BIN YANG

302 Cubicle, Meliora Hall
Rochester, NY 14623, USA
Email: bin.yang@rochester.edu

EDUCATION / TRAINING

Aug. 2017 – present:

Degree:	PhD	Institute:
Advisor:	Michele Rucci, PhD	Department of Brain and Cognitive Sciences,
Major:	Brain & Cognitive Sciences	University of Rochester, Rochester, NY 14623, USA

Sep. 2013 – Jul. 2017:

Position:	Research Assistant	Institute:
Advisor:	Mingsha Zhang, PhD, MD	National Key Lab of Cognitive Neuroscience and Learning,
Field:	Neuronal Mechanisms of Cognitive Neuroscience	Beijing Normal University, Beijing, 100875, P.R. China

Sep. 2009 – Jun. 2013:

Degree:	Bachelor of Engineering	Institute:
Major:	Software Engineering	College of Software,
Ranking: 11/135		Nankai University, Tianjin, 300071, P.R. China

RESEARCH EXPERIENCE

Sep. 2017 – Present:

Field: Active Visual Perception. **Advisor**: Michele Rucci, Ph.D., Professor.
Institute: Department of Brain and Cognitive Sciences, University of Rochester.

Project 1: How Blink Transient Affects Visual Acuity.

It has long been believed that visual perception is suppressed around time of blinks to counteract the instability of visual input introduced by blinks. However, we propose that blinks and accompanying eye movements will redistribute spatial power of the visual input into the temporal domain, and power spectra analysis for this spatiotemporal power redistribution predicts that blinks would benefit visual acuity for low spatial frequencies. I am currently collecting behavioral data from human subjects to test the prediction, and the following step would be modeling retinal ganglion cells to investigate the underlying neuronal mechanisms.

Sep. 2013 – Jul. 2017:

Field: Neuronal Mechanisms of Cognitive Neuroscience. **Advisor**: Mingsha Zhang, M.D., Ph.D. Professor.
Institute: National Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University.

Project 2: Spatiotemporal Dynamics of Microsaccades Direction.

Microsaccades are small fixational eye movements which have been reported to be involved in preventing visual fading, supporting detailed visual sampling etc. Although microsaccades direction was found to be attention-modulated, the detailed modulation remains unclear. In this project, two monkeys were trained to perform a spatial choice saccade task, and the spatiotemporal dynamics of microsaccades direction were elaborately studied. It was found that microsaccades direction rotated continuously after spatial cue onset, and the rotation speed was greater when monkeys chose against their intrinsic directional bias. These results signify the importance of the spatiotemporal dynamics of microsaccades direction.

Project 3: Neuronal Mechanisms Underlying Automatic Allocentric Encoding.

Despite crucial roles of allocentric spatial coordinates in our daily life, there is a heated debate about whether there are "real" allocentric spatial representations in human brains. In 2015, an MRI study showed the existence of an automatic allocentric encoding signal in human right precuneus. To find out the neuronal mechanisms underlying this automatic allocentric encoding, this project involved single neuron recordings in right precuneus of rhesus monkeys to verify a neuronal model which explained how egocentric encoding neurons integrate to form allocentric representations.

Project 4: Retrospective Bayesian Perceptual Decoding Model.

Like encoding for sensory input, decoding for perception and memory retrieval is usually thought to be carried out with information representations processed in a sequence from low- to high- levels. However,

Dr. Ning Qian and Dr. Misha Tsodyks recently found a repulsion phenomenon of the relative orientation judgement of two lines presented sequentially, which followed a retrospective Bayesian perceptual model decoding from high- to low- levels. The current project in collaboration with Dr. Qian verified a prediction from this model using psychophysics: the repulsion increases as the memory of two lines gets worse.

Mar. 2012 – Aug. 2013:
  Field: Cellular Automata (CA).   **Advisor**: Chao Wang, Ph.D., Associate Professor.
  Institute: College of Software, Nankai University.

  Project 5: Reversibility of 1D Linear CA over the Binary Field $\mathbb{Z}_2$ under Null Boundary Conditions.

    The reversibility problem of 1D linear CA over the binary field $\mathbb{Z}_2$ under null boundary conditions is crucial to studies of both theories and applications of CA. In this study, I innovatively devised a universal graph method to determine the reversibility of such CA rules, which was a breakthrough in the study of this reversibility problem.

PUBLICATIONS

Xiaofeng Xu, **Bin Yang**, Ning Qian, Mingsha Zhang, Exaggeration on Tilt Repulsion Effect as Predicted by a Retrospective Bayesian Decoding Model on Working Memory, *Poster in the 14th Asia-Pacific Conference on Vision and the 3rd China Vision Science Conference,* 2018.

Bin Yang, Jing Guang, Yang Zhou, Mingsha Zhang, Rotated Direction of Microsaccade Represents Motor Choice in the Spatial Choice Tasks, *Oral presentation in the 1st China Vision Science Conference*, 2016.

Bin Yang, Jing Guang, Yang Zhou, Mingsha Zhang, Rotation of Microsaccades Direction Reflects Spatial Choice and Individual Bias, *Poster in the 6th FAONS Congress and 11th Biennial Conference of CNS*, 2015.

Bin Yang, Chao Wang, Aiyun Xiang, Reversibility of General 1D Linear Cellular Automata over the Binary Field $\mathbb{Z}_2$ under Null Boundary Conditions, *Information Sciences*, 2015.

WORKING EXPERIENCE

Sep. 2013 – Jul. 2017:
  Employer: Neuronal Mechanisms of Cognition Group, National Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University.
  Position: Research Assistant.
  Duties:
    1. Modifying, configuring and maintaining software including REX (monkey training system), Matlab & Psychtoolbox and lab webpage.
    2. Giving courses on Matlab programming.
    3. Conducting electrophysiological and psychophysical projects separately.

Jul. 2011 – Dec. 2011:
  Employer: Ambow Huaying School, Ambow Education
        (Top 10 private educational services provider in China)
  Position: C Language Teacher (part-time)
  Duties: Teaching C Language in the *National Olympiad in Informatics* class

HONORS / AWARDS

National Encouragement Scholarship (Available for top 10 ordered by GPA)	2010, 2012
TOP TEN Volunteer of Nankai University	2010
TOP TEN Volunteer of College of Software, Nankai University	2011
Merit Student of Nankai University	2012

EXTRA CURRICULUM ACTIVITIES

2009 – 2013: Volunteer of Tianjin Youth Volunteers Association, with over 70 hours of voluntary services.
2010 – 2011: Minister of the Department of Training, Youth Volunteer Service & Social Practice Center, College of Software, Nankai University.
2015, 2016: Men's Double champion of the Badminton Game for Teachers & Students, School of Brain and Cognitive Sciences, Beijing Normal University.