

Designing Better Cyber-physical Infrastructures



Shuguang (Robert) Cui
Associate Professor, Department of Electrical and Computer Engineering

CURRENT RESEARCH

Analyzing current systems and working towards creating a more secure and efficient national cyber-physical infrastructure

The safety and happiness of our families and our national welfare is critically dependent on the normal and efficient operation of the national infrastructure, which is always under threats from natural disasters or man-made terrorism attacks. Dr. Shuguang Cui at Texas A&M University and his team of researchers are working on ways to combat this. Their findings will be critical in early detection of such threats and provide instrumental information on how to isolate and mitigate the effects of such threats.

As our national infrastructure becomes more complex and interdependent, disasters, natural or man-made, pose more serious threats to the functioning of our infrastructure systems. As an example, hurricanes have often forced evacuation of the major metropolitan areas, stressing infrastructure systems beyond their design capacity: roadways become congested, telecommunications systems are overloaded, and power supply is disrupted. These disasters often damage both the cyber and physical parts of the infrastructure, resulting in correlated failures among electric energy, transportation, and communication systems. Dr. Cui and his group focus on the cascading failure issue of complex cyber-physical systems in the following several key aspects.

- 1) Distributed sensing and information collection to efficiently gather system state data;
- 2) Large-scale statistical learning and distributed processing to analyze the collected data, with the goal to predict or early detect cascading failures;
- 3) Modeling cascading effects to estimate the failure impacts;
- 4) Designing control schemes to isolate and prevent cascading failure propagation

Dr. Cui has been leading these...

AFFILIATION



Texas A&M University

EDUCATION

- Ph.D. in Department of Electrical Engineering 2005, Stanford University

AWARDS

- Highly Cited Researchers by Thomas Reuters, 2014
- Fellow of the Institute of Electrical and Electronic Engineers, 2013
- Texas A&M University Engineering School Contribution Award, 2014
- IEEE Signal Processing Society Best Paper Award, 2013
- TEES Select Young Faculty Fellow for outstanding research performance, 2011
- and 2 more...

RESEARCH AREAS

Atmospheric / Space, Technology, IOT, Devices, Data, Natural Disasters / Emergency

FUNDING REQUEST

Your contributions will help Dr. Cui cover the costs of research, which include the partial salary for the research team, equipment costs to support computation, simulation, and testbed verification, and expenses for publication, collaboration travels and attending conferences.

[Read More at benefunder.com/](http://benefunder.com/)