Yihong ZHOU

Postdoctoral Researcher, University of Oxford

yihong.zhou@eng.ox.ac.uk | +44 07540143206 | Oxford, United Kingdom

Personal Website | Google Scholar (Citations: 313) | ORCID

Education

The University of Edinburgh 11/2021–09/2025

PhD, Unlocking Grid Flexibility of Distributed Energy Resources

Supervisors: Prof Thomas Morstyn, Prof Gareth Harrison, Dr Wei Sun.

Examiners: Prof Pierre Pinson, Prof Daniel Friedrich.

University of Oxford 04/2024–04/2025

Visiting PhD Student, Department of Engineering Science

The University of Edinburgh 09/2020–09/2021

MSc in Artificial Intelligence Avg Score: 80.4/100 (Distinction)

**Distinction threshold is 70/100*

North China Electric Power University 09/2016–07/2020

BEng in Electrical Engineering and its Automation Avg Score: 90.63/100

Work Experience

University of Oxford 06/2025–Present

Postdoctoral Research Associate

- Project: SAGEflex: Safeguarded AI Agents for Grid-Edge Flexibility, funded by ARIA.

The University of Edinburgh 01/2022–05/2023

Teaching Assistant

- Courses: (1) Data Analysis and Machine Learning; (2) Distributed Energy Resources and Smart Grids.
- Role: Lab demonstrator and marker throughout the courses.

The University of Edinburgh 02/2022–07/2022

Research Assistant

- Provided feasibility evaluation for Smart Local Energy System options for the Scottish Borders Council.

North China Electric Power University 08/2019–07/2020

Research Assistant

- Designed machine learning algorithms for managing home energy resources and electric vehicle fleets.

Awards & Nominations

- 2025: **Top 3 Best Note Paper**, ACM e-Energy Conference, Netherlands.
- 2023: **EUSA Teaching Award Nomination**, for "Outstanding Course", University of Edinburgh.
- 2021: **Engineering Studentship**, University of Edinburgh.

Publications

Peer-reviewed Journals

[J1] **Yihong Zhou**, Y. Xia, H. Yang, and T. Morstyn. "Strengthened and faster linear approximation to joint chance constraints with wasserstein ambiguity." *INFORMS Journal on Computing*, 2026. doi: 10.1287/ijoc.2024.1073. arXiv:2412.12992. (**100x speedup**, TOP UTD 24 journal).

[J2] **Yihong Zhou** and T. Morstyn. "Grid-Intelligent AI Data Centres for Primary Response." *IEEE Transactions on Industry Applications*, 2026. doi: 10.1109/TIA.2026.3678552. (**The first data centre primary response validated on real GPUs**).

[J3] A. Paredes, **Yihong Zhou**†, J.A. Aguado, and T. Morstyn. "Independent Aggregators securing End User Wasserstein Distributionally Robust Flexibility through Bilevel Incentives." *Applied Energy*, 2026. (†*Corresponding author*)

[J4] H. Deng*, **Yihong Zhou***, T. Morstyn, and Y. Wang. "Supervised Reinforcement Learning for the Coordination of Distributed Energy Resources." Accepted by *Electric Power Systems Research*, special issue for Power Systems Computation Conference (PSCC), 2026. (**Equal contributions*)

[J5] A. Paredes, **Yihong Zhou**, J.A. Aguado, and T. Morstyn. "Optimal Reliability Thresholds for Stochastic Flexibility Aggregators in European Reserve Markets." Accepted by *Electric Power Systems Research*, special issue for Power Systems Computation Conference (PSCC), 2026.

[J6] T. Morstyn, **Yihong Zhou**, and I. Whitfield. "Multiscale Grid Intelligence to Fight AI Data Centre Grid Defection: Unlocking a Faster, Cheaper and Cleaner On-Grid AI Rollout." *IEEE Energy Sustainability Magazine*, 2025. doi: 10.1109/ESM.2025.3628276.

[J7] **Yihong Zhou**, C. Essayeh, and T. Morstyn. "Aggregated feasible active power region for distributed energy resources with a distributionally robust joint probabilistic guarantee." *IEEE Transactions on Power Systems*, 2024.

[J8] **Yihong Zhou**, C. Essayeh, S. Darby, and T. Morstyn. "Evaluating the social benefits and network costs of heat pumps as an energy crisis intervention." *iScience* 27(2), 2024.

[J9] **Yihong Zhou**, C. Essayeh, and T. Morstyn. "A novel surrogate polytope method for day-ahead virtual power plant scheduling with joint probabilistic constraints." *Electric Power Systems Research* 234, special issue for Power Systems Computation Conference (PSCC), 2024.

[J10] **Yihong Zhou**, C. Essayeh, and T. Morstyn. "Datasets of Great Britain primary substations integrated with household heating information." *Data in Brief* 54, 2024.

[J11] **Yihong Zhou**, Z. Ding, Q. Wen, and Y. Wang. "Robust load forecasting towards adversarial attacks via Bayesian learning." *IEEE Transactions on Power Systems* 38(2), 2022.

[J12] J. Hu, H. Zhou, **Yihong Zhou**, et al. "Flexibility prediction of aggregated electric vehicles and domestic hot water systems in smart grids." *Engineering* 7(8), 2021.

[J13] H. Zhou, **Yihong Zhou**, et al. "LSTM-based energy management for electric vehicle charging in commercial-building prosumers." *Journal of Modern Power Systems and Clean Energy* 9(5), 2021.

[J14] H. Zhou, **Yihong Zhou**, et al. "Real-time Optimization Scheduling Strategy for Aggregated Electric Vehicles Supported by Artificial Intelligence Technology." *Power System Technology* 45(4), 2021.

Peer-reviewed Conferences

[C1] F. Michelon, **Yihong Zhou**, and T. Morstyn. "Large language model interface for home energy management systems." *ACM International Conference on Future Energy Systems (e-Energy)*, pp. 590-602, 2025.

[C2] A. Paredes, **Yihong Zhou**, C. Essayeh, J.A. Aguado, and T. Morstyn. "Exploiting Data Centres and Local Energy Communities Synergies for Market Participation." *IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT Europe)*, 2024.

[C3] **Yihong Zhou**, A. Paredes, C. Essayeh, and T. Morstyn. "Evaluating and Comparing the Potentials in Primary Response for GPU and CPU Data Centers." *IEEE Power & Energy Society General Meeting (PESGM)*, 2024.

Preprints & In Review

[P1] **Yihong Zhou**, H. Zeng, and T. Morstyn. "GradMAP: Gradient-Based Multi-Agent Proximal Learning for Grid-Edge Flexibility." arXiv:2604.24549. (**1,000 agents minimising AC network constraints with no parameter sharing trained in 15 minutes on a single GPU**).

[P2] **Yihong Zhou**, D. Cope, J. Foerster, and T. Morstyn. "JAX-Based Batched AC Power Flow for GPU Acceleration and AI Ecosystem Integration." arXiv:2605.14103. Under review for *IEEE Power Engineering Letters*. (**14+ speedup for 2000-node GB transmission AC load flow**).

[P3] **Yihong Zhou**, H. Yang, and T. Morstyn. "FICA: Faster Inner Convex Approximation of Chance Constrained Grid Dispatch with Decision-Coupled Uncertainty." arXiv:2506.18806. (**500x speedup**). Targeting *IEEE Transactions on Power Systems*.

[P4] **Yihong Zhou**, A. Paredes, C. Essayeh, and T. Morstyn. "AI-focused HPC data centers can provide more power grid flexibility and at lower cost." arXiv:2410.17435. Targeting *Applied Energy*.

[P5] Y. Zhou, **Yihong Zhou**, T. Morstyn, and Y. Wang. "Decision-focused Learning for Local Energy Communities Management Under Uncertainty." Under review (2^{nd} round) for *IEEE Transactions on Smart Grid*.

[P6] Y. Xia, **Yihong Zhou**, I. Savelli, and T. Morstyn. "Bilevel Transmission Expansion Planning with Joint Chance-Constrained Dispatch." arXiv preprint arXiv:2505.11273.

Technical Reports

[R1] **Yihong Zhou**, J. Low, A. Lyden, C. Essayeh, W. Sun, D. Friedrich, and T. Morstyn. "Assessment of options for a smart, resilient and low-carbon multi-vector energy system in the Scottish Borders." Published by *EnergyREV*, UK, July 2023.

Patents & Intellectual Property

- **Patent application** (filed January 2026; named as the first inventor): A patent application for "methods enabling AI data centres to provide fast primary response services to power grids" has been filed with the UK Intellectual Property Office (UKIPO) via Oxford University Innovation (OUI), with professional patent support from J A Kemp LLP.

Academic Leadership & Services

Talks, Panels & Workshop Organisation

- 2026: Invited attendee, "Sustainability and Safety at the Frontier of AI Workshop", Royal Academy of Engineering, London.
- 2026: Panelist, "Reinventing Future Electricity Markets with AI", IEEE PES International Meeting, Hong Kong.
- 2026: Special Session Chair, "AI-Enabled Optimization for Integrated Energy and Transportation Systems in Smart Cities", IEEE IAS Industrial and Commercial Power System Asia (I&CPS Asia), Kunming, China.
- 2026: Special Session Chair, "Key Technologies for Collaborative Planning and Operation of Source-network-load-

storage in New-Type Power Systems", IEEE Conference on Energy Internet and Energy System Integration (EI^2), Shanghai, China.
- 2025: Speaker, "Large Language Models, Home Energy Management Systems, and Virtual Power Plants", industry-facing presentation to EcoFlow.
- 2025: Organiser & Chair & Speaker, Oxford Workshop on Safeguarded AI Agents for Grid-Edge Flexibility, Saïd Business School, University of Oxford, UK.
- 2025: Session Chair & Speaker, GW4 Exeter Workshop, Exeter University, UK.
- 2025: Invited Seminar, North China Electric Power University, Beijing, China.
- 2024: Presenter, Power Systems Computation Conference (PSCC), Paris, France.

Academic Services

- **Journal and Conference Reviewer**: *Joule*, *Nature Communications*, *IEEE Transactions on Power Systems*, *IEEE Transactions on Smart Grid*, *IEEE Transactions on Energy Markets, Policy and Regulation*, *IEEE Transactions on Industry Applications*, *IEEE Transactions on Industrial Informatics*, *Electric Power Systems Research*, etc.
- **Conference Reviewer**: Power Systems Computation Conference (PSCC), IEEE Power & Energy Society General Meeting (PESGM).
- **Co-supervision**: 3 DPhil students, 5 MSc/Undergrad theses (University of Oxford).
- **Lab Service**: Server and Code-space Manager for the Power System Architecture Lab.