisory Board, Cure Alzheimer's Fund (2012 - present)
- co-Founder/Scientific Advisory Board, Circuit Therapeutics, Inc. (2012 - present)
- Scientific Advisory Board, Neurocampus, Bordeaux, France (2013 - present)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Long-lasting activity-dependent changes in the efficacy of synaptic transmission play an important role in the development of neural circuits and may mediate many forms of learning and memory. Work from my laboratory over the last 10 years has demonstrated that there are a variety of related but mechanistically distinct forms of synaptic plasticity. A major goal of my laboratory is to elucidate both the specific molecular events that are responsible for the triggering of these various forms of synaptic plasticity and the exact modifications in synaptic proteins that are responsible for the observed, long-lasting changes in synaptic efficacy. To accomplish this we use cellular electrophysiological recording techniques to examine synaptic plasticity in a variety of different in vitro preparations including thin slices of various regions of the rodent brain and primary neurons in culture. We also use cell biological and molecular techniques to examine the activity-dependent modulation

of neurotransmitter receptors and to express dominant negative forms of various synaptic proteins so that their exact functions can be determined. An additional complementary approach has involved examining synaptic physiology and synaptic plasticity in various mutant mouse lines lacking specific synaptic proteins.

A related but independent area of research in my laboratory is the elucidation of the synaptic action of drugs of abuse such as the psychostimulants cocaine and amphetamine. Toward this end, we have developed in vitro slice preparations of the nucleus accumbens and ventral tegmental area, brain regions which are thought to mediate several of the behavioral effects of drugs of abuse. We have characterized a novel form of synaptic plasticity in the nucleus accumbens and have done an extensive pharmacological characterization of the synaptic effects of dopamine, cocaine, and amphetamine. Currently we are examining in more detail the underlying mechanisms of dopamine's actions and determining how chronic treatment with drugs of abuse affect the synaptic responses of nucleus accumbens and ventral tegmental area cells. Because chronic exposure to drugs of abuse elicit long-term adaptive changes in critical neural circuits, it is hoped that the knowledge gained from the work on the molecular mechanisms underlying synaptic plasticity will provide important clues to the molecular mechanisms underlying the development of tolerance, dependence and addiction.

CLINICAL TRIALS

- Engaging Self-regulation Targets to Improve Mood and Weight and Understand Mechanism in Depressed and Obese Adults, Recruiting

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Deniz Bingul, Abigail Rogers, Alina Xiao

Doctoral Dissertation Co-Advisor (AC)

Ashley Moses

Postdoctoral Research Mentor

Zihui Zhang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (Phd Program)

Publications

PUBLICATIONS

- **Systemic enhancement of serotonin signaling reverses social deficits in multiple mouse models for ASD.** *Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology*
  Walsh, J. J., Llorach, P., Cardozo Pinto, D. F., Wenderski, W., Christoffel, D. J., Salgado, J. S., Heifets, B. D., Crabtree, G. R., Malenka, R. C.
  2021
- **Anterior cingulate inputs to nucleus accumbens control the social transfer of pain and analgesia.** *Science (New York, N.Y.)*
  Smith, M. L., Asada, N. n., Malenka, R. C.
  2021; 371 (6525): 153–59
- **5-HT modulation of a medial septal circuit tunes social memory stability.** *Nature*
  Wu, X., Morishita, W., Beier, K. T., Heifets, B. D., Malenka, R. C.
  2021
- **Amygdala-Midbrain Connections Modulate Appetitive and Aversive Learning.** *Neuron*
  Steinberg, E. E., Gore, F. n., Heifets, B. D., Taylor, M. D., Norville, Z. C., Beier, K. T., Földy, C. n., Lerner, T. N., Luo, L. n., Deisseroth, K. n., Malenka, R. C.
  2020

- **Complementary Genetic Targeting and Monosynaptic Input Mapping Reveal Recruitment and Refinement of Distributed Corticostriatal Ensembles by Cocaine.** *Neuron*
  Wall, N. R., Neumann, P. A., Beier, K. T., Mokhtari, A. K., Luo, L. n., Malenka, R. C.
  2019
- **Distinct neural mechanisms for the prosocial and rewarding properties of MDMA.** *Science translational medicine*
  Heifets, B. D., Salgado, J. S., Taylor, M. D., Hoerbelt, P. n., Cardozo Pinto, D. F., Steinberg, E. E., Walsh, J. J., Sze, J. Y., Malenka, R. C.
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- **5-HT release in nucleus accumbens rescues social deficits in mouse autism model** *NATURE*
  Walsh, J. J., Christoffel, D. J., Heifets, B. D., Ben-Dor, G. A., Selimbeyoglu, A., Hung, L. W., Deisseroth, K., Malenka, R. C.
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- **5-HT release in nucleus accumbens rescues social deficits in mouse autism model.** *Nature*
  Walsh, J. J., Christoffel, D. J., Heifets, B. D., Ben-Dor, G. A., Selimbeyoglu, A., Hung, L. W., Deisseroth, K., Malenka, R. C.
  2018
- **Robert Malenka** *NEURON*
  Malenka, R.
  2018; 98 (1): 12–15
- **Postsynaptic synaptotagmins mediate AMPA receptor exocytosis during LTP** *NATURE*
  Wu, D., Bacaj, T., Morishita, W., Goswami, D., Arendt, K. L., Xu, W., Chen, L., Malenka, R. C., Sudhof, T. C.
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- **Rabies screen reveals GPe control of cocaine-triggered plasticity.** *Nature*
  Beier, K. T., Kim, C. K., Hoerbelt, P. n., Hung, L. W., Heifets, B. D., DeLoach, K. E., Mosca, T. J., Neuner, S. n., Deisseroth, K. n., Luo, L. n., Malenka, R. C.
  2017
- **Brains, environments, and policy responses to addiction.** *Science (New York, N.Y.)*
  Humphreys, K. n., Malenka, R. C., Knutson, B. n., MacCoun, R. J.
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- **Gating of social reward by oxytocin in the ventral tegmental area.** *Science (New York, N.Y.)*
  Hung, L. W., Neuner, S. n., Polepalli, J. S., Beier, K. T., Wright, M. n., Walsh, J. J., Lewis, E. M., Luo, L. n., Deisseroth, K. n., Dölen, G. n., Malenka, R. C.
  2017; 357 (6358): 1406–11
- **Input- and Output-Specific Regulation of Serial Order Performance by Corticostriatal Circuits.** *Neuron*
  Rothwell, P. E., Hayton, S. J., Sun, G. L., Fuccillo, M. V., Lim, B. K., Malenka, R. C.
  2015; 88 (2): 345-356
- **Circuit Architecture of VTA Dopamine Neurons Revealed by Systematic Input-Output Mapping** *CELL*
  Beier, K. T., Steinberg, E. E., DeLoach, K. E., Xie, S., Miyamichi, K., Schwarz, L., Gao, X. J., Kremer, E. J., Malenka, R. C., Luo, L.
  2015; 162 (3): 622-634
- **Circuit Architecture of VTA Dopamine Neurons Revealed by Systematic Input-Output Mapping.** *Cell*
  Beier, K. T., Steinberg, E. E., DeLoach, K. E., Xie, S., Miyamichi, K., Schwarz, L., Gao, X. J., Kremer, E. J., Malenka, R. C., Luo, L.
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- **Optogenetics and the circuit dynamics of psychiatric disease.** *JAMA*
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  2015; 313 (20): 2019-2020
- **Illuminating circuitry relevant to psychiatric disorders with optogenetics** *CURRENT OPINION IN NEUROBIOLOGY*
  Steinberg, E. E., Christoffel, D. J., Deisseroth, K., Malenka, R. C.
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- **Chronic pain. Decreased motivation during chronic pain requires long-term depression in the nucleus accumbens.** *Science*
  Schwartz, N., Temkin, P., Jurado, S., Lim, B. K., Heifets, B. D., Polepalli, J. S., Malenka, R. C.
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- **Input-specific control of reward and aversion in the ventral tegmental area** *NATURE*
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- **Integrating synaptic plasticity and striatal circuit function in addiction** *CURRENT OPINION IN NEUROBIOLOGY*
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  2022

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- **Neural circuits regulating prosocial behaviors.** *Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology*
  Walsh, J. J., Christoffel, D. J., Malenka, R. C.
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- **Local accumbens invivo imaging during deep brain stimulation reveals a strategy-dependent amelioration of hedonic feeding.** *Proceedings of the National Academy of Sciences of the United States of America*
  Wu, H., Kakusa, B., Neuner, S., Christoffel, D. J., Heifets, B. D., Malenka, R. C., Halpern, C. H.
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- **Selective filtering of excitatory inputs to nucleus accumbens by dopamine and serotonin.** *Proceedings of the National Academy of Sciences of the United States of America*
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  2021

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- **Deep posteromedial cortical rhythm in dissociation.** *Nature*
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- **Better living through chemistry: MDMA's prosocial mechanism as a starting point for improved therapeutics.** *Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology*
  Heifets, B. D., Malenka, R. C.
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- **Continuous and Discrete Neuron Types of the Adult Murine Striatum.** *Neuron*
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- **ELECTRICAL CIRCUIT INTEGRATION OF GLIOMA THROUGH NEURON-GLIOMA SYNAPSES AND POTASSIUM CURRENTS**
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  Klawonn, A. M., Malenka, R. C.
  2019
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