Bo Peng

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Education

Ph.D. candidate in Civil and Urban Engineering - New York University Abu Dhabi 2019/09 - 2024/05
· Dissertation: *Development and Geometry Analysis of Lunar Regolith Simulants*
· Research Interest: *Computer Graphics, Geometry Processing, Shape Analysis, Computer Vision, Machine Learning*

M.Sc. in Computer Science - Georgia Institute of Technology 2021/01 - 2022/12
· OMSCS Program: *Machine Learning Specialization*

M.Eng. in Architectural and Civil Engineering - Tongji University 2016/09 - 2019/06
· Dissertation: *Crack Detection on Concrete Bridges with Computer Vision*

B.Eng. in Civil Engineering - Tongji University 2012/09 - 2016/07

Skills & Tools

Framework: PyTorch, TensorFlow, libigl, Numpy, CuPy, SciPy, OpenGL
Programming Language: Python, MATLAB, C/C++, R

Research Experience

Characterization and Manufacturing of Lunar Regolith Simulants - New York University Abu Dhabi 2021 - Present
· Characterize commercial lunar regolith simulants with XRD, SEM and optical microscope.
· Produce lunar regolith simulants with local availiable deposits in the UAE.
· 3D shape reconstruction of aggregates with micro-CT.
· Develop 3D shape descriptors with spherical harmonics.

Geospatial Modelling of Urban Thermodynamics - New York University Abu Dhabi 2019 - 2022
· Develop algorithms for thermal imaging interpretation and atmosphere compensation.
· Optimize camera pose and intrinsics with bundle adjustment.
· Monitor building facade temperature in New York city and Abu Dhabi.
· Present pixel-level temperature comparison between thermal measurement and CFD simulation.

Vehicle Load Identification and Data Fusion Based on Computer Vision - Tongji University 2018 - 2019
· Create a vehicle detection dataset from surveillance videos.
· Develop vehicle detection and tracking algorithms with deep neural networks.
· Analyze traffic flow and loading history with Monte Carlo simulation.

Surface Diseases Identification for Long-Span Cable Bridge - Tongji University 2017 - 2018
· Develop an automated image acquisition system to capture images under bridge deck.
· Create a surface disease dataset for steel bridge inspection.
· Train a semantic segmentation model for surface disease identification with deep neural networks.

Publications

· **Peng, B.**, Thannasi, P., & Celik, K. (2023). "Design and assessment of AD-1 lunar regolith simulants." *74nd International Astronautical Congress (IAC 2023)*.
· **Peng, B.**, Hay, R., & Celik, K. (2023). "3D shape analysis of lunar regolith simulants." *Powder Technology*.
· Hay, R., **Peng, B.**, & Celik, K. (2022). "Filler and nucleation effects of CaCO3 polymorphs derived from limestone and seashell on hydration and carbonation of magnesium oxide (MgO) cement (RMC)." *Cement and Concrete Research*.
· **Peng, B.**, Hay, R., & Celik, K. (2022). "3D Shape Analysis of Lunar Regolith Simulants." *73nd International Astronautical Congress (IAC 2022)*.
· Chen, A., Fang, X., Pan, Z., Wang, D., Pan, Y., & **Peng, B.** (2022). "Engineering practices on surface damage inspection and performance evaluation of concrete bridges in China." *Structural Concrete*.
· Pan, Y., Wang, D., Dong, Y., & **Peng, B.** (2021). "A Novel Vision-Based Framework for Identifying Dynamic Vehicle Loads on Long-Span Bridges: A Case Study of Jiangyin Bridge, China." *IEEE Transactions on Intelligent Transportation Systems*.

· Hay, R., **Peng, B.**, & Celik, K. (2021). "Manufacturing and Characterization of Lunar Regolith Simulants." *72nd International Astronautical Congress (IAC 2021)*.

· Wang, D., Zhang, Y., Pan, Y., **Peng, B.**, Liu, H., & Ma, R. (2020). "An automated inspection method for the steel box girder bottom of long-span bridges based on deep learning." *IEEE Access*.

· Wang, D., Pan, Y., & **Peng, B.** (2018). "Steel box-girder bridge diseases identification based on computer vision system." *In Maintenance, Safety, Risk, Management and Life-Cycle Performance of Bridges*.

· Wang, D., **Peng, B.**, & Pan, Y. (2018). "Corrosion Segmentation and Quantitative Analysis Based on Deep Neural Networks." *In Maintenance, Safety, Risk, Management and Life-Cycle Performance of Bridges*.

· **Peng, B.**, & Wang, D. (2017). "Current Status and Thinking of Chinese Ancient Bridges Protection." *IABSE Symposium: Engineering the Future*.

Awards and Honors

· Global PhD Student Fellowships in Engineering - New York University Abu Dhabi 2019-2023
· China Road and Bridge Corporation (CRBC) Scholarship - Tongji University 2018
· Academy Scholarship - Tongji University 2016 - 2018
· Dream Help Scholarship - Venture Valley of Tongji University 2017
· Bridge Design Competition in Hunan Province - Tongji University 2017
· Learning Scholarship - Tongji University 2013, 2015