Te Pei

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EDUCATION

2017—2023 **Pennsylvania State University**
GPA: 3.9/4.0
Ph.D., Civil Engineering (Geotechnical Engineering)
Dissertation: *Integrating Geotechnical Domain Knowledge into Machine Learning for Slope Stability Predictions*
Major Advisor: Dr. Tong Qiu, Co-advisor: Dr. Chaopeng Shen

2015—2017 **Oklahoma State University**
GPA: 4.0/4.0
B.S., Civil Engineering (SWJTU-OSU joint program)

2013—2017 **Southwest Jiaotong University, China**
GPA: 3.6/4.0
B.S., Civil Engineering (Graduate of Mao Yisheng Honors College)

AWARDS AND HONORS

2022 **First Place in Group Competition,** 2022 NHERI hackathon
2022 **Student Travel Grant Recipient,** 2022 DesignSafe Academy and NHERI hackathon
2021 **DFI Educational Trust Penn State Scholarship**, Deep Foundation Institute
2021 **Leo P. Russell Graduate Fellowship in Civil Engineering**, The Pennsylvania State University
2015, 2016, 2017 **Intl. Student & Scholar Office Scholarship**, The Oklahoma State University
2015, 2016, 2017 **President's Honor Roll**, The Oklahoma State University
2015 **National Second Prize Award**, the "CSEE Cup" Contemporary Undergraduate Mathematical Contest in Modeling, China
2013, 2014, 2015 **Second Prize Scholarship**, Southwest Jiaotong University, China

ACADEMIC PUBLICATIONS

PEER-REVIEWED JOURNAL PUBLICATIONS

- **Pei, T.**, Qiu, T., and Shen, C. (2023). "Applying Physics-Guided Machine Learning to Slope Stability Prediction." Accepted for publication in the *Journal of Geotechnical and Geoenvironmental Engineering*.
- Palese, M., **Pei, T.**, Zarembskia, A., Qiu, T., Shen, C., and Palese, J. (2023). "Risk Assessment Framework for Statistical Analysis of Cut Slopes Using Track Inspection Videos and Satellite Imagery." Accepted for publication in *Georisk: Assessment and Management of Risk for Engineered Systems and Geohazards*.
- Li, Z., **Pei, T.**, Ying, W., Zhang, R., Yoon, J., Dabo, I., Srubar, W., and Radlinska, A. "Knowledge-Guided Machine Learning in Concrete: Integrating Abrams' law and Thermodynamic Modeling into Strength Prediction." Accepted for publication in the *Journal of the American Ceramic Society*.
- **Pei, T.**, and Qiu, T. (2022). "A Numerical Investigation of Laterally Loaded Steel Fin Pile Foundation in Sand." *International Journal of Geomechanics*, 22(7), 04022102.

- **Pei, T.**, and Qiu, T. (2022). "DEM Investigation of Energy Dissipation at Particle Contacts in Granular Soil Under Cyclic Torsional Shear." *International Journal of Geomechanics*, 22(4), 04022016.
- Nagendra, S., Kifer, D., Mirus, B., **Pei, T.**, Lawson, K., Manjunatha, S., Li, W., Nguyen, H., Qiu, T., Tran, S. and Shen, C. (2022). "Constructing a Large-Scale Landslide Database Across Heterogeneous Environments Using Task-Specific Model Updates." *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 15, pp. 4349-4370.
- **Pei, T.**, and Yang, X. (2018). "Compaction-Induced Stress in Geosynthetic-Reinforced Granular Base Course – A Discrete Element Model." *Journal of Rock Mechanics and Geotechnical Engineering*, 10(4), 669–677.

JOURNAL PAPERS UNDER REVIEW

- **Pei, T.**, and Qiu, T. "Machine Learning with Monotonic Constraint for Geotechnical Engineering Applications: An Example of Slope Stability Prediction." Submitted for publication in *Acta Geotechnica*. **(This paper has been reviewed and is currently under revision)**
- **Pei, T.**, Qiu, T. "Landslide Susceptibility Mapping Using Physics-Guided Machine Learning: An Application in Colorado Front Range." Submitted for publication in *Acta Geotechnica*.

JOURNAL PAPERS IN PREPARATION

- Liu, J., **Pei, T.**, Shen, C., Kifer, K. "Diagnosing the Critical Spatial Scales of Controls for Rainfall-Induced Landslide Risk Using Machine Learning Models." In preparation.

CONFERENCE PUBLICATIONS/PRESENTATIONS

- Li, Z., **Pei, T.**, Ying, W., Zhang, R., Yoon, J., Dabo, I., Srubar, W., and Radlinska, A. "Simulation-assisted transfer learning for concrete strength prediction." Accepted for publication in *Proc. of 77th RILEM Annual Week and the 1st Interdisciplinary Symposium on Smart & Sustainable Infrastructures (ISSSI 2023)*.
- **Pei, T.**, and Qiu, T. (2023). "Landslide susceptibility mapping in Colorado Front Range, USA: a comparison of physics-based and data-driven approaches." Accepted for publication in *Proc. of 8th International Conference on Debris Flow Hazard Mitigation*.
- Palese, M., **Pei, T.**, Zarembskia, A., Qiu, T., Shen, C., and Palese, J. (2023). "Risk assessment framework for statistical analysis of cut slopes using track inspection videos and satellite imagery." Accepted for publication in *Proc. of 2023 Georisk Conference*.
- **Pei, T.**, and Qiu, T. (2023). "Landslide susceptibility mapping using machine learning methods: a case study in Colorado Front Range, USA." in *Proc. of 2023 Geo-Congress Conference*.
- Xiong, J., **Pei, T.**, and Qiu, T. (2023). "A machine learning-based method with integrated physics knowledge for predicting bearing capacity of pile foundations." in *Proc. of 2023 Geo-Congress Conference*.
- **Pei, T.**, Nagendra, S., Banagere Manjunatha, S., He, G., Kifer, D., Qiu, T., and Shen, C. (2021). "Utilizing an interactive AI-empowered web portal for landslide labeling for establishing a landslide database in Washington state, USA." in Proc. of *EGU Gen. Assem. Conf. Abstr., 2021*, Art. no. EGU21- 13974.
- Liu, J., Shen, C., **Pei, T.**, Lawson, K., Kifer, D., Nagendra, S., and Manjunatha, B. (2021). "A new rainfall-induced deep learning strategy for landslide susceptibility prediction." in *Proc. of AGU Fall Meeting Abstr.*, vol. 2021, 2021, Art. no. NH35E-0504.
- **Pei, T.**, Qiu. T., and Laman, J. (2020) "A numerical investigation of laterally loaded steel fin pile foundations." in *Proc. of 2020 Joint-Rail Conference*, V001T08A012. New York: ASME.
- **Pei, T.**, Nagendra, Manjunatha, B., S., He, G., Kifer, D., Qiu, T., and Shen, C. (2020). "Cloud-based

interactive database management suite integrated with deep learning-based annotation tool for landslide mapping." in *Proc. AGU Fall Meeting Abstr.*, vol. 2020, 2020, Art. no. NH030-0011.

- Nagendra, S., Manjunatha, B., Shen, C., Kifer, D., **Pei, T.** (2020). "An efficient deep learning mechanism for cross-region generalization of landslide events." in *Proc. of AGU Fall Meeting Abstr.*, vol. 2020, 2020, Art. no. NH030-0010.

CONFERENCE PUBLICATIONS UNDER REVIEW

- **Pei, T.**, Li, Z., and Qiu, T. "An efficient deep learning mechanism for cross-region generalization of landslide events." Submitted for publication in *Proc. of Geo-Shanghai International Conference 2024*.

TECHNICAL REPORTS FOR CONFERENCE PUBLICATIONS UNDER REVIEW

- Palese, M., **Pei, T.**, Qiu, T., Shen, C., Zarembskia, A., and Palese, J. (2022). *Landslide Risk Assessment in Cut Locations Using Artificial Intelligence Based on Right-of-Way Videos and Geophysical Data*. Report No. CIAM-UTC-REG22
- Prabhu, S., **Pei, T.**, Qiu, T., and Laman, J. (2021). *Laboratory Test on Scaled Steel Fin Pile Foundations*. Report No. CIAM-UTC-REG09.
- **Pei, T.**, Qiu, T., and Laman, J. (2019). *Parametric Study of Steel Fin Pile Foundations*. Report No. LTI 2020-02.

ORAL PRESENTATIONS

- Palese, M., and **Pei, T.** (2022). "Artificial Intelligence for Advance Landslide Warning along Railroad Tracks." *2022 Big Data in Railroad Maintenance Planning Conference*, December 14–15, Newark, DE, USA.
- **Pei, T.**, Shen, C., and Qiu, T. (2022). "Landslide susceptibility mapping using physics-guided machine learning (PGML): an application to debris flows in Colorado Front Range." *2022 Transportation Asset and Infrastructure Management (TAIM) Conference*, October 17–18, University Park, PA, USA.
- Liu, J., Shen, C., Kifer, D., **Pei, T.**, and Lawson, K. (2022). "The machine learning strategy for rainfall-induced landslide susceptibility prediction." *2022 Geo for Good Summit*, October 4–6, Mountain View, CA, USA.
- Palese, M., and **Pei, T.** (2021). "Landslide risk assessment in cut locations using right-of-way videos and artificial intelligence." *2021 Big Data in Railroad Maintenance Planning Conference*, December 15–16, Newark, DE, USA.
- **Pei, T.**, Qiu, T., and Laman, J. (2019). "Steel fin pile foundation (SFPF): improving the lateral load carrying capacity of monopile foundations." *2019 Transportation Asset and Infrastructure Management (TAIM) Conference*, October 28–29, University Park, PA, USA.
- Yang, X., and **Pei, T.** (2017). "Compaction-induced stress in geosynthetic-reinforced granular base course: a discrete element model." *2017 World Transport Convention (WTC)*, Jun 3–6, Beijing, China.

RESEARCH INTERESTS

Soil dynamics; granular mechanics; numerical analysis in geotechnical engineering; soil-structure interaction; physics/theory-informed machine learning in civil engineering; landslide susceptibility modeling

RESEARCH EXPERIENCE

Fall 2023— **The City College of New York**
Assistant Professor
Department of Civil Engineering

Fall 2017— **The Pennsylvania State University**
Graduate Research Assistant
Department of Civil and Environmental Engineering

Spring 2017 **Oklahoma State University**
Undergraduate Research Assistant
Department of Civil and Environmental Engineering

TEACHING EXPERIENCE

Fall 2023 **The City College of New York**
Instructor
CE 345: Soil Mechanics
Department of Civil Engineering

Spring 2020 **The Pennsylvania State University**
Instructor
CE 337: Civil Engineering Materials Laboratory
Department of Civil and Environmental Engineering

MEMBERSHIPS

2020— **Student Member**, American Geophysical Union (AGU)
2020— **Student Member**, Deep Foundation Institute (DFI)
2017— **Student Member**, American Society of Civil Engineers (ASCE)
2017— **Member**, Chi Epsilon