

QUANJING CHEN

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EDUCATION

University of Rochester, Rochester, NY	<i>Sep 2013 - Jul 2018</i>
Doctor of Philosophy (Ph.D.) in Brain & Cognitive Sciences	
Beijing Normal University, Beijing, China	<i>Sep 2010 - Jul 2013</i>
Master of Science (M.S.) in Psychology	
Beijing Normal University, Beijing, China	<i>Sep 2006 - Jul 2010</i>
Bachelor of Science (B.S.) in Psychology	

RESEARCH INTERESTS

- Applying machine learning methods to multimodal neuroimaging (functional and structural MRI, functional connectivity, diffusion MRI and psychophysiology);
- Studying neural representations of conceptual knowledge in the brain;
- Identifying sensitive biomarkers for early detection of Alzheimer's disease;
- Developing cognitive interventions that promote cognitive health.

RESEARCH EXPERIENCE

University of Rochester Medical Center - CogT Lab	<i>Sep 2018 - present</i>
<i>Postdoctoral Associate</i>	<i>Rochester, NY</i>

- **Longitudinal Structural Connectome Mapping for Successful Aging**
 - Aimed to identify brain markers (white matter oriented) that protect older adults against the effects of Alzheimer pathology and prevent them from cognitive decline.
 - Extracted connectomes from diffusion MRI data using a cutting-edge diffusion imaging processing pipeline.
 - Applied Finite Mixture Modeling to identify a set of stable and intact connectomes that are unique to high-performing elderly adults.
 - Validated the prediction power of identified connectomes using support vector machine and significantly classified positive vs. negative pathology of Alzheimer's disease with accuracies above 70% in an external validation sample
- **Computerized intervention in older adults with Mild Cognitive Impairment**
 - Aimed to elucidate the relationship between parasympathetic nervous system (PNS) function and Alzheimer's disease associated neurodegeneration via a 6-week computerized cognitive training.
 - Assessed PNS responses with ECG and brain function with task fMRI at baseline and after training.
 - Extracted shapelets (time-series subsequences) from ECG data using a sliding window approach and calculated the similarity between a shapelet and a series as a discriminatory feature for later classification.
 - Built a feature selection model using Orthogonal Matching Pursuit and identified a task-independent ECG shapelet at baseline which successfully predicted cognitive and neural gains after training.

University of Rochester - CAOs Lab	<i>Sep 2013 - Jul 2018</i>
<i>Research Assistant</i>	<i>Rochester, NY</i>

- **The representation of tool knowledge in the human brain**
 - Aimed to study how information about manipulable objects is organized in the human brain using patterned

based task fMRI and functional connectivity.

- *Developed a novel computational approach for decoding object knowledge in which classifiers were trained on one pair of objects and then tested on a distinct pair; this permitted a measurement of classification accuracy over and above object-specific.*
- *Established a classification model with support vector machine and showed that action similarity among objects could be decoded in the inferior parietal lobule independent of the task applied to objects and stimulus.*
- *Built a multivariate pattern analysis model in a novel way to relate patterns of functional connectivity to patterns of task activation.*

PUBLICATIONS

1. **Chen, Q.**, Yang, H., Rooks, B., Anthony, M., Zhang, Z., Tadin, D., Heffner, K., & Lin, F. Autonomic Flexibility Reflects Learning in Old Age. (under review)
2. **Chen, Q.**, Baran, T. M., Rooks, B., O'Banion, M. K., Mapstone, M., Zhang, Z., & Lin, F. Cognitive older adults maintain a unique structural connectome that is resistant to Alzheimer's pathology. (under review)
3. Lin, F., **Chen, Q.**, Tao, Y., McDermott, K., Jacobs, A., Chen, D., Schifitto, G., Conwell, Y., Heffner, K., Mapstone, M., Porsteinsson, A., & Tadin, D. The neurocognitive effects of a 6-week computerized cognitive training program in older adults with amnesic mild cognitive impairment (CogTE study): A phase II randomized controlled trial. (under review)
4. Rooks, B., Anthony, M., **Chen, Q.**, Lin, Y., Baran, T., Zhang, Z., Lichtenberg, P., & Lin, F. A Generic Brain Connectome Map Linked to Different Types of Real-World Decision-Making in Old Age. (under review)
5. Tao Y.†, **Chen, Q.**†, Chen, S., Zhuang, Y., Baran, T., & Lin, F. Neural Reserve Versus Compensation underlying Pre-Frail Status in Old Age. (under review) (†equally contributing authors)
6. **Chen, Q.**, Garcea, F. E., Jacobs, R. A., & Mahon, B. Z. (2018). Abstract representations of object-directed action in the left inferior parietal lobule. *Cerebral Cortex*, 28(6), 2162-2174.
7. Garcea, F. E., **Chen, Q.**, Vargas, R., Narayan, D. A., & Mahon, B. Z. (2018). Task- and domain-specific modulation of functional connectivity in the ventral and dorsal object-processing pathways. *Brain Structure and Function*, 223(6), 2589-2607.
8. Shay, E. A., **Chen, Q.**, Garcea, F. E., & Mahon, B. Z. (2018). Decoding intransitive actions in primary motor cortex using fMRI: toward a componential theory of 'action primitives' in motor cortex. *Cognitive neuroscience*, 1-7.
9. **Chen, Q.**, Garcea, F. E., Almeida, J., & Mahon, B. Z. (2017). Connectivity-based constraints on category-specificity in the ventral object processing pathway. *Neuropsychologia*, 105, 184-196.
10. Erdogan, G., **Chen, Q.**, Garcea, F. E., Mahon, B. Z., & Jacobs, R. A. (2016). Multisensory part-based representations of objects in human lateral occipital cortex. *Journal of cognitive neuroscience*, 28(6), 869-881.
11. Striem-Amit, E., Almeida, J., Belledonne, M., **Chen, Q.**, Fang, Y., Han, Z., Caramazza, A. & Bi, Y. (2016). Topographical functional connectivity patterns exist in the congenitally, prelingually deaf. *Scientific Reports*, 6.
12. Amaral, L., Ganho-Ávila, A., Osório, A., Soares, M. J., He, D., **Chen, Q.**, ... & Bi, Y. (2016). Hemispheric asymmetries in subcortical visual and auditory relay structures in congenital

deafness. *European Journal of Neuroscience*, 44(6), 2334-2339.

13. Fang, Y.[†], **Chen, Q.**[†], Lingnau, A., Han, Z., & Bi, Y. (2016). Areas recruited during action understanding are not modulated by auditory or sign language experience. *Frontiers in Human Neuroscience*. (†equally contributing authors)
14. **Chen, Q.**, Garcea, F. E., & Mahon, B. Z. (2016). The representation of object-directed action and function knowledge in the human brain. *Cerebral Cortex*, 26(4):1609-1618.
15. Almeida, J., He, D., **Chen, Q.**, Mahon, B.Z., Zhang, F., Gonçalves, O.F., Fang, F., & Bi, Y. (2015). Decoding visual location from neural patterns in the auditory cortex of the congenitally deaf. *Psychological Science*, 26, 1771-1782.
16. Han, Z., Bi, Y., Chen, J., **Chen, Q.**, He, Y., & Caramazza, A. (2013). Distinct regions of right lateral temporal cortex are associated with biological and human agent motion: fMRI and neuropsychological evidence. *Journal of Neuroscience*, 33, 15442-15453.

HONORS AND AWARDS

Model Student of Academic Records, Beijing Normal University, 2007-2009

Graduate fellowship, Beijing Normal University, 2010-2013

Student Outstanding Research Award, Beijing Normal University, 2012

TEACHING EXPERIENCE

Teaching assistant of

2017 BCS 110 - Neural Foundations of Behavior

2016 BCS 111 - Foundations of Cognitive Sciences

2015 BCS 111 - Foundations of Cognitive Sciences

COURSEWORK

Computational Modeling, Machine Learning, Introduction to fMRI, Cognition, Language, Cognitive Neuroscience, Applied Linear Regression

TECHNICAL STRENGTHS

Programming Languages

Python^{*}, Matlab^{*}, R^{*}

Neuroimaging Software

FSL^{*}, Freesurfer^{*}, SPM^{*}, TractVis^{*}, BrainVoyager^{*}

Frameworks & Libraries

SciPy^{*}, NumPy^{*}, DIPY^{*}, PyTorch[†], Psychtoolbox^{*}

^{*} Proficient. [†] Familiar.