

CURRICULUM VITAE

Hailan Hu

Professor, Senior Investigator
Center for Neuroscience, School of Medicine
Zhejiang University Interdisciplinary Institute of Neuroscience &
Technology (ZIINT)
Hangzhou, 310058
P.R. China



Email huhailan@zju.edu.cn
Lab homepage <http://www.hailanhu-lab.net>

Education

2002 Dec. Ph.D. in Neuroscience, University of California Berkeley,
 with Corey Goodman
1996 Jul. B.S. in Biochemistry and Molecular Biology, Beijing University

Postdoctoral training

2004-2008 Cold Spring Harbor Laboratory/UCSD, with Roberto Malinow
2003-2004 University of Virginia, with Julius Zhu and Roberto Malinow

Professional positions

2015-present Professor, Senior Investigator, Executive director of Center for Neuroscience, Zhejiang University
2009-2015 Principal Investigator, Institute of Neuroscience, Chinese Academy of Sciences
1996-1997 Postgraduate researcher, University of California San Francisco

Research interest

Emotions color our lives and profoundly shape the way we think and behave. Research in my lab aims to understand how emotional and social behaviors are encoded in the brain, with a main focus on the neural circuitry underlying depression and social dominance. Specifically we are looking into three major problems: First, we study how the brain represents emotions of different valence. Through simultaneously mapping the neural activity response to rewarding and aversive stimuli in the same mouse brain and at single cell resolution, we have identified a functional valence map. Second, we search for the molecular and circuit mechanism of depression, focusing on a brain region called habenula, which encodes negative reward. We have identified several key habenula-expressing molecules that play important roles in the etiology of depression. Third, we establish animal models for studying social hierarchy in mice and explore the neural mechanism underlying the dominance trait. We are recording and manipulating neural activity during social competition to study how dominance hierarchy arises from interplay between the activity of specific neural circuits and social experience such as history of winning or losing. We are tackling these problems using combinatorial techniques including imaging, electrophysiology (both *in vitro* and *in vivo*),

molecular genetics and optogenetic. We hope that these studies will shed new light on the neural basis of some essential emotional and social behaviors, and provide therapeutic implications for the treatment of emotional disorders.

Awards and honors

2016	Tan Jia Zhen Life Science Award
2016	14 th Chinese Young Scientist Award
2015	Chang Jiang Scholar Award
2015	12 th L'Oreal Women Scientist Award of China
2015	Sanofi Scholar Award
2013	Meiji Life Science Outstanding Award
2012	Chinese Distinguished Young Scholar Award
2012, 2014	Excellent Mentorship Award of Chinese Academy of Sciences
2010-2012	Shanghai Pujiang Talent Award
2009-2012	Chinese Hundred Talent Plan Award
2003-2006	Damon Runyon Foundation Postdoctoral Fellowship
2002	HHMI and IBRO fellowships for MBL Neurobiology Course
1998-2003	Howard Hughes Medical Institute Predoctoral Fellowship

Referee for Science, Nature, Nature Medicine, Nature Neuroscience, Neuron, eLife, Current Biology, PNAS etc.

Committee Service:

2017-	F1000 faculty member
2015- 2018	SFN Program Committee
2013- 2015	IBRO Alumni Committee
2009- present	Reviewer for Chinese National Science Foundation Grants
2010	Reviewer for UK MRC grant

Teaching:

2008-present	Neurobiology (Lecture: The Autonomous Nervous System)
2012-2014	ION summer school (Lecture: Neural Mechanism of Emotion)

Trainees present:

Yihui Cui (lecturer, PhD with Laurent Venance at College de France)
Yan Yang (postdoc fellow, PhD with Yuqiu Zhang at Fudan University)
Jihua Wang (graduate student)
Zhengxiao Fan (graduate student)
Yiyan Dong (graduate student)
Shuangshuang Ma (graduate student)
Chao Zhang (graduate student)
Zheyi Ni (graduate student)
Diyang Zheng (graduate student)
Ying Xu (master student)

Ph.D students graduated (current position):

Fei Wang (postdoc, HHMI Janellia Farm, with Barry Dickson)
Kun Li (postdoc, Rockefeller University, with Nathaniel Heintz)
Jianbo Xiu (postdoc, Peking Union Medical School, with Qi Xu)
Tao Zhou (Assistant investigator, Shanghai Sci & Tech University)
Qi Zhang (postdoc, Shanghai Mental Health Center, With Tifei Yuan)
Hong Zhu (postdoc, Scripps Institute, with Li Ye)
Tingting Zhou (postdoc, MIT, with Guoping Feng)

Undergraduate students trained (current position):

Zhanmin Lin (graduate school, Erasmus Univ.)
Jia Shen (graduate school, SUNY/CSHL, US)

Research Subjects

- [1] Neural representation of emotional valence
- [2] Molecular and circuit mechanism of depression
- [3] Neural circuit mechanism of social hierarchy

Selected Publications

1. Yang Y, Cui Y, Sang K, Dong Y, Ni Z, Ma S, **Hu H.** (2018) Ketamine blocks bursting in the lateral habenula to rapidly relieve depression. *Nature*, 554: 317-22
2. Cui Y, Yang Y, Ni Z, Dong Y, Sang K, Cai G, Foncelle A, Ma S, Sang K, Tang S, Li Y, Shen Y, Berry H, Wu S, **Hu H.** (2018) Astroglial Kir4.1 in the lateral habenula drives neuronal bursts in depression. *Nature*, 554: 323-27
3. Fan Z and **Hu H.** (2018) Medial Prefrontal Cortex Excitation/Inhibition Balance and Schizophrenia-like Behaviors Regulated by Thalamic Inputs to Interneurons. *Biological Psychiatry* 83(8):630-31 (invited Commentary)
4. Zhou TT, Sandi C*, Hu H*. (2018) Advances in understanding neural mechanisms of social dominance. *Current Opinion in Neurobiology*, 49 (invited review, * co-corresponding author)
5. Yang Y, Wang H, Hu J*, Hu H*. (2018) Lateral habenula in the pathophysiology of depression *Current Opinion in Neurobiology*, 48 (invited review, * co-corresponding author)
6. Zhang Q, He Q, Wang J, Fu C, Hu H. (2017) Use of TAI-FISH to visualize neural ensembles activated by multiple stimuli. *Nature Protocol*, 13:118-33
7. Zhou TT, Zhu H, Fan ZX, Wang F, Chen Y, Liang HX, Yang ZF, Zhang L, Lin LN, Zhan Y, Wang Z, **Hu H.** (2017) History of winning remodels thalamo-PFC circuit to reinforce social dominance. *Science*, 357: 162-168.
8. **Hu H.** (2016) Reward and aversion. *Annual Review in Neuroscience*, 39: 297-324. (invited review)

9. Lv Q, Yang L, Li G, Wang Z, Shen Z, Yu W, Jiang Q, Hou B, Pu J, **Hu H**, Wang Z. (2015) Large-scale persistent network reconfiguration induced by ketamine in anesthetized monkeys: relevance to mood disorders. *Biological Psychiatry*, 79(9):765-75.
10. Xiu JB, Zhang Q, Zhou T, Zhou TT, **Hu H**. (2014) Visualizing an emotional valence map in the limbic forebrain by TAI-FISH. *Nature Neuroscience*, 17:1552-1559 (Selected by **Faculty 1000**)
11. Wang F, Kessels H*, **Hu H***. (2014) The mouse that roared - neural mechanisms of social hierarchy. *Trends in Neuroscience* 11:674-682 (invited review, cover article, * co-corresponding author)
12. Li K, Zhou T, Liao L, Yang Z, Wong C, Henn F, Malinow R, Yates J, **Hu H**. (2013) β CaMKII in lateral habenula mediates core symptoms of depression. *Science*, 341:1016-1020. (Featured by *Nat. Rev. Neuro.* and *JAMA*, selected by **Faculty 1000**)
13. Wang F, Zhu J, Zhu H, Zhang Q, Lin Z, **Hu H** (2011) Bidirectional control of social hierarchy by synaptic efficacy in medial prefrontal cortex. *Science*, 334: 693-697. (Featured in *Science*, 334: 608-9)
14. **Hu H***, Qin Y*, Bochorishvili G, Zhu Y, Van Aelst, L, and Zhu JJ. (2008) Ras signaling mechanism for impaired synaptic plasticity and AMPA receptor trafficking in a mouse model of fragile X syndrome. *Journal of Neuroscience*, 28(31): 7847-62.) (* co-first author)
15. **Hu H**, Real E, Takamiya K, Kang MG, Ledoux J, Hugarir R, Malinow R. (2007) Emotion Enhances Learning via Norepinephrine Regulation of AMPA-Receptor Trafficking. *Cell* 131: 160-73. (Featured by *Nature* Journal club and *Nat. Rev. Neurosci.*)
16. **Hu H***, Li M*, Labrador J, McEwen J, Lai EC, Goodman CS, Bashaw GJ. (2005) Cross GTPase-activating protein (CrossGAP)/Vilse links the Roundabout receptor to Rac to regulate midline repulsion. *Proc Natl Acad Sci* 102(12): 4613-8. (* co-first author)
17. Godenschwege TA, **Hu H**, Shan X, Goodman CS and Murphey RK. (2002) Bi-directional signaling by Semaphorin 1a during central synapse formation in Drosophila. *Nature Neuroscience* 5: 1294-301.
18. Bashaw GJ, **Hu H**, Nobes CD, Goodman CS. (2002) A novel Dbl family RhoGEF promotes Rho-dependent axon attraction to the central nervous system midline in Drosophila and overcomes Robo repulsion. *Journal of Cell Biology* 155(7): 1117-1122. (Cover article)
19. **Hu H**, Marton T and Goodman CS. (2001) PlexinB Mediates Axon Guidance in Drosophila by Simultaneously Inhibiting Active Rac and Enhancing RhoA Signaling. *Neuron* 32(1): 39-51. (Highlighted in the Preview of *Neuron*)
20. Driessens MH, **Hu H**, Nobes CD, Self A, Jordens I, Goodman CS, Hall A. (2001) Plexin-B semaphorin receptors interact directly with active Rac and regulate the actin cytoskeleton by activating Rho. *Current Biology*, 11(5): 339-44.
21. Bellocchio EE, **Hu H**, Pohorille A, Chan J, Pickel VM and Edwards RH. (1998) The Localization of the Brain-Specific Inorganic Phosphate Transporter Suggests a Specific Presynaptic Role in

Glutamatergic Transmission. *J. Neurosci.*, 18(21): 8648-59.

Invited Talks

- 2018 Canada Gairdner Award Symposium "Let there be light, Optogenetics in neuroscience and beyond", Toronto, Canada
- 2018 UCLA seminar, Los Angeles, USA
- 2018 Scripps seminar, San Diego, USA
- 2018 Sainsbury Wellcome Center Seminar, London, UK
- 2018 Cold Spring Harbor Asia Conference on "Latest advances in development& function of neural circuits", meeting **co-organizer**, Awaji, Japan
- 2018 Gordon conference on "Molecular and Cellular Neurobiology", Hongkong, China
- 2018 Cold Spring Harbor Conference on "Brains & Behavior: Order & Disorder in the Nervous System", New York, USA
- 2017 MIT Picower Symposium on "Neural Circuits of Emotion and Motivation", Boston, USA
- 2017 Harvard University Center for Brain Science seminar, Boston, USA
- 2017 Boston Children's Hospital Kirby Neuroscience Program seminar, USA
- 2017 Mount Sinai Medical School seminar, New York, USA
- 2017 Gordon Conference on "Excitatory Synapses & Brain Function", Diablerets, Switzerland
- 2017 Francis Crick Symposium of Neuroscience, Cold Spring Harbor Asia Conference, meeting **co-organizer**, Suzhou, China
- 2016 UCSD symposium "Wiring and Functional Principles of Neural Circuits", San Diego, USA
- 2016 Nature Conference on "Neural Circuitry of Emotion", Shenzhen, China
- 2016 Annual Conference of Chinese Psychology Society, **Plenary lecture**, Chongqing, China
- 2016 Chinese-American Kavli Frontiers of Science Conference, **Session organizer**, Irvine, USA
- 2016 Korean Society of Neuroscience symposium talk, Seoul, Korea
- 2016 FENS meeting, symposium organizer, Copenhagen, Denmark
- 2016 "The Neurobiology of Mental Health" NCCR Conference, Geneva, Switzerland
- 2016 NYU-Shanghai seminar
- 2015 Biennial Conference of Chinese Neuroscience Society, **Plenary lecture** Wuzheng, China
- 2015 Francis Crick Symposium of Neuroscience, Cold Spring Harbor Asia Conference, Suzhou, China
- 2015 "From Neural Circuitry to Neurotechnology" meeting by AAA Science, RIKEN & IPSEN, Tokyo, Japan
- 2014 Society of Japanese Neuroscience Conference, symposium on aggression behavior, Japan
- 2014 RIKEN seminar, Japan
- 2014 Chinese-American Frontiers of Science Symposium
- 2014 Institute of Biophysics "Bei Shi Zhang" seminar, Chinese Academy of Sciences, Beijing
- 2013 FMI seminar, Basel, Switzerland
- 2013 EMBL seminar, Monterotondo, Italy
- 2013 Cold Spring Harbor Asia Conference, Francis Crick Symposium of Neuroscience: The Changing Brain. Suzhou, China
- 2013 CGSB Meeting of NYU, Abu Dhabi, UAE
- 2012 College de France, Paris, France
- 2012 University of Muenster/EMBL, Muenster, Germany
- 2012 The European Science Foundation/FENS conference on The Neurobiology of Emotion, Stressa, Italy.
- 2012 14th International Congress of Histochemistry and Cytochemistry (ICHC 2012). Kyoto, Japan.

(**Session co-chair** on “Neurobiology of social behavior”)

- 2012 Cold Spring Harbor Asia Conference on Neural Circuit Basis of Behavior and its Disorders.
Suzhou, China.
- 2011 Erasmus Univeristy, Department of Neuroscience seminar, the Netherlands.
- 2011 VU University of Amsterdam seminar, the Netherlands.
- 2011 4th Sino-German Frontiers of Science Symposium in Berlin
- 2010 Japan National Institute for Physiological Science meeting “Synapse”
- 2009 22nd Biennial Meeting of International Society of Neurochemistry, Young Scientist
Lecture, “In search of the Molecular and Circuit Mechanism of Depression”
- 2008 New York University, Center for Neural Science
- 2008 Mount Sinai Medical School
- 2008 Harvard University, Center for Brain Science
- 2008 MIT, Picower Center for Learning and Memory