

Wei-Ting (Jonathan) Tang

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RESEARCH INTERESTS

Bayesian optimization, Gaussian processes, deterministic global optimization, decision-making under uncertainty, uncertainty quantification, machine learning, process system engineering

EDUCATION

The Ohio State University (OSU)	Columbus, USA
Ph.D. in Chemical Engineering (Advisor: Dr. Joel A. Paulson)	Sep. 2022-
National Taiwan University (NTU)	Taipei, Taiwan
M.S. in Chemical Engineering (Advisor: Dr. Jeffrey D. Ward)	Sep. 2020–June 2022
B.S. in Chemical Engineering	Sep. 2016–June 2020

HONOR AND AWARDS

1 st Place Poster Presentation Award, Graduate Research Symposium, Ohio State University	2024
Selected presentation at the CAST division plenary session, AIChE	2024
Robert S. Brodkey Scholarship, Ohio State University	2023
Best Poster Presentation Award, Taiwan Symposium on Thermodynamics and PSE	2023
Dean's Award for CoE Graduate Students, National Taiwan University	2022
Merit Award for Master and Ph.D. Thesis Competition, National Taiwan University	2022
Scholarship from Great Eastern Resins Industrial CO., LTD.	2021
Honorable Award for TSFY Process Design Competition, National Taiwan University	2019

PUBLICATIONS

1. **Tang, W. T.**, Chakrabarty, A., & Paulson, J. A. TR-BEACON: Shedding Light on Efficient Behavior Discovery in High-Dimensions with Trust-Region-based Bayesian Novelty Search. *Advances in Neural Information Processing Systems Workshop on Bayesian Decision-making and Uncertainty (NeurIPS Workshop on BDU)*, 2024. [\[link\]](#)
2. **Tang, W. T.**, Chien, C. K., & Ward, J. D. A review of energy intensification strategies for distillation processes: Cyclic operation, stacking, heat pumps, side-streams, dividing walls and beyond. *Separation and Purification Technology (SPT)*, 2024. [\[link\]](#).
3. **Tang, W. T.**, Chakrabarty, A., & Paulson, J. A. BEACON: A Bayesian Optimization Strategy for Novelty Search in Expensive Black-Box Systems. *arxiv preprint*, 2024. [\[link\]](#)
4. **Tang, W. T.**, Kudva, A., Tsay, C & Paulson, J. Efficient Guaranteed Global Optimization of Posterior Mean Functions for Gaussian Processes. *Journal of Global Optimization*, 2024. (under preparation)

5. **Tang, W. T.**, & Paulson, J. A. CAGES: Cost-Aware Gradient Entropy Search for Efficient Local Multi-Fidelity Bayesian Optimization. *IEEE Conference on Decision and Control (CDC)*, 2024. [[link](#)]
6. Gan, C. S., **Tang, W. T.**, & Ward, J. D. Combinatorial energy intensification of a ternary distillation process. *Chemical Engineering and Processing-Process Intensification (CEPPI)*, 2024. [[link](#)]
7. Chakrabarty, A., Vanfretti, L., **Tang, W. T.**, Paulson, J. A., Zhan, S., Bortoff, S. A., Deshpande, V. M., Wang, Y., Laughman, C. R.. Assessing Building Control Performance Using Physics-Based Simulation Models and Deep Generative Networks. *IEEE Conference on Control Technology and Applications (CCTA)*, 2024. [[link](#)]
8. Shah, U., Kudva, A., Donnelly, K. B., **Tang, W. T.**, Bakshi, B. R., & Paulson, J. A. Integrated Design, Control, and Techno-Ecological Synergy: Application to a Chloralkali Process. In *Foundations of Computer-Aided Process Design (FOCAPD)*, 2024. [[link](#)]
9. Kudva, A., **Tang, W. T.**, & Paulson, J. A. Robust Bayesian optimization for flexibility analysis of expensive simulation-based models with rigorous uncertainty bounds. *Computers & Chemical Engineering (CACE)*, 2024. [[link](#)]
10. **Tang, W. T.**, Chien, C. K., & Ward, J. D. Stacked Side-Stream distillation sequences. *Chemical Engineering Science (CES)*, 2023. [[link](#)]
11. **Tang, W. T.** & Ward, J. D. Energy and exergy analysis of a stacked complex sequence and alternatives for ternary distillation. *Separation and Purification Technology (SPT)*, 2023. [[link](#)]
12. **Tang, W. T.** & Ward, J. D. Comparison of Separation Alternatives for Two Industrial C6–C7 Aliphatic Hydrocarbon Mixtures Including Stacked Complex Sequences. *Industrial & Engineering Chemistry Research (IECR)*, 2023. [[link](#)]
13. **Tang, W. T.** & Ward, J. D. Stacked complex sequences for ternary zeotropic distillation. *Computers & Chemical Engineering (CACE)*, 2022. [[link](#)]
14. Ni, Y. W., Lin, W. E., **Tang, W. T.**, & Ward, J. D. Plantwide optimization coupled with column sequencing and stacking using a process simulator automation server. *Computers & Chemical Engineering (CACE)*, 2021. [[link](#)]

RESEARCH PRESENTATIONS

Oral Presentations

1. **Tang, W. T.**, Kudva, A., Tsay, C & Paulson, J. Scalable Global Optimization of Gaussian Processes Using a Specialized Branch-and-Bound Algorithm. In *2024 AIChE Annual Meeting. (Selected presentation at the CAST Division Plenary Session)* [[link](#)]
2. **Tang, W. T.**, & Paulson, J. A. Efficient Local Multi-Fidelity Optimization of High-Dimensional Objective Functions Using Cost-Aware Gradient Entropy Search (CAGES). In *2024 AIChE Annual Meeting*. [[link](#)]
3. **Tang, W. T.**, Chien, C. K., & Ward, J. Stacked Side-Stream Distillation Sequences for Energy Intensification of Multi-Component Separations. In *2024 AIChE Annual Meeting*. [[link](#)]

4. Kudva, A., **Tang, W. T.**, Donnelly, K., & Paulson, J. A Hyper-Sample-Efficient Framework for Robust Global Optimization of Expensive Function Network Systems Under Uncertainty. In *2024 AIChE Annual Meeting*. [\[link\]](#)
5. **Tang, W. T.**, & Paulson, J. A. Efficient Local Multi-Fidelity Optimization of High-Dimensional Objective Functions using Cost-Aware Gradient Entropy Search (CAGES). In *2024 Mid-Atlantic Process Control (MPC) Academy Meeting*
6. **Tang, W. T.**, & Paulson, J. A. Efficient Local Multi-Fidelity Optimization of High-Dimensional Objective Functions using Cost-Aware Gradient Entropy Search (CAGES). In *2024 Great Lake PSE Workshop*
7. Kudva, A., **Tang, W. T.**, & Paulson, J. Efficient Flexibility Analysis of Computationally Expensive Black-Box Simulators Using Quantile-Based Bayesian Optimization. In *2023 AIChE Annual Meeting*. [\[link\]](#)

Poster Presentations

8. **Tang, W. T.**, & Paulson, J. A. BEACON: A Bayesian Novelty Search Algorithm for Efficient Material Property Exploration. In *2024 Graduate Research Symposium*, Ohio State University (**1st place poster presentation award**)
9. **Tang, W. T.**, & Paulson, J. A. Efficient Guaranteed Global Optimization of Posterior Mean Functions for Gaussian Processes. In *2023 Graduate Research Symposium*, Ohio State University
10. **Tang, W. T.**, Chien, C. K., & Ward, J. The intensification and selection of distillation sequences. In *2023 Symposium on Thermodynamics and Process System Engineering*, Taiwan (**best poster presentation award**)

RESEARCH EXPERIENCE

Research Associate @ The Ohio State University, Columbus, OH

Nov. 2022-

Advanced Control and Optimization Lab

- Developed a scalable Bayesian-based novelty search algorithm for exploring multi-dimensional outcome spaces in expensive black-box systems, achieving 30% higher reachability for material exploration tasks compared with state-of-the-art exploration algorithms.
- Proposed a cost-aware local Bayesian optimization algorithm for multi-fidelity models, achieving 68% higher rewards in high-dimensional reinforcement learning problem than state-of-the-art multi-fidelity optimization algorithm.
- Created a specialized spatial branch-and-bound algorithm, ensuring global optimality and faster convergence rate for Gaussian process optimization. Successfully applied to optimize chemical reaction conditions and save CPU time by 82% compared to state-of-the-art solver SCIP.

Research Associate @ National Taiwan University, Taipei, Taiwan

Apr. 2020–Sep. 2022

Process System Engineering Lab

- Applied simulated annealing algorithm to optimize complex chemical processes modeled with Aspen Plus, resulting in significant improvements in process efficiency.
- Developed a novel stacked complex distillation sequence, reducing total annual cost by 20%

compared to traditional distillation methods.

- Predicted cracking and byproduct formation rates of an industrial cracking furnace (operated by Formosa Plastic Corporation) by deep neural networks trained with first-principle kinetic models.

TEACHING EXPERIENCE

Teaching Assistant for Process Control, Ohio State University	Fall 2023/Spring 2024
Teaching Assistant for Advanced Process Control, National Taiwan University	Spring 2022
Teaching Assistant for Process Control, National Taiwan University	Fall 2021

INDUSTRY EXPERIENCE

Product Manager Intern @ Air Liquide Far Eastern, Taipei, Taiwan	July-Aug. 2021
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PROFESSIONAL SERVICES

Journal reviewer: IEEE Access

Conference reviewer: ACC (2025)

SKILLS

Python, Pytorch, Matlab, Aspen Plus