

## Curriculum Vitae of FU Yuguang

Assistant Professor  
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### Summary

Dr. Fu's research has been primarily in the areas of smart sensing & diagnostic technologies, advanced experimental techniques, and their applications in infrastructure monitoring and digital construction. Prof. Fu has published 15+ journal papers and hold 4 patents. He participated several critical projects as PI, co-PI or key personnel, funded by NASA, NSF, FRA (in the USA), NSFC (in China), and MOE, AI Singapore (in Singapore). He acted as the key personnel for next-gen wireless smart sensor development and enabled the world's largest wireless sensor network in Ain Dubai Ferris Wheel for construction monitoring, with nearly 200 nodes. He developed a smart IoT system, commercialized it via the support of NSF-SBIR, and successfully deployed it on over 10 railroad bridges in North America. He also coordinated the development of a multi-physics cyber-physical testbed to enable unprecedented testing of resilient strategies of deep space infrastructure at scale, and the achievement has been reported by WSJ.

### Education

University of Illinois at Urbana-Champaign, USA

Ph.D. in Civil Engineering, Sept. 2019

Tongji University, China

Bachelor-Master Joint Program in Civil Engineering, July. 2014

### Professional Experience

Assistant Professor, Nanyang Technological University, Aug. 2021-present

Postdoctoral Research Associate, Purdue University, Dec. 2019-July.2021

Research Scientist, Embedor Technologies, July.2019-Dec.2019

Invited Journal Reviewers, Structural Control and Health Monitoring, Structural Health Monitoring, Smart Structures and Systems, Mechanical Systems and Signal Processing, Automation in Construction, ASCE Journal of Aerospace Engineering, Measurement, etc.

Early Career Editorial Board Member, *Earthquake Engineering and Resilience*, May. 2022-present

Topical Advisory Panel Member & Special Issue Editor, *Sensors*, May. 2022-present

### Professional Memberships

Member, *American Society of Civil Engineers*, 2013-Present

Early Career Researchers Committee Member, *International Society for Structural Health Monitoring of Intelligent Infrastructure*, 2022-Present

### Awards, Honors and Scholarships

1. Second Prize, 1st International Project Competition for Structural Health Monitoring, 2020.
2. Best Student Paper Award (3<sup>rd</sup> Place), ASCE EMI conference, Caltech, 2019.
3. LIU Huixian Earthquake Engineering Scholarship Award, 2018
4. Mavis Future Faculty Fellow, UIUC, 2017
5. YEE Fellowship Award, College of Engineering, UIUC, 2017
6. List of Teachers Ranked as Excellent by Their Students, UIUC, 2016
7. National Scholarship, Ministry of Education, China (Top 2%), 2009,2010,2013
8. Bayer-Tongji Sustainability Development Chair Scholarship (Top 2%), 2013
9. Best Student Paper Award (2<sup>nd</sup> Place), National Civil Engineering Forum, China, 2012
10. First Prize, ASCE Mid-Pacific Student Conference, UC Berkeley, 2012

### **Selected Journal Publications in Recent Five Years**

1. **Fu, Y.**, Zhu, Y.\*, Hoang, T., Mechitov, K. and Spencer, B.F. (2022) “xImpact: Intelligent Wireless System for Cost-Effective Rapid Condition Assessment of Bridges under Impacts”, *Sensors*, 22(15), 5701.
2. Chou, J.Y. **Fu, Y.**, Huang, S.K.\*, Chang, C.M. (2022) “SHM Data Anomaly Classification Using Machine Learning Strategies: A Comparative Study”, *Smart Structures and Systems*, 29(1), 77-91.
3. **Fu, Y.\***, Hoang, T., Mechitov, K., Spencer Jr, B.F. (2021) “xShake: Intelligent Wireless System for Cost-effective Real-time Seismic Monitoring”, *Smart Structures and Systems*, 28 (4), 483-497.
4. **Fu, Y.**, Mechitov, K., Hoang, T., Kim, J.R., Memon, S.A., Spencer Jr, B.F.\* (2020). “Efficient and High-precision Time Synchronization for Sudden Event Monitoring using Wireless Smart Sensors”, *Structural Control and Health Monitoring*, e 2643.
5. Hoang, T., **Fu, Y.**, Mechitov, K., Gomez, F., Spencer Jr, B.F.\* (2020) “Autonomous End-to-end Wireless Monitoring System for Railroad Bridges”, *Advances in Bridge Engineering*, 1(1), 1-27.
6. Maghareh, A.\*, **Fu, Y.**, Montoya H., Wang, Z., Dyke, S. (2020). “A Reflective Framework for Performance Management of Real-time Hybrid Simulation”, *Frontiers in Built Environment*, 6, 159.
7. **Fu, Y.**, Peng, C., Gomez, F., Narazaki, Y., Spencer Jr, B.F.\* (2019). “Sensor Fault Management Techniques for Wireless Smart Sensor Networks in Structural Health Monitoring”, *Structural Control and Health Monitoring*, 26(7), e2362.
8. Mao, J.X., Wang, H.\*, **Fu, Y.**, Spencer Jr, B.F. (2019). “Automated modal identification using principal component and cluster analysis: Application to a long-span cable-stayed bridge”. *Structural Control and Health Monitoring*, 26(10), e2430.
9. **Fu, Y.**, Mechitov, K., Hoang, T., Kim, J.R., Lee, D., Spencer Jr, B.F.\* (2019). “Development and Full-scale Validation of High-fidelity Data Acquisition on a Next-generation Wireless Smart Sensor Platform”, *Advances in Structural Engineering*, 22(16), 3512-3533.
10. **Fu, Y.\***, Hoang, T., Mechitov, K., Spencer Jr, B.F., Kim, J. (2018). “Sudden Event Monitoring of Civil Infrastructure using Demand-based Wireless Smart Sensors”, *Sensors*, 18(12), 4480.
11. Zhu, L., **Fu, Y.**, Chow, R., Spencer Jr, B.F.\*, Park, J.W., Mechitov, K. (2018). “Development of a High-Sensitivity Wireless Accelerometer for Structural Health Monitoring.” *Sensors*, 18(1), 262.

### **Patents Filed**

1. **Fu, Y.**, Tong, L., Zhou, H. “A Design Method for FRP-Strengthened Circular Hollow K-joints”. Invention Patent in China, ZL 201510174183.3, issued August 2<sup>nd</sup>, 2017.
2. **Fu, Y.**, Shao, B., Fu, S., Chen, S., Wang, P. “Bamboo-Cable Composite Structural Members”. Invention Patent in China, ZL 201310161674.5, issued May 13th, 2015.
3. Shao, B., **Fu, Y.**, Fu, S., Chen, S., He, X. “Sleeve-Gypsum Bamboo Joints”. Invention Patent in China, ZL 201310166059.3, issued January 21st, 2015.
4. **Fu, Y.**, Wang, M., Li, L., Ge, H. “Sleeve-Cement Bamboo Joints”. Utility Patent in China, ZL 201220095107.5, issued December 5th, 2012.

### **Selected Conference Proceedings in Recent Five Years**

1. **Fu, Y.**, Wang, Z., Maghareh, A., Dyke, S., Jahanshahi, M., Shahriar, A. (2021). “Scalable Impact Detection and Localization Using Deep Learning and Information Fusion”, IWSHM, Stanford, USA.
2. Zhang, X., **Fu, Y.\***, Sharma, S., Dyke, S. (2021). “Auto-tuning Bayesian Filtering for Model Identification and Updating Using Reinforcement Learning”, *ACAM10*, Adelaide, Australia.
3. **Fu, Y.**, Hoang, T., Mechitov, K., Spencer Jr, B.F. (2021). “Rapid Condition Assessment of Bridges under Impacts: from System Design to Decision Making”, *ASCE-EMI*, New York, NY, USA.
4. **Fu, Y.**, Hoang, T., Mechitov, K.A., Kim, J., Spencer Jr, B.F. (2019). “An Intelligent Wireless System for Real-time Seismic Monitoring of Civil Infrastructure”, IWSHM, Stanford, CA, USA.
5. **Fu, Y.**, Hoang, T., Mechitov, K.A., Spencer Jr, B.F. (2019). “Real-time Wireless Data Acquisition Framework for Structural Health Monitoring”, *Proc. 9th International Conference on Structural Health Monitoring of Intelligent Infrastructure*, St. Louis, MO, USA.

6. **Fu, Y.**, Hoang, T., Mechitov, K.A., Spencer Jr, B.F. (2019). “An Intelligent Wireless Monitoring System for Real-Time Condition Assessment of Civil Infrastructures”, *ASCE-EMI*, Caltech, CA.
7. **Fu, Y.**, Gomez, F., Spencer Jr, B.F. (2018). “Instability Monitoring of Space Grid Structures under Blizzards”, *Proc. 7th World Conference on Structural Control and Monitoring*, Qingdao, China.
8. **Fu, Y.**, Hoang, T., Mechitov, K., Spencer Jr, B.F. (2018). “Demand-based Wireless Smart Sensors Enabling Sudden Event Monitoring of Civil Infrastructure”, *ASCE-EMI*, Boston, MA, USA.
9. **Fu, Y.**, Zhu, L., Hoang, T., Mechitov, K., Spencer Jr, B.F. (2018). “Demand-based Wireless Smart Sensors for Earthquake Monitoring of Civil Infrastructure”, *SPIE Smart Structures/NDE*, Denver.
10. **Fu, Y.**, Peng, C., Park, J.W., Spencer Jr, B.F. (2017). “Fault Detection and Classification for Wireless Sensor Network using Full-scale Monitoring Data”, *ASCE-EMI*, San Diego, CA, USA.

### Recent Research Grants

- PI, *Developing a learning analytics model to facilitate adaptive blended learning*, S\$25,040, NTU EdeX Grants, Oct. 2022 - Mar. 2024.
- PI, *A smart digital twin framework using advanced modelling and data analytics for monitoring and management of underground transportation infrastructure*, S\$100,000, Ministry of Education Tier 1 Seed Fund, Jan. 2022 - Dec. 2024.
- PI, *Edge Intelligence Enabling Smart IoT Networks for Autonomous Long-term Monitoring of Civil Infrastructure*, S\$100,000, Ministry of Education Tier 1 Generic, Jan. 2022 - Jun. 2024.
- PI, *Artificial Intelligence of Things Framework for Smart Sensing and Diagnostics of Civil Infrastructure*, S\$275,000, NTU Start-up Grant, Jan. 2022 - Jun. 2024.
- PI, *A novel framework for occupant comfort and building energy management to accelerate decarbonization*, S\$12,000, Imperial-NTU collaboration seed fund, Sept. 2021- Sept. 2025.
- Co-PI, *Novel context-aware multivariate time series modelling for underground transportation infrastructure monitoring and management*, S\$2,968,800, AI Singapore, May. 2022 - Apr. 2025.
- Key Personnel, *Resilient ExtraTerrestrial Habitats Institute*, National Aeronautics and Space Administration, \$15,000,000, Sept. 2019 - Aug.2024.
- Co-PI, *SBIR Phase I: Smart IoT System for Rapid Condition Assessment of Bridges under Sudden Events*, National Science Foundation, \$224,700, July. 2019 - April.2020.
- Key Personnel, *Condition Assessment of Railroad Bridges using Wireless Smart Sensors*, Federal Railroad Administration, \$335,400, Oct. 2016 - June. 2019.
- Key Personnel, *Rare Event Detection and Rapid Condition Assessment using Wireless Smart Sensors*, ZJU-UIUC Institute Research Program, \$75,000, Mar. 2017 - Mar.2018.

### Invited Talks

1. “System of Systems Modeling and Testbed for Development of Resilient Deep Space Habitats”, *School of Civil Engineering, Tianjin University*, Tianjin, Nov 2021.
2. “Intelligent Infrastructure: Enabling Resilient Built Environment under Multiple Hazards”, *School of Civil Engineering, Harbin Institute of Technology*, Shenzhen, Nov 2021.
3. “Intelligent Infrastructure: Enabling Sustainable Built Environment under Multiple Hazards”, *School of Civil and Environmental Engineering, NTU*, Singapore, Dec 2020.
4. “Smart IoT System: Enabling Intelligent Infrastructure under multiple hazards”, *School of Civil Engineering, Tianjin University*, Tianjin, China, Nov 2020.
5. “Smart IoT System for Sustainable Civil Infrastructure Management under hazard events”, *Lyles School of Civil Engineering, Purdue University*, West Lafayette, IN, Oct 2020.
6. “Smart IoT System for Rapid Condition Assessment of Bridges under Sudden Events”, *Illinois Center for Transportation, University of Illinois at Urbana-Champaign*, Champaign, IL, Nov 2019.
7. “Intelligent Wireless Monitoring Systems for Rapid Condition Assessment under Sudden Events”, *Dept. Civil, Environmental & Architectural Engineering, University of Kansas*, KS, Aug 2019.
8. “Demand-based Wireless Smart Sensors for Sudden Event Monitoring of Civil Infrastructure”, *College of Civil Engineering & Architecture, Zhejiang University*, Hangzhou, China, June 2018.