# Bendong Tan

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## Education

- **University of Connecticut (PhD student in Electrical Engineering)** Jan 2022 – Now
  - **Research area:** Low-inertia power system identification, monitoring and control
  - **Supervisor:** Prof.Junbo Zhao
- **Wuhan University (M.S. in Electrical Engineering)** Sep 2017 – May 2020
  - **Weighted of Average Score:** 89.32/100
  - **Thesis:** Power System Transient Stability Assessment with Unsatisfactory Data
  - **Supervisor:** Prof.Yuanzhang Sun & Prof.Jun Yang
- **Wuhan University (B.E. in Electrical Engineering)** Sep 2013 – Jul 2017
  - **Grade Point Average (GPA):** 3.60/4.00
  - **Ranking:** 22/379 **(top 6%)**
  - **Thesis:** Transient Stability Assessment of Power System Based on Data Mining Technology
  - **Supervisor:** Prof.Jun Yang

## Awards & Honors

- **Awards**
  - Outstanding Reviewer Award from IEEE Transactions on Power Systems 2021
  - Best Paper Award, IEEE Power and Engineering Society General Meeting 2022
  - Best Paper Award, IEEE PES ISGT Aisa 2022
  - Best Paper Award, International Journal of Electrical Power & Energy Systems 2022
- **Scholarships**
  - Third-class scholarship of Wuhan University **(top 15%)** Dec 2014
  - First-class scholarship of Wuhan University **(top 5%)** Dec 2015 & Dec 2016
  - Second-class Scholarship of Wuhan University **(top 10%)** Dec 2018
  - Power Exploration Scholarship **(top 1%)** Dec 2019
- **Contests**
  - Meritorious winner in American mathematical contest in modeling, America Apr 2015
  - First prize of mathematical contest in modeling, Hubei Nov 2015
  - Third prize of mathematical contest in modeling, China Nov 2017 & Nov 2018
  - Second prize of table tennis contest in School of Electrical Engineering, Wuhan University May 2018
- **Honors**
  - Outstanding student of Wuhan University Dec 2014
  - Triple-A student of Wuhan University Dec 2015 & Dec 2016
  - Outstanding graduate student of Wuhan University Dec 2018
  - Advanced individual of graduate innovative and practical contests in China Nov 2017 & Nov 2018

## Publications

- **Journal Paper**
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Data-driven time-varying inertia estimation of inverter-based resources considering current limit,", ***IEEE Transactions on Power Systems***, 2022. (To be submitted)
  - Jiahao Liu, Cheng Wang, Junbo Zhao and **Bendong Tan**, *et al.*, "Simplified transient model of DFIG wind turbine for power system frequency dynamics analysis,", ***IEEE Transactions on Power Systems***, 2022. (Under review)
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Debiased uncertainty quantification approach for probabilistic transient stability assessment,", ***IEEE Transactions on Power Systems***, 2022. (Under revision)
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Amortized Bayesian parameter estimation approach for WECC composite load model,", ***IEEE Transactions on Power Systems***, 2022. (Under revision)
  - Guozhou Zhang, Junbo Zhao, Weihao Hu, Di Cao and **Bendong Tan**, *et al.*, "A novel data-driven self-tuning SVC additional fractional-order sliding mode controller for voltage stability with wind generations,", ***IEEE Transactions on Power Systems***, 2022. (Under revision)
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Transferable deep kernel emulator for probabilistic load margin assessment with topology changes, uncertain renewable generations and loads,", ***IEEE Transactions on Power Systems***, 2022.
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Data-driven time-varying inertia estimation of inverter-based resources,", ***IEEE Transactions on Power Systems***, 2022.
  - **Bendong Tan**, Junbo Zhao, *et al.*, "A general decentralized dynamic state estimation with synchronous generator magnetic saturation,", ***IEEE Transactions on Power Systems***, 2022.
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Distributed frequency divider for power system bus frequency online estimation considering virtual inertia from DFIGs,.", ***IEEE Journal on Emerging and Selected Topics in Circuits and Systems***, vol. 12, no. 1, pp. 161-171, 2022.
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Decentralized data-driven estimation of generator rotor speed and inertia constant based on adaptive unscented Kalman filter,", ***International Journal of Electrical Power & Energy Systems***, vol.137, pp.107853, 2022.
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Power system inertia estimation: review of methods and the impacts of converter-interfaced generations," ***International Journal of Electrical Power & Energy Systems***, vol.134, pp.107362, 2022.
  - S. R. Khazeiynasab, J. Zhao, I. Batarseh and **Bendong Tan**, "Power plant model parameter calibration using conditional variational autoencoder," ***IEEE Transactions on Power Systems***, vol. 37, no. 2, pp. 1642-1652, 2022.
  - **Bendong Tan**, Jun Yang, *et al.*, "Spatial-temporal adaptive transient stability assessment for power system under missing data," ***International Journal of Electrical Power & Energy Systems***, vol.123, pp.106237, 2020.
  - **Bendong Tan**, Jun Yang, *et al.*, "A deep imbalanced learning framework for transient stability assessment of power system," ***IEEE Access***, vol.7, pp.81759-81769, 2019.
- **Conference Paper**
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Explainable Bayesian neural network for probabilistic transient stability analysis considering wind energy,", in ***2022 IEEE Power & Energy Society General Meeting (PESGM)***, pp. 1-5, 2022. (Best paper award)
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Interpretable data-driven probabilistic power system load margin assessment with uncertain renewable energy and loads,", in ***11th International Conference on Innovative Smart Grid Technologies (Asia)***, 2022. (Best paper award)
  - **Bendong Tan**, Junbo Zhao, *et al.*, "Extended frequency divider for bus frequency estimation considering virtual inertia from DFIGs,", in ***2021 IEEE PES Innovative Smart Grid Technologies Conference - Latin America (ISGT Latin America)***, pp. 1-5, 2021.
  - **Bendong Tan**, Jun Yang, *et al.*, "A novel temporal feature selection for time-adaptive transient stability assessment,", in ***2019 IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe)***, pp. 1-5, 2019.
  - **Bendong Tan**, Jun Yang, *et al.*, "Representational learning approach for power system transient stability assessment based on convolutional Neural Network," in ***The 6th Renewable Power Generation Conference***, Sep. 2017.

## Skills

- **Power System Softwares**
  - Familiar with **DIgSILENT simulation language** for converter interfaced generation modeling;
  - Master the usage of **PST, DIgSILENT, PSS/E, PowerWorld, PSASP, PSD-BPA**, and develop batch simulation scripts of transient stability for these software;
- **Programming Languages** – Julia, Python, C and Matlab.

## Projects

- **Load sculptor: robust dynamic load modeling and uncertainty quantification** 06/2020–12/2023
  **Funding source**: US Department of Energy and Lawrence Livermore National Laboratory.
  **PI**: Prof. Junbo Zhao
  - A prior distribution restrictor is developed via a classifier to filter out invalid simulations because of the unsuitable parameter combinations during the offline training stage;
  - A sparse polynomial chaos expansion (SPCE) enabled global sensitivity analysis is developed to identify the importance of each parameter's response to the captured system dynamics;
  - The multi-fidelity trajectory statistics constructor is proposed to extract the representations from post-disturbance dynamic responses of the composite load model with distributed generation (CMPLDWG);
  - Conditional masked autoregressive flow (CMAF) is utilized to learn the parameter posterior distribution.
- **Modeling and analytics for WI near term resilience and reliability** 03/2021-04/2022
  **Funding source**: US Department of Energy and National Renewable Energy Lab.
  **PI**: Prof. Junbo Zhao
  - A probabilistic transferable deep kernel emulator (DKE) is proposed to extract the hidden relationship between uncertain sources, i.e., wind generations and loads, and load margin for probabilistic load margin assessment (PLMA);
  - A transfer learning framework is also developed to reduce the invariant representation space distance between the old topology and new one. It allows the DKE to be quickly fine tuned with only a few samples under the new topology;
- **Macro-resiliency of the north American power grid** 06/2020–12/2023
  **Funding source**: US Department of Energy and Argonne National Laboratory.
  **PI**: Prof. Junbo Zhao
  - By modeling the active power control and deriving the state-space model between unknown states and parameters to the measurements, an enhanced adaptive Unscented Kalman filter (EAUKF) is proposed to track the time-varying inertia in inverter-based resources (IBRs) with grid-forming control;
  - Considering the effects from current limiter, variational Bayesian Unscented Kalman filter (VBAUKF) is proposed to track the time-varying inertia in inverter-based resources (IBRs) with grid-forming control.