RU-YUAN ZHANG(张洳源)

Curriculum Vitae (Updated 03/31/2019)

Contact

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Education

2010-2016	University of Rochester	**Ph.D**., Brain & Cognitive Sciences (BCS) Advisors: Dr. Duje Tadin and Dr. Daphne Bavelier
2010 - 2014	University of Rochester	**M.A**., Brain & Cognitive Sciences
2006 - 2010	Peking University	**B.A**., Psychology; Minor: Computer Science

PhD Advisory Committee: Dr. Duje Tadin, Dr. Daphne Bavelier and Dr. Robert Jacobs (Chair)

PhD Thesis Committee: Dr. Duje Tadin, Dr. Daphne Bavelier, Dr. Brad Mahon, Dr. Zhonglin Lu (OSU), Dr. Krystel Huxlin (Chair)

Appointment

2019-present	**Postdoctoral Research Associate (Advisor Dr. Geoff Ghose)** Center for Magnetic Resonance Research, Department of Neuroscience, University of Minnesota
2018-2019	**Postdoctoral Research Associate (Advisor Dr. Ben Hayden)** Center for Magnetic Resonance Research, Department of Neuroscience, University of Minnesota
2016-2018	**Postdoctoral Research Associate (Advisor Dr. Kendrick Kay)** Center for Magnetic Resonance Research, Department of Radiology, University of Minnesota

2010 - 2016 **PhD student (Advisor Dr. Duje Tadin)**
Department of Brain & Cognitive Sciences and Center of Visual Science, University of Rochester

2010 - 2016 **PhD student (Advisor Dr. Daphne Bavelier)**
Department of Brain & Cognitive Sciences and Center of Visual Science, University of Rochester
FPSE, University of Geneva, Switzerland

2007 - 2010 **Undergraduate Research Assistant (Advisor: Dr. Fang Fang)**
Vision and Brain Imaging Lab, Department of Psychology, Peking University

Awards and honors

2013 Student Travel Award for 12th Vision Sciences Society Annual Meeting

2010 Graduate Fellowship from Department of Brain & Cognitive Sciences, University of Rochester

2009 Undergraduate Research Fellowship from Institute of Psychology, Chinese Academy of Science

2009 Class Scholarship in Department of Psychology, Peking University

2008 Undergraduate Research Fellowship from Peking University

2008 GuangHua Undergraduate Scholarship, Peking University

2007 Class Scholarship in Department of Psychology, Peking University

Research Method and Skills

Research skills: visual psychophysics, structural and functional magnetic resonance neuroimaging, computational modeling.
Research/Programming software: Matlab, Python, Psychotoolbox, Freesurfer, BrainVoyager, SPSS.

Grants

Kay, K., **Zhang, R**. High resolution imaging of spatial representation in human visual cortex. ***NIH R21 grant*** (revision and resubmission).

Publications

(*co-first author, #corresponding/senior author)

Journal papers

1. **Zhang, R***., Kwon, O. S*. & Tadin, D. (2013) Illusory motion of stationary stimuli in visual periphery: evidence for a strong centrifugal prior. ***Journal of Neuroscience**,* 33, 4415-4423.

2. V. R. Bejjanki***.**, **Zhang, R*.**, Li. R., Lu. Z., Pouget, A., Green, CS, & Bavelier, D. (2014) Action video game facilitates development of better perceptual template. ***Proceedings of the National Academy of Sciences***, 111(47), 16961-16966.

3. Cavanaugh M.R*., **Zhang, R***., Melnick M.D., Das. A., Roberts,M., Tadin,D., Carrasco,M., $ Huxlin,. K. R. (2015) Visual recovery in cortical blindness is limited by high internal noise. ***Journal of Vision**, 15*(10), 9-9.

4. Nyquist J.B., Lappin J. S., **Zhang, R.,** & Tadin, D. (2016) Perceptual Training yields rapid improvements in visually impaired youth. ***Scientific Reports**, 6,* 37431.

5. **Zhang, R.,** Engel, S., & Kay, K. (2017) Binocular Rivalry: a window into cortical competition and suppression. ***Journal of Indian Institute of Sciences,*** 1-9. *97*:477

6. Park, Wj, Schauder, K.B., **Zhang， R.**, Bennetto, L., &Tadin D. (2017) Perceptual inefficiency characterized by increased internal noise and reduced external noise filtering in autism spectrum disorder. ***Scientific Reports***, *7*, 17584.

7. **Zhang ,R#.,** &Tadin, D. (2019) Disentangling locus of perceptual learning in the visual hierarchy of motion processing. ***Scientific Reports***, *9*, 1557.

8. Kay K., Jamison K., Vizioli L., **Zhang R**., Margalit E, Ugurbil K. (2019) A critical assessment of data quality and venous effects in ultra-high-resolution fMRI. ***Neuroimage,*** *189*, 847-869.

9. Fang, W., **Zhang, R**., Zhao, Y., Wang, L., Zhou, Y. (2019) Attenuation of pain perception induced by the rubber hand illusion. ***Frontiers in Neuroscience***, *13*, 261.

10. Zhang, C., Qiao, K., Wang, L., Tong, L., Hu, G., **Zhang, R-Y#**., Yan, B#. A visual encoding model based on deep neural networks and transfer learning for brain activity measured by functional magnetic resonance imaging. ***Journal of***

Neuroscience Methods (in press). arxiv (https://arxiv.org/abs/1902.08793)

Conference papers

11. **Zhang, R**[#]., Kay, K. (2017) Attentional field model does not explain task-dependent spatial representation in human ventral temporal cortex. ***Proceedings of Conference on Cognitive Computational Neuroscience.*** PDF (https://www2.securecms.com/CCNeuro/docs-0/592873f768ed3fff4b8a2562.pdf)

12. **Zhang, R**[#]., & Kay, K. (2018) The impact of noise correlation on multivariate pattern classification in fMRI. ***Proceedings of Conference on Cognitive Computational Neuroscience***. PDF (https://ccneuro.org/2018/proceedings/1186.pdf)

13. Zhang, C., Duan, X., **Zhang, R**[#]., Tong, L[#]. (2018) Representation of adversarial images in deep neural networks and the human brain. ***Proceedings of Conference on Cognitive Computational Neuroscience***. PDF (https://ccneuro.org/2018/proceedings/1066.pdf)

14. Zhao, Y., Ran, X., Zhang, L., **Zhang, R**[#]., Ku, Y[#]. (2018) Modeling visual working memory in Schizophrenia. ***Proceedings of Conference on Cognitive Computational Neuroscience***. PDF (https://ccneuro.org/2018/proceedings/1076.pdf)

In review/revision/preparation

15. **Zhang, R-Y.,** Lu, Z., Martin, B., Jaeggi, Susanne., Green C.S., & Bavelier, D. 'Learning to learn' as a mechanism for generalization of learning: Lessons from action video games. ***elife*** (in prep).

16. **Zhang, R-Y**[#]**.,** Kay, K. Flexible attentional modulation in human ventral temporal cortex. ***Neuroimage*** (in review). biorxiv (https://www.biorxiv.org/content/10.1101/279935v2)

17. Zhao, Y., Ran, X., Zhang, L., **Zhang, R-Y**[#]., Ku, Y[#]., Atypically larger variability of resource allocation accounts for visual working memory deficits in schizophrenia. ***Biological Psychiatry*** (in review). biorxiv (https://www.biorxiv.org/content/10.1101/424523v1)

18. Zhang, C., Duan, X., **Zhang, R-Y**[#]., Tong, L[#]. Dissociable neural representations of adversarially perturbed images in deep neural networks and the human brain. ***Neuroimage*** (in review). arxiv (https://arxiv.org/abs/1812.09431)

19. Zhao, Y*., Ran, X., Zhang, L., **Zhang, R-Y**[#]., Ku, Y[#]. Unexpected higher resilience

to distraction during visual working memory in schizophrenia. ***Schizophrenia Bulletin*** (in review). biorxiv (https://www.biorxiv.org/content/10.1101/567859v1?rss=1)

20. **Zhang, R-Y#**., Wei, X-X., Kay, K., Understanding multivariate brain activity: evaluating the effect of voxelwise noise correlations in functional magnetic resonance imaging. ***Journal of Neuroscience*** (in review). biorxiv (https://www.biorxiv.org/content/10.1101/592618v1)

Conference presentations

2019

- Zhao, Y., Ran, X., Zhang, L., **Zhang, R#**., Ku, Y#. (2019) Abnormally enhanced resilience to distraction in visual working memory in schizophrenia. (2019 Annual Meeting of Society of Biological Psychiatry)
- Zhao, Y., Ran, X., Zhang, L., **Zhang, R#**., Ku, Y#. (2019) Atypically larger variability of resource allocation accounts for visual working memory deficits in schizophrenia. (2019 Annual Meeting of Society of Biological Psychiatry)
- Margalit, E., Jamison, K., Weiner, K., Vizioli, L., **Zhang, R.**, Kay, K., and Grill-Spector, K. (2019) Differential representation of object category information follows anatomical differences in ventral temporal cortex. (Vision Sciences Society Annual Meeting 2019)
- Ge, Y., **Zhang, R.**, Qian, C., Chen, C., Mesik, J., Engle, S., He S. (2019) Underlying mechanisms of temporal dynamics in bistable perception. (Vision Sciences Society Annual Meeting 2019).

2018

- **Zhang, R**., & Kay, K. (2018) The impact of noise correlation on multivariate pattern classification in fMRI. (Annual Conference on Cognitive Computational Neuroscience 2018).
- Zhang, C., Duan, X., **Zhang, R#**., Tong, L#. (2018) Representation of adversarial images in deep neural networks and the human brain. (Annual Conference on Cognitive Computational Neuroscience 2018).
- Zhao, Y., Ran, X., Zhang, L., **Zhang, R#**., Ku, Y#. (2018) Modeling visual working memory in Schizophrenia. (Annual Conference on Cognitive Computational Neuroscience 2017).
- Zhang, C., Duan, X., Tong L., **Zhang R** (2018). Representation of adversarial images in deep neural networks and the human brain (Asia-Pacific Conference on Vision 2018).
- Racey, C., **Zhang, R.**, Kay, K., Schloss K B. (2018). The neural substrate for semantic associations underlies color preference judgments (Vision Sciences Society Annual Meeting 2018)
- Kay, K., Jamison, K., Vizioli, L., **Zhang, R.**, Margalit, E. (2018). Ultra-high-resolution fMRI: a critical assessment. (Organization of Human

Brain Mapping Annual Meeting 2018)

2017

- Jamison K, Vizioli L, **Zhang R**, Tao J, Winawer J, Kay K. (2017). A tool for automatic identification of cerebral sinuses and corresponding artifacts in fMRI (Vision Sciences Society Annual Meeting 2017).
- **Zhang R**, Kay K. (2017). Attentional field model does not explain task-dependent spatial representation in human ventral temporal cortex (Annual Conference on Cognitive Computational Neuroscience 2017).

2016

- **Zhang, R.,** Tadin, D. (2016). The complete transfer of learning between component and pattern motion: psychophysical evidence for training-induced plasticity in MT. (Vision Sciences Society Annual Meeting 2016)

2015

- **Zhang, R**., Kwon, O.S., & Tadin, D. (2015). Specificity and transfer of perceptual learning of motion. (Vision Sciences Society Annual Meeting 2015)
- Kwon, O.S., **Zhang, R**., & Tadin, D. (2015). Temporal evolution of motion direction judgments. (Vision Sciences Society Annual Meeting 2015)

2014

- **Zhang, R**., Jaeggi, S.M., Buschkuehl, M.,& Bavelier, D. (2014). Working memory and skill learning as a function of video game experience. (Association for Psychological Science Convention 2014)
- Cavanaugh, M.R., Melnick, T.M., **Zhang, R**., Roberts, M., Das, A., Tadin, D., Carrasco, M., & Huxlin, K.R., (2014). Residual inefficiencies of recovered vision in cortically blind fields – insights from the equivalent noise analysis**.** (Vision Sciences Society Annual Meeting 2014)
- Cavanaugh, M.R., Das, A., Melnick, T.M., **Zhang, R**., Tadin, D., Carrasco, M., & Huxlin, K.R., (2014). Engineering the Eye IV Restoring Vision 29th Symposium. Center of Visual Science, University of Rochester. (29th Center of Visual Science Symposium)

2013

- **Zhang, R**., Green, S., Lu, Z., & Bavelier, D. (2013). Speeding up Learning: Action Video Games and Perceptual Learning. Journal of Vision, 13(9), 1089-1089. (Vision Sciences Society Annual Meeting 2013)

2012

- **Zhang*, R**., Kwon*, O.S., & Tadin, D. (2012) Illusory motion of stationary stimuli in visual periphery: evidence for a strong centrifugal prior. (**=equally contributing authors). Computational Foundations of Perception & Action 28th

Symposium. Center of Visual Science, University of Rochester. (28th Center of Visual Science Symposium)

- **Zhang, R**., Bejjanki, V. R., Lu, Z., Green, S., Pouget, A., & Bavelier, D. (2012). Action Video Games playing improves learning to learn in perceptual learning. Journal of Vision, 12(9), 1130-1130. (Vision Sciences Society Annual Meeting 2012)

2011

- **Zhang, R.**, Li, R., Lu, Z., & Bavelier, D. (2011). Perceptual templates improvement through action video game playing and comparison to perceptual learning. i-Perception, 2(4), 269-269. (Asia-Pacific Conference of Vision 2011)
- **Zhang, R**., & Tadin, D. (2011). Illusory centrifugal motion direction observed in brief stimuli: psychophysics and energy model. i-Perception, 2(4), 389-389. (**Abstract** at Asia-Pacific Conference of Vision 2011)
- **Zhang, R**., & Tadin, D. (2011). Illusory centrifugal motion direction observed in stationary stimuli: Dependency on duration and eccentricity. Journal of Vision, 11(11), 769-769. (Vision Sciences Society Annual Meeting 2011)

2009

- **Zhang, R**. & Fang, F. (2009). Top-down influence on invisible face to gain access to awareness during continuous flash suppression (poster presentation). Workshop on Cognitive Science: From Cellular Mechanisms to Computational Theories (CS-2009), May, 2009, Beijing, China. (Beijing International Cognitive Science Workshop)

Computational Methods Courses

Peking University, Computer Science
Introduction to Computer Science
Data Structure and Algorithm

Tsinghua University, Computer Science

Computational Neuroscience	Instructor: Dr. Zhaoping Li	Audit

University of Rochester, Brain & Cognitive Sciences (BCS)

Computational Neuroscience	Instructor: Dr. Alex Pouget	Grade: A
Computational Methods in Cognitive Science	Instructor: Dr. Robert Jacobs	Grade: A
Computational Neuroscience (Spring 2015)	Instructor: Dr. Ralf Haefner	Audit

University of Minnesota,Psychology

Deep Learning and Human Vision	Instructor:Dr. Dan Kersten

Online Courses

Computational Neuroscience (Coursera)	Instructor: Dr. Rajesh P.N. Rao and Dr. Adrienne Fairhall
Machine Learning (Coursera)	Instructor: Dr. Andrew Ng
Statistical Analysis of fMRI Data (Coursera)	Instructor: Dr. Martin Lindquist
Introduction to Statistics: Descriptive, Probability and Inference (Edx)	Instructor: Dr. Ani Adhikari

Ongoing and planned courses

Probabilistic Graphical Models (Coursera)	Instructor: Dr. Daphne Koller
Neural Networks for Machine Learning (Coursera)	Instructor: Dr. Geoffery Hinton
An Introduction to Interactive Programming in Python (Coursera)	

Journal Review

Frontiers in System Neuroscience, Current Biology, Journal of Neuroscience, Neuroimage, Journal of Vision, Plos one

Talks

2018 Institute of Science and Technology for Brain-Inspired intelligence, Fudan University

2017 Perception Lunch Talk, Department of Psychology, University of Minnesota, Twin Cities.

2016 Perception Lunch Talk, Department of Psychology, University of Minnesota, Twin Cities.

2016 Talk, the School of Psychology, South China Normal University, Guangzhou, China

2016 Talk, Neuro-Cognitive Research Center, South University of Science and Technology of China

2016 Invited Talk, Department of Psychology, Zhejiang University, Hangzhou,

China.

2016 Invited Talk, Department of Psychology, the School of Education, Suchow University, Suchow, China.

2016 Talk, Institute of Cognitive Neuroscience, the School of Psychology and Cognitive Science, East China Normal University, Shanghai, China.

2015 Talk, National Institute of Health, Laboratory of Dr. Biyu He

2015 Talk, University of California, Berkeley, Laboratory of Dr. Jack Gallant

2015 Talk, Center of Visual Science, University of Rochester

2014 Graduate student lunch talk, Department of Brain& Cognitive Sciences, University of Rochester

2013 Graduate student lunch talk, Department of Brain& Cognitive Sciences, University of Rochester

Teaching

University of Rochester

2015 Instructor for graduate course *Special Topic in Vision* (BCS)

2014 Teaching assistant for undergraduate course *Foundation of Cognitive Sciences* (BCS111)

2013 Teaching assistant for undergraduate course *Foundation of Cognitive Sciences* (BCS111)

2011 Teaching assistant for undergraduate course *Perception & Action* (BCS151)

Peking University

2009 Teaching assistant for undergraduate course *Central Neuro System*

2010 Teaching assistant for undergraduate course *Cognitive Neuroscience*

Professional Membership (Past and Present)

Vision Sciences Society (2010-present)
Association for Psychological Science (2014-2015)
Cognitive computational neuroscience (2017-present)

Other research-related activities

2015	Participant, University of Rochester Deep Learning Reading Group
2014-2016	Organizer and participant, Center for Visual Science journal club
2015	Student host for Prof. Christopher Baker, Boynton Colloquium Series Lecture, Center of Visual Science
2014	Student host for Prof. Sheng He, Boynton Colloquium Series Lecture, Center of Visual Science
2012	Student host for Prof. Takeo Watanabe, Boynton Colloquium Series Lecture, Center of Visual Science