Yanbing Dai

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Research Interests

Efficient energy systems development; Energy saving; Energetic, exergetic, economic, and environmental performance analysis.

Education

Xi'an Jiaotong University (XJTU, Top 10 in China)   **Xi'an, China**

Master of Energy and Power Engineering (GPA: 91.92/100, Top 10%)   Sep 2022 - Jun 2025
B.E. in Energy and Power Engineering (GPA: 85.39/100)   Sep 2017 - Jun 2021

Warsaw University of Technology (Top 3 in Poland)   **Warsaw, Poland**

Summer School on Power Engineering - Energy Sources, Conversion and Storage (obtained 5 ECTS credits)   Aug 1, 2019 - Aug 14, 2019

Publications

Journal Articles

1. X. Han, **Y. Dai**, X. Guo, K. Braimakis, S. Karellas, J. Yan. A novel dual-stage intercooled and recuperative gas turbine system integrated with transcritical organic Rankine cycle: System modeling, energy and exergy analyses. *Energy*, 2024, 305: 132252. [X. Han is the advisor, and Y. Dai completed the majority of the research work as the second author]

2. M. Su, X. Han, **Y. Dai**, J. Wang, J. Liu, J. Yan. Investigation on recirculated regenerative solid desiccant-assisted dehumidification system: Impact of system configurations and desiccant materials. *Energy*, 2024, 286: 129629.

3. X. Han, T. Yuan, D. Zhang, **Y. Dai**, J. Wang, J. Liu, J. Yan. Waste heat utilization from boiler exhaust gases for zero liquid discharge of desulphurization wastewater in coal-fired power plants: Thermodynamic and economic analysis. *Journal of Cleaner Production*, 2021, 308: 127328.

4. H. Wang, Y. Qian, **Y. Dai**, X. Han, W. Chen, J. Yan. Comparative thermodynamic analysis and optimization design of open Brayton cycle configurations. *Journal of Engineering Thermophysics*, 2024, 45(7): 1890-1896. [In Chinese]

Conference Papers

1. **Y. Dai**, X. Han, X. Guo, J. Yan. Part-load performance analysis of an intercooled and recuperative gas turbine system integrated with transcritical organic Rankine cycle. *16th International Conference on Applied Energy*, Niigata, Japan, Sep 1-5, 2024. [Oral Presentation]

2. **Y. Dai**, X. Han, X. Guo, K. Braimakis, S. Karellas, J. Yan. Thermodynamic analysis of a novel dual-stage intercooled and recuperative gas turbine-transcritical organic Rankine cycle power generation system. *3rd International Conference for Global Chinese Academia on Energy and Built Environment*, Shanghai, China, Jul 29-31, 2023. [Poster Presentation]

3. **Y. Dai**, X. Han, Y. Zhang, Y. Yang, W. Chen, J. Yan. Multi-objective optimization and off-design performance analysis of air Brayton cycle configurations. *The Engineering Thermodynamics and Energy Utilization Branch of the Engineering Thermophysics Society*, Xiamen, China, Dec 13-16, 2024. [In Chinese. Accepted]

4. X. Han, **Y. Dai**, T. Yuan, D. Zhang, J. Liu, J. Yan. Thermodynamic and techno-economic analysis of solar-steam hybrid driven flue gas desulfurization wastewater zero liquid discharge system. *12th International Conference on Applied Energy*, Bangkok, Thailand, Dec 1-10, 2020. [Oral Presentation. X. Han is the advisor, and Y. Dai completed the majority of the research work as the second author]

5. Y. Li, **Y. Dai**, X. Han, X. Guo, S. Karellas, J. Yan. Process modeling and economic viability analysis of a power-to-H$_2$-to-power system: Case study in China. *ECOS 2024 - Proceedings of the 37th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems*, Rhodes, Greece, Jun 30-Jul 5, 2024. [Oral Presentation]

6. M. Su, X. Han, **Y. Dai**, J. Wang, J. Liu, J. Yan. Investigation on recirculated regenerative solid desiccant-assisted dehumidification system: Impact of system configurations and desiccant materials. *3rd International Conference for Global Chinese Academia on Energy and Built Environment*, Shanghai, China, Jul 29-31, 2023. [Oral Presentation]

7. H. Wang, Y. Qian, **Y. Dai**, X. Han, W. Chen, J. Yan. Comparative thermodynamic analysis and optimization design of open Brayton cycle configurations. *The Engineering Thermodynamics and Energy Utilization Branch of the Engineering Thermophysics Society*, Luoyang, China, Nov 10-13, 2023. [In Chinese. Outstanding Paper Award. Oral Presentation]

Patents

1. X. Han, **Y. Dai**, Y. Zhang, Y. Zhou, W. Chen, J. Wang, J. Liu, J. Yan. A closed air Brayton cycle power generation system coupled with seawater desalination. *Intellectual Property Publishing House Co.,Ltd*, China Patent CN202410589966.7, 2024 Aug 23. [In Chinese. Publication]

2. X. Han, H. Wang, Y. Qian, W. Chen, X. Tang, **Y. Dai**, J. Liu, J. Yan. A multi-objective optimization and configuration screening method for closed air Brayton cycle. *Intellectual Property Publishing House Co.,Ltd*, China Patent ZL202310880459.4, 2024 Mar 6. [In Chinese]

Software Copyright

1. X. Han, H. Wang, **Y. Dai**, Y. Qian, W. Chen, J. Yan. Closed air Brayton cycle configuration optimization software considering diversified application scenarios. *China Copyright Protection Center*, 2024SR0071522, 2024 Jan 10. [In Chinese]

Research Experience

Design and Preformance Analysis of Gas Turbine-Organic Rankine Cycle Combined Cycles

Advisor: **Assoc. Prof. Xiaoqu Han**   Sep 2022 - Present

- Proposed a combined cycle integrating an intercooled and recuperative gas turbine with a transcritical organic Rankine cycle, enabling deep recovery of exhaust heat and improving system performance.
- Developed an energy and exergy analysis model using THERMOFLEX software, including part-load operation analysis models.
- Designed the system and analyzed its performance under design and part-load conditions.

Configuration and Cold-End Optimization of High-Efficiency Air Brayton Cycles

Advisor: **Assoc. Prof. Xiaoqu Han**   Sep 2022 - Present

- Utilized EBSILON and MATLAB to conduct thermodynamic design for various open and closed air Brayton cycle configurations using a "system-component" integrated design approach.

- Performed single-objective and multi-objective optimizations based on power generation efficiency and power density using a genetic algorithm for both open and closed cycle configurations.
- Analyzed the performance of different configurations under varying loads and ambient temperatures in fixed and mobile power generation scenarios.
- Investigated the impact of cold-end design on the performance of closed air Brayton cycles.

High-Efficiency, Low-Cost Treatment and Recovery Technology for Wastewater in Coal-Fired Power Plants

Advisor: **Assoc. Prof. Xiaoqu Han**   Sep 2019 - Jun 2021

- Proposed an improved flue gas-driven forced-circulation multi-effect distillation and crystallization system to achieve simultaneous wastewater mitigation, water recovery, and energy savings.
- Developed a thermodynamic analysis model using Fortran, validated with literature data and real power plant measurements.
- Evaluated the economic feasibility of utilizing solar collectors to assist in achieving zero liquid discharge of flue gas desulphurization wastewater.

Leadership

Xi'an Jiaotong University   **Xi'an, Shaanxi**

Class President   Sep 2022 - Present

- Organized and led class meetings, ensuring smooth communication between students and faculty
- Coordinated class activities and events, managing a team of 34 students
- Facilitated conflict resolution within the class, promoting a harmonious learning environment

Class Representative in Charge of Studies   Sep 2018 - Jun 2021

- Collected and distributed assignments for 27 students, ensuring timely submission and feedback
- Planned and organized collaborative learning activities to enhance peer-to-peer support
- Handled communication between students and teachers regarding academic concerns

Honors and Awards

Top-Tier Graduate Academic Scholarship, Xi'an Jiaotong University	2023, 2024
Excellent Postgraduate, Xi'an Jiaotong University	2024
Excellent Postgraduate Cadre, Xi'an Jiaotong University	2023
Third-Class Scholarship, Xi'an Jiaotong University	2018

Service

Reviewer of *Journal of Cleaner Production* and *Energy*	2024

- Completed 5 peer reviews

Skills

System Design	THERMOFLEX, EBSILON, HTRI
Programming	MATLAB, Fortran, LaTeX
Languages	Mandarin (Native), English (Fluent, TOEFL: 95)