Curriculum Vitae

YANBING DAI

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Research Interests

Energy systems design and optimization; Waste heat recovery; Energetic, exergetic, economic, and environmental performance analysis.

Education

University of Maryland College Park, MD, USA
Ph.D. student in Mechanical Engineering **GPA**: 4.0/4.0 Expected May 2030
- **Advisor:** Prof. Vikrant Aute

Xi'an Jiaotong University Xi'an, Shaanxi, China
M.Eng. in Energy and Power Engineering **GPA**: 91.92/100, **Rank**: 2/34 Jun 2025
- **Thesis:** Thermodynamic Analysis of Intercooled and Recuperative Gas Turbine Integrated with Organic Rankine Cycle under Full Operating Conditions (**Outstanding Master's Thesis, Top 3%**)
- **Advisor:** Assoc. Prof. Xiaoqu Han

Xi'an Jiaotong University Xi'an, Shaanxi, China
B.Eng. in Energy and Power Engineering **GPA**: 85.39/100 Jul 2021

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.
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. Poster Presentation]
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]
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. ***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

Center for Environmental Energy Engineering, University of Maryland — College Park, MD, USA
Graduate Research Assistant — Advisor: Prof. Vikrant Aute — Aug 2025 - Present

Vapor Compression Cycle Modeling and Software Maintenance

- Maintained and enhanced VapCyc ejector and capillary tube components by integrating updated models and correlations and improving robustness across operating conditions.
- Built C# utilities for vapor compression cycle computation and regression testing, enabling batch execution, standardized outputs, and automated comparisons across solver versions.

Department of Thermal Power and Control Engineering, Xi'an Jiaotong University — Xi'an, Shaanxi, China
Graduate Research Assistant — Advisor: Assoc. Prof. Xiaoqu Han — Sep 2022 - Jun 2025

Design and Performance Analysis of Energy Recovery-Based Combined Thermal Cycles

- Proposed a thermal system integrating high-temperature and low-temperature cycles to enhance heat recovery, improving overall energy efficiency from 43.88% to 62.48%.
- Developed system-level energy and exergy analysis using THERMOFLEX, including part-load and varying ambient temperature operation modeling.
- Conducted performance evaluation under both design and off-design conditions.

Configuration and Performance Optimization of Advanced Air-Based Thermal Power Cycles

- Applied EBSILON and MATLAB to design various open and closed-loop thermodynamic cycles using integrated component modeling.
- Conducted optimization with respect to thermal efficiency and compactness across multiple cycle configurations.

Department of Thermal Power and Control Engineering, Xi'an Jiaotong University — Xi'an, Shaanxi, China
Undergraduate Research Assistant — Advisor: Assoc. Prof. Xiaoqu Han — Sep 2019 - Jun 2022

Energy-Efficient Wastewater Treatment and Heat Recovery in Thermal Power Plants

- Proposed an integrated system for wastewater treatment and resource recovery, driven by flue gas waste heat in thermal power stations.
- Developed a thermodynamic and techno-economic analysis model in FORTRAN, validated with literature data and real power plant measurements.
- Integrated solar-assisted evaporation to achieve zero liquid discharge, reducing levelized cost of wastewater treatment by 8%.

Honors and Awards

Outstanding Master's Thesis (**Top 3%**), Xi'an Jiaotong University	2025
Graduate Cadre with Honor, Xi'an Jiaotong University	2025
Top-Tier Graduate Academic Scholarship, Xi'an Jiaotong University	2023, 2024
Power Plant Alumni Scholarship, School of Energy and Power Engineering	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 and Leadership

Reviewer, ***Journal of Cleaner Production*** and ***Energy*** 2024, 2025
Class President, Xi'an Jiaotong University Sep 2022 - Jun 2025
Class Representative in Charge of Studies, Xi'an Jiaotong University Sep 2018 - Jul 2021

Skills

Programming C#, MATLAB, FORTRAN, LaTeX
System Design VapCyc, THERMOFLEX, EBSILON, HTRI
Languages Mandarin (Native), English (Fluent)