JIN YAN

Civil, Construction, and Environmental Engineering
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EDUCATION

Ph.D., Iowa State University 2017 - Present
- School of Civil, Construction and Environmental Engineering, Intelligent Infrastructure Specialization.
- Advisor: Professor Simon Laflamme

M.Sc., Georgia Institute of Technology 2016
- School of Civil Engineering and Environmental Engineering, Structures Specialization.
- Advisor: Professor Yang Wang

B.Sc., Central South University 2015
- Department of Civil Engineering, Structural Engineering Specialization.

PROFESSIONAL & TEACHING EXPERIENCE

Research Experience

Research Assistant, Iowa State University, Ames, IA 2017 - Present
- Conducting research in the field of Structural Health Monitoring:
  - *Smart Sensor Technology, Smart Materials and Structures*: Developed, prototyped, and characterized a multifunctional CFRP sensor for both strengthening and monitoring large-scale structure.
  - *Adaptive systems*: Developed damage identification methods by adapting one dimensional & two dimensional models with sensor measurements for probability of detection.
  - *Structural Health Monitoring and Damage Detection*: Investigated the use of a dense sensor network for crack detection from hardware and instrumentation to algorithms.
  - *Resilient infrastructure*: Condition-based long-term monitoring of a sign structure using data-driven approaches.

Research Assistant, Georgia Institute of Technology, Atlanta, GA 2016
- Experimental modal testing of a highway bridge for structural health monitoring.
- Structural modeling of a stadium and modeling technique documentation.

Mentorship Experience

Research Assistant, Iowa State University, Ames, IA 2017 - Present
- Mentored nine undergraduate students from Departments of Civil Eng., Mechanical Eng., and Industrial Eng. on sensor noise characterization, CFRP sensor development, computer vision, and sensing skin optimization, resulted in one journal which I am the senior author.
- Mentoring one master student in Civil Eng. prototyping a new sensing skin.
- Mentored three Ph.D. students in Civil Eng. in experimental design and instrumentation of alkali-silica reaction investigation, prototyping new structural sensors, and real-time machine learning.

Research Assistant, Georgia Institute of Technology, Atlanta, GA 2016
- Mentored three undergraduate students on structural modeling.

Teaching Experience

Teaching Assistant, Iowa State University, Ames, IA 2019
- CEE 332: Structural Analysis (undergraduate course with 74 students), Professor An Chen.

PUBLICATIONS

See my google scholar profile.
(‡) equal contribution.

In Preparation

[2] **Jin Yan**, Simon Laflamme, Jonathan Hong, Jacob Dodson.
"Online Parameter Estimation Without Persistent Excitation for A High-Rate Dynamic System."
Submit to Structural Health Monitoring.

[1] Han Liu, **Jin Yan**(‡), Simon Laflamme, Matthias Kollosche.
"Topological Design of A Unidirectional Soft Elastomeric Sensing Skin."

Journals

[5] **Jin Yan**, Simon Laflamme, Leifur Leifsson.
"Computational Framework for Dense Sensor Network Evaluation Based on Model Assisted Probability of Detection."
Accepted at Materials Evaluation.

[4] **Jin Yan**, Austin Downey, An Chen, Simon Laflamme, Sammy Hassan.
"Capacitance-Based Sensor with Layered Carbon-Fiber Reinforced Polymer and Titania-Filled Epoxy."
Composite Structures, Volume 227, Page 111247. 2019. [Acc. rate: 32%].

[3] **Jin Yan**, Austin Downey, Alessandro Cancelli, Simon Laflamme, An Chen, Jian Li, Filippo Ubertini.
"Concrete Crack Detection and Monitoring Using a Capacitive Dense Sensor Array."
MDPI: Sensors, Volume 19, Issue 8, Page 1843. 2019.

[2] Austin RJ Downey, **Jin Yan**, Eric M Zellner, Karl H Kraus, Iris V Rivero, Simon Laflamme.
"Use of flexible sensor to characterize biomechanics of canine skin."
BioMed Central: BMC veterinary research, Volume 15, Issue 1, Page 40. 2019.

[1] Mohammadkazem Sadoughi, Austin Downey, **Jin Yan**, Chao Hu, Simon Laflamme.
"Reconstruction of unidirectional strain maps via iterative signal fusion for mesoscale structures monitored by a sensing skin."
Mechanical Systems and Signal Processing, Volume 112, Pages 401-416. 2019. [Acc. rate: 38%]

Conference Proceedings

[6] **Jin Yan**, Austin Downey, Alessandro Cancelli, Simon Laflamme, An Chen.
"Detection and Monitoring of Cracks in Reinforced Concrete Using an Elastic Sensing Skin."
Structures Congress 2019: Bridges, Nonbuilding and Special Structures, and Nonstructural Components, Pages 78-87, 2019. [Peer-reviewed]

[5] **Jin Yan**, Xiaosong Du, Simon Laflamme, Leifur Leifsson, Chao Hu, An Chen.
"Model-assisted validation of a strain-based dense sensor network."
Proceedings Volume 10970, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2019.

[4] Xiaosong Du, **Jin Yan**, Simon Laflamme, Leifur Leifsson, Yonatan Tesfahunegn, Slawomir Koziel.
"Model-assisted probability of detection for structural health monitoring of flat plates."
Computational Science – ICCS 2018, Volume 10861. Springer, Cham, 2018.

[3] **Jin Yan**, Xiaosong Du, Austin Downey, Alessandro Cancelli, Simon Laflamme, Leifur Leifsson, An Chen, Filippo Ubertini.
"Surrogate model for condition assessment of structures using a dense sensor network."
Proc. SPIE Volume 10598, Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems 2018, 27 March, 2018.

[2] **Jin Yan**, Sammy Hassan, An Chen, Simon Laflamme.
"Novel Capacitive CFRP Sensor for Structural Health Monitoring."
Proc. 9th International Conference on Fibre-Reinforced Polymer (FRP) Composites in Civil Engineering, July 2018.

[1] Austin Downey, **Jin Yan**, Simon Laflamme, An Chen.
"Dynamic Reconstruction of In-plane Strain Maps using a Two-dimensional Sensing Skin. "
Structural Health Monitoring, 2017.

PRESENTATIONS

- Probability of Detection in Dense Sensor Network Structural Health Monitoring Systems.
Engineering Mechanics Institute Conference. Oral Presentation. Pasadena, CA, USA. 2019

- Model-assisted validation of a strain-based dense sensor network.
SPIE smart structures and nondestructive evaluation. Oral Presentation. Denver, CO, USA. 2019

- Multifunctional Carbon Fiber-Reinforced Polymer as structural capacitor for strain sensing.
Engineering Mechanics Institute Conference. Oral Presentation. Boston, MS, USA. 2018

HONORS & AWARDS

- The American Society for Nondestructive Testing (ASNT) Fellowship 2018
- International Concrete Repair Institute (ICRI) Scholarship 2018
- National Scholarship (7/504), the highest-level scholarship in China 2015
- First Prize Scholarship of Central South University 2014
- First Prize in Mathematical Modeling Contest of Central South University 2014
- Third Prize Scholarship of Central South University 2014
- Second Prize in The Mathematical Contest in Modeling of Hunan Province 2013

MENTORED STUDENTS

Graduate Students

[5] Vahid Barzegar, Ph.D.; Civil Eng., A programming model and platform architecture for real-time machine learning for sub-second systems. 2019 - present
[4] Han Liu, M.Sc.; Civil Eng., Designing and fabricating of a new type of one-directional sensing skin for structural health monitoring. 2019 - present
[3] Zachary Dietrich, M.Sc.; Civil Eng., Fatigue reliability assessment of anchor rods of support structures for signs, luminaires and traffic signals. 2019 - present
[2] Hanming Zhang, Ph.D.; Civil Eng., Smart installation and monitoring system for large anchor bolts of support structure for highway signs, luminaires, and traffic signals. 2018 - present
[1] Nazik Citir, Ph.D.; Civil Eng., Investigating alkali–silica reaction using dense sensor network and ground penetrating radar. 2018

Undergraduate Students

[9] Haihan Yu; Civil Eng., Computer vision measurement method of Poisson's ratio of thin films. 2019
[8] Nick Embray; Mechanical Eng., Sensor contacts investigation for thin film sensors. 2019
[7] Jackson Zehr; Mechanical Eng., Pressure sensor materials investigation. 2019
[6] Theodore Willemsen; Mechanical Eng., Sensor interface development. 2019
[5] Sammy Hassan; Civil Eng., CFRP sensor fabricating. 2017 - 2018
[4] Xinqi Mao; Civil Eng., Computer vision for crack detection. 2018
[3] Pedro Paiva-De-Lima; Civil Eng., Thin film sensor fabricating & 3D printing. 2018
[2] Nicholas A Chockalingam; Industrial Eng., CFRP sensor fabricating. 2017
[1] Owen Fischer; Mechanical Eng., CFRP sensor fabricating. 2017