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EDUCATION:

University of Pennsylvania (UPenn), School of Arts and Science — Philadelphia, PA, USA
Advisors: Dr. Danielle S. Bassett — Fall 2011 – Spring 2016
Ph.D. in Applied Mathematics and Computational Science
Dissertation: Control Theory Analysis on Brain Networks

Tsinghua University - Academic Talent Program — Beijing, China
B.S. in Mathematics and Physics — Fall 2007 – Spring 2011

EXPERIENCE:

Research Assistant in Penn Image Computing & Science Lab. — Philadelphia, PA, Sep 2011 – Sep 2013

Teaching Assistant in University of Pennsylvania. — Philadelphia, PA, Sep 2012 – Sep 2013

Research Assistant in Complex System Group. — Philadelphia, PA, Sep 2013 – May 2016

Postdoc in Psychiatric and Developmental Imaging Laboratory. — Philadelphia, PA, May 2016 – May 2017

Professor in Computer Science and Engineering of UESTC. — Chengdu, China, June 2017–

HONORS:

Forbes China 30 under 30 for 2017	July 2017
China's 1000 Young Talent Program	May 2017
Benjamin Franklin Fellowship, University of Pennsylvania,	June 2011
Union Gold Medal winner (ranked 1st) of S-T Yau College Students Mathematics Contest	Oct 2010
Scholarship for Academic Excellence, Tsinghua University	Nov 2009

PUBLICATIONS:

Leading and corresponding author papers:

1. **Shi Gu**, Fabio Pasqualetti, Matthew Cieslak, Scott T. Grafton, Danielle S. Bassett. Controllability of Structural Brain Networks. Nature Communications. Nat Commun. 2015, 6:8414.

2. **Shi Gu**, Theodore Satterthwaite, John Medaglia, Muzhi Yang, Raquel Gur, Ruben Gur, Danielle S. Bassett. Emergence of System Roles in Normative Neurodevelopment. PNAS. 112(44): 13681-13686

3. **Shi Gu**, Richard F. Betzel, Matthew Cieslak, Scott T. Grafton, Fabio Pasqualetti, Danielle Bassett. Optimal Trajectories of Brain State Transitions. NeuroImage (2017).

4. **Shi Gu**, Muzhi Yang, John D. Medaglia, Ruben C. Gur, Raquel E. Gur, Theodore D. Satterthwaite, and Danielle S. Bassett. "Functional hypergraph uncovers novel covariant structures over neurodevelopment." *Human brain mapping* 38, no. 8 (2017): 3823-3835.

5. **Shi, Gu**, Matthew Cieslak, Benjamin Baird, Sarah F. Muldoon, Scott T. Grafton, Fabio Pasqualetti, and Danielle S. Bassett. "The energy landscape of neurophysiological activity implicit in brain network structure." *Scientific reports* 8, no. 1 (2018): 1-15.

6. **Shi, Gu**, Cedric Huchuan Xia, Rastko Ciric, Tyler M. Moore, Ruben C. Gur, Raquel E. Gur, Theodore D. Satterthwaite, and Danielle S. Bassett. "Unifying the Notions of Modularity and Core–Periphery Structure in Functional Brain Networks during Youth." *Cerebral Cortex* 30, no. 3 (2020): 1087-1102.

7. Yang, Huzheng, Xiaoxiao Li, Yifan Wu, Siyi Li, Su Lu, James S. Duncan, James C. Gee, and **Shi Gu***. "Interpretable Multimodality Embedding of Cerebral Cortex Using Attention Graph Network for Identifying Bipolar Disorder." In *International Conference on Medical Image Computing and Computer-Assisted Intervention,* pp. 799-807. Springer, Cham, 2019.

8. Zhang, Tianwei, Lequan Yu, Na Hu, Su Lv, and **Shi Gu***. "Robust Medical Image Segmentation from Non-expert Annotations with Tri-network." In *International Conference on Medical Image Computing and Computer-Assisted Intervention*, pp. 249-258. Springer, Cham, 2020.

9. Cui, Hengji, Dong Wei, Kai Ma, **Shi Gu***, and Yefeng Zheng. "A Unified Framework for Generalized Low-Shot Medical Image Segmentation with Scarce Data." *IEEE Transactions on Medical Imaging* (2020).

10. Deng, Shikuang and **Shi Gu***. "Optimal Conversion of Conventional Artificial Neural Networks to Spiking Neural Networks." *International Conference on Learning Representations* (2021).

11. Yuhang Li, Ruihao Gong, Xu Tan, Yang Yang, Peng Hu, Qi Zhang, Fengwei Yu, Wei Wang, **Shi Gu***. “"BRECQ: Pushing the Limit of Post-Training Quantization by Block Reconstruction”." *International Conference on Learning Representations* (2021).

Collaborative papers:

1. Richard F Betzel, **Shi Gu**, John D Medaglia, Fabio Pasqualetti, Danielle S. Basset. Optimally controlling the human connectome: the role of network topology. *Scientific Reports* 6 (2016).

2. Sarah Feldt Muldoon, Fabio Pasqualetti, **Shi Gu**, Matthew Cieslak, Scott T. Grafton, Jean M. Vettel, Danielle S. Bassett. Stimulation-based control of dynamic brain networks. *PLoS Comput Biol, 12(9),* p.e 1005076.

3. Wiles, Laura, **Shi Gu**, Fabio Pasqualetti, Brandon Parvesse, David Gabrieli, Danielle S. Bassett, and David F. Meaney. "Autaptic connections shift network excitability and bursting." *Scientific Reports* 7 (2017).

4. Ashourvan, Arian, **Shi Gu**, Marcelo G. Mattar, Jean M. Vettel, and Danielle S. Bassett. "The Energy Landscape Underpinning Module Dynamics in the Human Brain Connectome." *NeuroImage* (2017)..

5. Medaglia, John D., Shi Gu, Fabio Pasqualetti, Rebecca L. Ashare, Caryn Lerman, Joseph Kable, and Danielle S. Bassett. "Cognitive control in the controllable connectome." *arXiv preprint arXiv*:1606.09185 (2016).

6. Murphy, Andrew C., Shi Gu, Ankit N. Khambhati, Nicholas F. Wymbs, Scott T. Grafton, Theodore D. Satterthwaite, and Danielle S. Bassett. "Explicitly linking regional activation and function connectivity: community structure of weighted networks with continuous annotation." *arXiv preprint arXiv:*1611.07962 (2016).

7. Heidi K Norton, Harvey Huang, Daniel J Emerson, Jesi Kim, **Shi Gu**, Danielle S Bassett, Jennifer E Phillips-Cremins. Detecting hierarchical 3-D genome domain reconfiguration with network modularity. *Nature methods*, *15*(2), p.119

8. Tang, Evelyn, Chad Giusti, Graham L. Baum, **Shi Gu**, Eli Pollock, Ari E. Kahn, David R. Roalf et al. "Developmental increases in white matter network controllability support a growing diversity of brain dynamics." *Nature Communications*8, no. 1 (2017): 1252.

9. Cedric Huchuan Xia, Zongming Ma, Rastko Ciric, **Shi Gu**, Richard F Betzel, Antonia N Kaczkurkin, Monica E Calkins, Philip A Cook, Angel Garcia de la Garza, Simon N Vandekar, Zaixu Cui, Tyler M Moore, David R Roalf, Kosha Ruparel, Daniel H Wolf, Christos Davatzikos, Ruben C Gur, Raquel E Gur, Russell T Shinohara, Danielle S Bassett, Theodore D Satterthwaite., 2018. Linked dimensions of psychopathology and connectivity in functional brain networks. *Nature communications*, *9*(1), p.3003.

10. Zhen Yang, **Shi Gu**, Nicolas Honnorat, Kristin A Linn, Russell T Shinohara, Irem Aselcioglu, Steven Bruce, Desmond J Oathes, Christos Davatzikos, Theodore D Satterthwaite, Danielle S Bassett, Yvette I Sheline. *Molecular psychiatry*, p.1.

11. Bernhardt, Boris C., Fatemeh Fadaie, Min Liu, Benoit Caldairou, **Shi Gu,** Elizabeth Jefferies, Jonathan Smallwood, Danielle S. Bassett, Andrea Bernasconi, and Neda Bernasconi. "Temporal lobe epilepsy: Hippocampal pathology modulates connectome topology and controllability." *Neurology* 92, no. 19 (2019): e2209-e2220.

12. Yang, Zhen, Qawi K. Telesford, Alexandre R. Franco, Ryan Lim, **Shi Gu**, Ting Xu, Lei Ai et al. "Measurement Reliability for Individual Differences in Multilayer Network Dynamics: Cautions and Considerations." *NeuroImage* (2020): 117489.

13. Cui, Zaixu, Jennifer Stiso, Graham L. Baum, Jason Z. Kim, David R. Roalf, Richard F. Betzel, **Shi Gu** et al. "Optimization of energy state transition trajectory supports the development of executive function during youth." *Elife* 9 (2020): e53060.

14. Ashourvan, Arian, Preya Shah, Adam Pines, **Shi Gu**, Christopher W. Lynn, Danielle S. Bassett, Kathryn A. Davis, and Brian Litt. "Pairwise maximum entropy model explains the role of white matter structure in shaping emergent co-activation states." *Communications Biology* 4, no. 1 (2021): 1-15.

FUNDINGS:

1. NSFC General program 61876032: controllability modeling and analysis on functional brain networks. Amount: RMB 620K

2. Young Talent Program package: RMB 3 million
3. School startup package: RMB 3 million

ACTIVITY:

1. IPMI 2019 International Summer School, May 2019, Chengdu, Co-organizer.
2. SfN Global Event: AI meets Neuroscience, Jan 2021, Online, Co-chair.

INVITED TALKS:

1. TEDxChengdu 2017: Understand our brain, Chengdu, Nov, 2017
2. NetSci 2018 Satellite Symposium: Controlling complex networks, Paris, June 11, 2018
3. OHBM 2018 Symposium: A spotlight on network hub, Singapore, June 11, 2018
4. SfN 2018 Minisymposium: Controllability Analysis on Functional Brain Networks, Nov 6, 2018
5. SfN 2019 Minisymposium: Cross-modality optimization, Oct 22, 2019

REFERENCES:

1. **Danielle S. Bassett**, dsb@seas.upenn.edu
J. Peter Skirkanich Professor, University of Pennsylvania & Santa Fe Institute

2. **Theodore D. Satterthwaite**, sattertt@pennmedicine.upenn.edu
Associate Professor & Director of PennLINC, University of Pennsylvania

3. **James C. Gee**, gee@upenn.edu
Associate Professor of Radiologic Science in Radiology, University of Pennsylvania

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Thomas A. Scott Professor of Mathematics, Founding AMCS Chair, University of Pennsylvania