





Karl Deisseroth

D. H. Chen Professor, Professor of Bioengineering and of Psychiatry and Behavioral Sciences

 NIH Biosketch available Online

 Curriculum Vitae available Online

CLINICAL OFFICE (PRIMARY)

- **Psychiatry and Behavioral Sciences**

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MC 5795

Stanford, CA 94305

Tel (650) 498-9111

Fax (650) 724-9900

ACADEMIC CONTACT INFORMATION

- **Alternate Contact**

Cynthia Delacruz - Executive Assistant

Email cdelacruz@stanford.edu

Bio

BIO

Karl Deisseroth is the D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences at Stanford University, and Investigator of the Howard Hughes Medical Institute. He received his undergraduate degree from Harvard, his PhD from Stanford, and his MD from Stanford. He also completed postdoctoral training, medical internship, and adult psychiatry residency at Stanford, and he is board-certified by the American Board of Psychiatry and Neurology. He continues as a practicing psychiatrist at Stanford with specialization in affective disorders and autism-spectrum disease, employing medications along with neural stimulation.

Over the last sixteen years, his laboratory created and developed optogenetics, hydrogel-tissue chemistry (beginning with CLARITY), and a broad range of enabling methods. He also has employed his technologies to discover the neural cell types and connections that cause adaptive and maladaptive behaviors, and has disseminated the technologies to thousands of laboratories around the world.

Among other honors, Deisseroth was the sole recipient for optogenetics of the 2010 Koetser Prize, the 2010 Nakasone Prize, the 2011 Alden Spencer Prize, the 2013 Richard Lounsbery Prize, the 2014 Dickson Prize in Science, the 2015 Keio Prize, the 2015 Lurie Prize, the 2015 Albany Prize, the 2015 Dickson Prize in Medicine, the 2017 Redelsheimer Prize, the 2017 Fresenius Prize, the 2017 NOMIS Distinguished Scientist Award, the 2018 Eisenberg Prize, the 2018 Kyoto Prize, the 2020 Heineken Prize in Medicine from the Royal Netherlands Academy of Arts and Sciences, and the 2023 Japan Prize. For his discoveries, Deisseroth has also received the Perl Prize (2012), the BRAIN prize (2013), the Pasarow Prize (2013), the Breakthrough Prize (2015) the BBVA Award (2016), the Massry Prize (2016) and the Harvey Prize from the Technion/Israel (2017). He was selected a Howard Hughes Medical Institute Investigator in 2013, and was elected to the US National Academy of Medicine in 2010, to the US National Academy of Sciences in 2012, and to the US National Academy of Engineering in 2019.

CLINICAL FOCUS

- Psychiatry

ACADEMIC APPOINTMENTS

- Professor, Bioengineering
- Professor, Psychiatry and Behavioral Sciences

- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Japan Prize in Life Sciences, for optogenetics (2023)
- Luisa Gross Horwitz Prize, for optogenetics (2022)
- Lasker Basic Medical Research Award, for development of optogenetics (2021)
- Ariëns Kappers Award, Royal Netherlands Academy of Arts and Sciences (2020)
- Lifetime Achievement Award in Medicine, J.E. Wallace Sterling (2020)
- Heineken Prize in Medicine, Royal Netherlands Academy of Arts and Sciences (2020)
- Kyoto Prize, for the discovery of optogenetics and the development of causal systems neuroscience (2018)
- Harvey Prize in Human Health, Technion, Israel (2017)
- Dickson Prize in Medicine, for optogenetics (2015)
- Breakthrough Prize in Life Science, for optogenetics (2015)
- Massry Prize, Massry Foundation (2017)
- Warren Alpert Prize, Harvard (2019)
- Berthold Leibinger Prize, for development of optogenetics (2018)
- Eisenberg Prize, University of Michigan (2018)
- Rumford Prize, AAAS (2018)
- NOMIS Distinguished Scientist Award, NOMIS Foundation (2017)
- BBVA Award, for optogenetics (2016)
- Redelshheimer Award, for optogenetics and CLARITY (2016)
- Albany Prize in Medicine, for optogenetics (2015)
- Young investigator Award, Society for Neuroscience (2009)
- Lurie Prize in Biomedical Sciences, Foundation for the NIH (2015)
- Meyer Award, American Psychiatric Association (2015)
- Dickson Prize in Science, for optogenetics (2014)
- Keio Medical Science Prize, for optogenetics (2014)
- Wilson Prize, Harvard (2014)
- BRAIN Prize, Lundbeck Research Foundation (2013)
- Gabbay Award, Brandeis (2013)
- Goldman-Rakic Award, Yale (2013)
- Pasarow Foundation Award, Pasarow Foundation (2013)
- Premio Citta' di Firenze for Molecular Sciences, for optogenetics and CLARITY (2013)
- Richard Lounsbery Prize, National Academy of Sciences (2013)
- Perl Prize, UNC (2012)
- Zuelch Prize, Max-Planck Society (2012)
- Spencer Prize, Columbia (2011)
- Koetsier Prize, Zurich Switzerland (2010)

- Nakasone Prize, HFSP (2010)
- Gill YIA Award, Indiana University (2009)
- Lawrence C. Katz Prize, Duke University (2008)
- Schuetze Prize, Columbia (2008)
- McKnight Foundation Scholar Award, McKnight Foundation (2007)
- Presidential Early Career Award in Science and Engineering (PECASE), NIH (2006)
- Director's Pioneer Award, National Institutes of Health (2005)
- Early Career Translational Research Award, Coulter Foundation (2005)
- Klingenstein Fellowship, Klingenstein Foundation (2005)
- McKnight Foundation Technological Innovations in Neuroscience Award, McKnight Foundation (2005)
- Culpeper Scholar Award, Rockefeller Brothers Fund, Goldman Philanthropic Partnerships (2004)
- Outstanding Resident, National Institute of Mental Health (2002)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, National Academy of Medicine (2011 - present)
- Member, National Academy of Engineering (2019 - present)
- Member, National Academy of Sciences (2012 - present)

PROFESSIONAL EDUCATION

- Medical Education: Stanford University School of Medicine (2000) CA
- Residency: Stanford University Adult Psychiatry Residency (2004) CA
- Internship: Stanford University Adult Psychiatry Residency (2001) CA
- Board Certification: Psychiatry, American Board of Psychiatry and Neurology (2006)
- Ph.D., Stanford University , Neuroscience (1998)
- M.D., Stanford University (2000)
- A.B., Harvard , Biochemical Sciences (1992)

LINKS

- Deisseroth Lab Website: <https://web.stanford.edu/group/dlab/>
- optogenetics technology portal: <http://optogenetics.org>
- CLARITY technology portal: <http://clarityresourcecenter.org>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Karl Deisseroth is the D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences at Stanford University, and Investigator of the Howard Hughes Medical Institute. Over the last sixteen years, his laboratory created and developed optogenetics, hydrogel-tissue chemistry (beginning with CLARITY), and a broad range of enabling methods. He also has employed his technologies to discover the neural cell types and connections that cause adaptive and maladaptive behaviors, and has disseminated the technologies to thousands of laboratories around the world.

Teaching

COURSES

2023-24

- Principles and Practice of Optogenetics for Optical Control of Biological Tissues: BIOE 291 (Aut)
- Systems Physiology and Design: BIOE 103 (Spr)

2022-23

- Principles and Practice of Optogenetics for Optical Control of Biological Tissues: BIOE 291 (Aut)
- Systems Physiology and Design: BIOE 103 (Spr)
- Systems Physiology and Design: BIOE 103B (Spr)

2021-22

- Principles and Practice of Optogenetics for Optical Control of Biological Tissues: BIOE 291 (Aut)
- Systems Physiology and Design: BIOE 103 (Spr)

2020-21

- Principles and Practice of Optogenetics for Optical Control of Biological Tissues: BIOE 291 (Aut)
- Systems Physiology and Design: BIOE 103 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Spencer Zhao

Postdoctoral Faculty Sponsor

Claire Bedbrook, Yiming Chen, Antonia Drinnenberg, Mengyu Liu, Peter Wang, Yu Wang, Wendy Wenderski

Doctoral Dissertation Advisor (AC)

Lucas Encarnacion-Rivera, YoungJu Jo, John Kochalka, Aviv Korman, Tony Liu, Kang Yong Loh, Joseph Noh, Marija Pavlovic, Misha Raffiee, Shenandoah Wrobel

Doctoral Dissertation Co-Advisor (AC)

Leili Mortazavi, Ethan Richman

Postdoctoral Research Mentor

Claire Bedbrook, Antonia Drinnenberg

Doctoral (Program)

Michelle Tai

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Neurosciences (Phd Program)
- Psychiatry and Behavioral Science (Fellowship Program)

Publications

PUBLICATIONS

- **Human OPRM1 and murine Oprm1 promoter driven viral constructs for genetic access to μ -opioidergic cell types.** *Nature communications*

- Salimando, G. J., Tremblay, S., Kimmey, B. A., Li, J., Rogers, S. A., Wojcik, J. A., McCall, N. M., Wooldridge, L. M., Rodrigues, A., Borner, T., Gardiner, K. L., Jayakar, S. S., Singeç, et al
2023; 14 (1): 5632
- **Lifelong restructuring of 3D genome architecture in cerebellar granule cells.** *Science (New York, N.Y.)*
Tan, L., Shi, J., Moghadami, S., Parasar, B., Wright, C. P., Seo, Y., Vallejo, K., Cobos, I., Duncan, L., Chen, R., Deisseroth, K.
2023; 381 (6662): 1112-1119
 - **Structural basis for ion selectivity in potassium-selective channelrhodopsins.** *Cell*
Tajima, S., Kim, Y. S., Fukuda, M., Jo, Y., Wang, P. Y., Paggi, J. M., Inoue, M., Byrne, E. F., Kishi, K. E., Nakamura, S., Ramakrishnan, C., Takaramoto, S., Nagata, et al
2023
 - **Cardiogenic control of affective behavioural state.** *Nature*
Hsueh, B., Chen, R., Jo, Y., Tang, D., Raffiee, M., Kim, Y. S., Inoue, M., Randles, S., Ramakrishnan, C., Patel, S., Kim, D. K., Liu, T. X., Kim, et al
2023
 - **All-optical physiology resolves a synaptic basis for behavioral timescale plasticity.** *Cell*
Fan, L. Z., Kim, D. K., Jennings, J. H., Tian, H., Wang, P. Y., Ramakrishnan, C., Randles, S., Sun, Y., Thadhani, E., Kim, Y. S., Quirin, S., Giocomo, L., Cohen, et al
2023
 - **Video-based pooled screening yields improved far-red genetically encoded voltage indicators.** *Nature methods*
Tian, H., Davis, H. C., Wong-Campos, J. D., Park, P., Fan, L. Z., Gmeiner, B., Begum, S., Werley, C. A., Borja, G. B., Upadhyay, H., Shah, H., Jacques, J., Qi, et al
2023
 - **Multiregion neuronal activity: the forest and the trees.** *Nature reviews. Neuroscience*
Machado, T. A., Kauvar, I. V., Deisseroth, K.
2022
 - **Cell-type-specific population dynamics of diverse reward computations.** *Cell*
Sylwestrak, E. L., Jo, Y., Vesuna, S., Wang, X., Holcomb, B., Tien, R. H., Kim, D. K., Fenno, L., Ramakrishnan, C., Allen, W. E., Chen, R., Shenoy, K. V., Sussillo, et al
2022; 185 (19): 3568
 - **Structural basis for channel conduction in the pump-like channelrhodopsin ChRmine.** *Cell*
Kishi, K. E., Kim, Y. S., Fukuda, M., Inoue, M., Kusakizako, T., Wang, P. Y., Ramakrishnan, C., Byrne, E. F., Thadhani, E., Paggi, J. M., Matsui, T. E., Yamashita, K., Nagata, et al
1800
 - **From microbial membrane proteins to the mysteries of emotion.** *Cell*
Deisseroth, K.
2021
 - **A Molecular Calcium Integrator Reveals a Striatal Cell Type Driving Aversion.** *Cell*
Kim, C. K., Sanchez, M. I., Hoerbelt, P., Fenno, L. E., Malenka, R. C., Deisseroth, K., Ting, A. Y.
2020
 - **Deep posteromedial cortical rhythm in dissociation.** *Nature*
Vesuna, S., Kauvar, I. V., Richman, E., Gore, F., Oskotsky, T., Sava-Segal, C., Luo, L., Malenka, R. C., Henderson, J. M., Nuyujukian, P., Parvizi, J., Deisseroth, K.
2020
 - **Multiple convergent hypothalamus-brainstem circuits drive defensive behavior.** *Nature neuroscience*
Lovett-Barron, M., Chen, R., Bradbury, S., Andalman, A. S., Wagle, M., Guo, S., Deisseroth, K.
2020
 - **Genetically targeted chemical assembly of functional materials in living cells, tissues, and animals.** *Science (New York, N.Y.)*
Liu, J. n., Kim, Y. S., Richardson, C. E., Tom, A. n., Ramakrishnan, C. n., Birey, F. n., Katsumata, T. n., Chen, S. n., Wang, C. n., Wang, X. n., Joubert, L. M., Jiang, Y. n., Wang, et al
2020; 367 (6484): 1372-76

- **Cortical Observation by Synchronous Multifocal Optical Sampling Reveals Widespread Population Encoding of Actions.** *Neuron*
Kauvar, I. V., Machado, T. A., Yuen, E. n., Kochalka, J. n., Choi, M. n., Allen, W. E., Wetzstein, G. n., Deisseroth, K. n.
2020
- **Comprehensive Dual- and Triple-Feature Intersectional Single-Vector Delivery of Diverse Functional Payloads to Cells of Behaving Mammals.** *Neuron*
Fenno, L. E., Ramakrishnan, C. n., Kim, Y. S., Evans, K. E., Lo, M. n., Vesuna, S. n., Inoue, M. n., Cheung, K. Y., Yuen, E. n., Pichamoorthy, N. n., Hong, A. S., Deisseroth, K. n.
2020
- **Deep brain optogenetics without intracranial surgery.** *Nature biotechnology*
Chen, R. n., Gore, F. n., Nguyen, Q. A., Ramakrishnan, C. n., Patel, S. n., Kim, S. H., Raffiee, M. n., Kim, Y. S., Hsueh, B. n., Krook-Magnusson, E. n., Soltesz, I. n., Deisseroth, K. n.
2020
- **Neuronal Dynamics Regulating Brain and Behavioral State Transitions** *CELL*
Andalman, A. S., Burns, V. M., Lovett-Barron, M., Broxton, M., Poole, B., Yang, S. J., Grosenick, L., Lerner, T. N., Chen, R., Benster, T., Mourrain, P., Levoy, M., Rajan, et al
2019; 177 (4): 970+
- **Thirst regulates motivated behavior through modulation of brainwide neural population dynamics** *SCIENCE*
Allen, W. E., Chen, M. Z., Pichamoorthy, N., Tien, R. H., Pachitariu, M., Luo, L., Deisseroth, K.
2019; 364 (6437): 253+
- **Interacting neural ensembles in orbitofrontal cortex for social and feeding behaviour** *NATURE*
Jennings, J. H., Kim, C. K., Marshel, J. H., Raffiee, M., Ye, L., Quirin, S., Pak, S., Ramakrishnan, C., Deisseroth, K.
2019; 565 (7741): 645+
- **Cortical layer-specific critical dynamics triggering perception.** *Science (New York, N.Y.)*
Marshel, J. H., Kim, Y. S., Machado, T. A., Quirin, S. n., Benson, B. n., Kadmon, J. n., Raja, C. n., Chibukhchyan, A. n., Ramakrishnan, C. n., Inoue, M. n., Shane, J. C., McKnight, D. J., Yoshizawa, et al
2019
- **Crystal structure of the natural anion-conducting channelrhodopsin GtACR1** *NATURE*
Kim, Y., Kato, H. E., Yamashita, K., Ito, S., Inoue, K., Ramakrishnan, C., Fenno, L. E., Evans, K. E., Paggi, J. M., Dror, R. O., Kandori, H., Kobilka, B. K., Deisseroth, et al
2018; 561 (7723): 343+
- **Structural mechanisms of selectivity and gating in anion channelrhodopsins** *NATURE*
Kato, H. E., Kim, Y., Paggi, J. M., Evans, K. E., Allen, W. E., Richardson, C., Inoue, K., Ito, S., Ramakrishnan, C., Fenno, L. E., Yamashita, K., Hilger, D., Lee, et al
2018; 561 (7723): 349+
- **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; 560 (7720): 589+
- **Three-dimensional intact-tissue sequencing of single-cell transcriptional states** *SCIENCE*
Wang, X., Allen, W. E., Wright, M. A., Sylwestrak, E. L., Samusik, N., Vesuna, S., Evans, K., Liu, C., Ramakrishnan, C., Liu, J., Nolan, G. P., Bava, F., Deisseroth, et al
2018; 361 (6400): 380+
- **Hydrogel-Tissue Chemistry: Principles and Applications** *ANNUAL REVIEW OF BIOPHYSICS, VOL 47*
Gradinaru, V., Treweek, J., Overton, K., Deisseroth, K., Dill, K. A.
2018; 47: 355–76
- **Optical and chemical discoveries recognized for impact on biology and psychiatry.** *EMBO reports*
Deisseroth, K.
2017; 18 (6): 859-860
- **Global Representations of Goal-Directed Behavior in Distinct Cell Types of Mouse Neocortex** *NEURON*
Allen, W. E., Kauvar, I. V., Chen, M. Z., Richman, E. B., Yang, S. J., Chan, K., Gradinaru, V., Deverman, B. E., Luo, L., Deisseroth, K.

2017; 94 (4): 891-?

- **Integration of optogenetics with complementary methodologies in systems neuroscience** *NATURE REVIEWS NEUROSCIENCE*
Kim, C. K., Adhikari, A., Deisseroth, K.
2017; 18 (4): 222-235
- **Gamma oscillations organize top-down signalling to hypothalamus and enable food seeking** *NATURE*
Carus-Cadavieco, M., Gorbati, M., Ye, L., Bender, F., van der Veldt, S., Kosse, C., Borgers, C., Lee, S. Y., Ramakrishnan, C., Hu, Y., Denisova, N., Ramm, F., Volitaki, et al
2017; 542 (7640): 232-236
- **Cognitive neuroscience: In search of lost time.** *Nature*
Young, N. P., Deisseroth, K.
2017; 542 (7640): 173-174
- **The form and function of channelrhodopsin.** *Science (New York, N.Y.)*
Deisseroth, K., Hegemann, P.
2017; 357 (6356)
- **Rabies screen reveals GPe control of cocaine-triggered plasticity.** *Nature*
Beier, K. T., Kim, C. K., Hoerbel, 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
- **Pathways to clinical CLARITY: volumetric analysis of irregular, soft, and heterogeneous tissues in development and disease.** *Scientific reports*
Hsueh, B. n., Burns, V. M., Pauerstein, P. n., Holzem, K. n., Ye, L. n., Engberg, K. n., Wang, A. C., Gu, X. n., Chakravarthy, H. n., Arda, H. E., Charville, G. n., Vogel, H. n., Efimov, et al
2017; 7 (1): 5899
- **Modulation of prefrontal cortex excitation/inhibition balance rescues social behavior in CNTNAP2-deficient mice.** *Science translational medicine*
Selimbeyoglu, A. n., Kim, C. K., Inoue, M. n., Lee, S. Y., Hong, A. S., Kauvar, I. n., Ramakrishnan, C. n., Fenno, L. E., Davidson, T. J., Wright, M. n., Deisseroth, K. n.
2017; 9 (401)
- **Ancestral Circuits for the Coordinated Modulation of Brain State.** *Cell*
Lovett-Barron, M. n., Andalman, A. S., Allen, W. E., Vesuna, S. n., Kauvar, I. n., Burns, V. M., Deisseroth, K. n.
2017; 171 (6): 1411-23.e17
- **Thirst-associated preoptic neurons encode an aversive motivational drive.** *Science (New York, N.Y.)*
Allen, W. E., DeNardo, L. A., Chen, M. Z., Liu, C. D., Loh, K. M., Fenno, L. E., Ramakrishnan, C. n., Deisseroth, K. n., Luo, L. n.
2017; 357 (6356): 1149-55
- **Molecular and Circuit-Dynamical Identification of Top-Down Neural Mechanisms for Restraint of Reward Seeking.** *Cell*
Kim, C. K., Ye, L. n., Jennings, J. H., Pichamorthy, N. n., Tang, D. D., Yoo, A. W., Ramakrishnan, C. n., Deisseroth, K. n.
2017; 170 (5): 1013-27.e14
- **A LOOK INSIDE THE BRAIN** *SCIENTIFIC AMERICAN*
Deisseroth, K.
2016; 315 (4): 31-37
- **Wiring and Molecular Features of Prefrontal Ensembles Representing Distinct Experiences** *CELL*
Ye, L., Allen, W. E., Thompson, K. R., Tian, Q., Hsueh, B., Ramakrishnan, C., Wang, A., Jennings, J. H., Adhikari, A., Halpern, C. H., Witten, I. B., Barth, A. L., Luo, et al
2016; 165 (7): 1776-1788
- **Targeting Neural Circuits** *CELL*
Rajasethupathy, P., Ferenczi, E., Deisseroth, K.
2016; 165 (3): 524-534
- **Hypothalamic control of male aggression-seeking behavior** *NATURE NEUROSCIENCE*
Falkner, A. L., Grosenick, L., Davidson, T. J., Deisseroth, K., Lin, D.
2016; 19 (4): 596-?

- **Simultaneous fast measurement of circuit dynamics at multiple sites across the mammalian brain.** *Nature methods*
Kim, C. K., Yang, S. J., Pichamoorthy, N., Young, N. P., Kauvar, I., Jennings, J. H., Lerner, T. N., Berndt, A., Lee, S. Y., Ramakrishnan, C., Davidson, T. J., Inoue, M., Bito, et al
2016; 13 (4): 325-328
- **Nucleus accumbens D2R cells signal prior outcomes and control risky decision-making** *NATURE*
Zalocusky, K. A., Ramakrishnan, C., Lerner, T. N., Davidson, T. J., Knutson, B., Deisseroth, K.
2016; 531 (7596): 642-?
- **Communication in Neural Circuits: Tools, Opportunities, and Challenges** *CELL*
Lerner, T. N., Ye, L., Deisseroth, K.
2016; 164 (6): 1136-1150
- **Illuminating next-generation brain therapies.** *Nature neuroscience*
Ferenczi, E., Deisseroth, K.
2016; 19 (3): 414-6
- **Multiplexed Intact-Tissue Transcriptional Analysis at Cellular Resolution** *CELL*
Sylwestrak, E. L., Rajasethupathy, P., Wright, M. A., Jaffe, A., Deisseroth, K.
2016; 164 (4): 792-804
- **Structural foundations of optogenetics: Determinants of channelrhodopsin ion selectivity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Berndt, A., Lee, S. Y., Wietek, J., Ramakrishnan, C., Steinberg, E. E., Rashid, A. J., Kim, H., Park, S., Santoro, A., Frankland, P. W., Iyer, S. M., Pak, S., Ahrlund-Richter, et al
2016; 113 (4): 822-829
- **NEURAL CIRCUITS Prefrontal cortical regulation of brainwide circuit dynamics and reward-related behavior** *SCIENCE*
Ferenczi, E. A., Zalocusky, K. A., Liston, C., Grosenick, L., Warden, M. R., Amatya, D., Katovich, K., Mehta, H., Patenaude, B., Ramakrishnan, C., Kalanithi, P., Etkin, A., Knutson, et al
2016; 351 (6268): 41-U59
- **Optogenetic approaches addressing extracellular modulation of neural excitability.** *Scientific reports*
Ferenczi, E. A., Vierock, J., Atsuta-Tsunoda, K., Tsunoda, S. P., Ramakrishnan, C., Gorini, C., Thompson, K., Lee, S. Y., Berndt, A., Perry, C., Minniberger, S., Vogt, A., Mattis, et al
2016; 6: 23947-?
- **SPED Light Sheet Microscopy: Fast Mapping of Biological System Structure and Function** *CELL*
Tomer, R., Lovett-Barron, M., Kauvar, I., Andalman, A., Burns, V. M., Sankaran, S., Grosenick, L., Broxton, M., Yang, S., Deisseroth, K.
2015; 163 (7): 1796-1806
- **Extended field-of-view and increased-signal 3D holographic illumination with time-division multiplexing** *OPTICS EXPRESS*
Yang, S. J., Allen, W. E., Kauvar, I., Andalman, A. S., Young, N. P., Kim, C. K., Marshel, J. H., Wetzstein, G., Deisseroth, K.
2015; 23 (25): 32573-32581
- **Basomedial amygdala mediates top-down control of anxiety and fear.** *Nature*
Adhikari, A., Lerner, T. N., Finkelstein, J., Pak, S., Jennings, J. H., Davidson, T. J., Ferenczi, E., Gunaydin, L. A., Mirzabekov, J. J., Ye, L., Kim, S., Lei, A., Deisseroth, et al
2015; 527 (7577): 179-185
- **Projections from neocortex mediate top-down control of memory retrieval.** *Nature*
Rajasethupathy, P., Sankaran, S., Marshel, J. H., Kim, C. K., Ferenczi, E., Lee, S. Y., Berndt, A., Ramakrishnan, C., Jaffe, A., Lo, M., Liston, C., Deisseroth, K.
2015; 526 (7575): 653-659
- **Thalamic control of sensory selection in divided attention** *NATURE*
Wimmer, R. D., Schmitt, L. I., Davidson, T. J., Nakajima, M., Deisseroth, K., Halassa, M. M.
2015; 526 (7575): 705-709
- **Optogenetics: 10 years of microbial opsins in neuroscience** *NATURE NEUROSCIENCE*
Deisseroth, K.

2015; 18 (9): 1213-1225

- **OPTOGENETICS. Expanding the optogenetics toolkit.** *Science*
Berndt, A., Deisseroth, K.
2015; 349 (6248): 590-591
- **Intact-Brain Analyses Reveal Distinct Information Carried by SNc Dopamine Subcircuits** *CELL*
Lerner, T. N., Shilyansky, C., Davidson, T. J., Evans, K. E., Beier, K. T., Zalocusky, K. A., Crow, A. K., Malenka, R. C., Luo, L., Tomer, R., Deisseroth, K.
2015; 162 (3): 635-647
- **Optogenetics and the circuit dynamics of psychiatric disease.** *JAMA*
Deisseroth, K., Etkin, A., Malenka, R. C.
2015; 313 (20): 2019-2020
- **The BRAIN Initiative: developing technology to catalyse neuroscience discovery** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*
Jorgenson, L. A., Newsome, W. T., Anderson, D. J., Bargmann, C. I., Brown, E. N., Deisseroth, K., Donoghue, J. P., Hudson, K. L., Ling, G. S., MacLeish, P. R., Marder, E., Normann, R. A., Sanes, et al
2015; 370 (1668): 8-19
- **Closed-Loop and Activity-Guided Optogenetic Control** *NEURON*
Grosenick, L., Marshel, J. H., Deisseroth, K.
2015; 86 (1): 106-139
- **Simultaneous cellular-resolution optical perturbation and imaging of place cell firing fields** *NATURE NEUROSCIENCE*
Rickgauer, J. P., Deisseroth, K., Tank, D. W.
2014; 17 (12): 1816-1824
- **Advanced CLARITY for rapid and high-resolution imaging of intact tissues** *NATURE PROTOCOLS*
Tomer, R., Ye, L., Hsueh, B., Deisseroth, K.
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