

Wei-Ting Tang

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RESEARCH ACTIVITIES

Bayesian optimization, Gaussian process, deterministic global optimization, nonlinear programming, multi-armed bandit, process system engineering

EDUCATION

University of Wisconsin-Madison, WI, Ph.D., Chemical Engineering	Expected 2027 Spring
National Taiwan University, Taipei, Taiwan, M.S., Chemical Engineering	2022
National Taiwan University, Taipei, Taiwan, B.S., Chemical Engineering	2020

HONORS AND AWARDS

Computing and Systems Technology (CAST) Director's Student Presentation Award Finalists, American Institute of Chemical Engineers (AIChE) (<i>8 works chosen per year</i>)	2026
Travel Award, Midwest Machine Learning Symposium	2026
CAST Directors' Award Semi-Finalist, AIChE	2025
IEEE Control System Society Technical Committee Process Control Outstanding Student Paper Prize (<i>1 paper chosen per year</i>)	2025
1 st Place Poster Presentation Award, Graduate Research Symposium, Ohio State University	2024
CAST Division Plenary, AIChE (<i>5 works chosen per year</i>)	2024
Robert S. Brodkey Scholarship, Ohio State University	2023

PROFESSIONAL EMPLOYMENT

Dow Chemical, Remote	
Research Intern, Machine Learning, Optimization, and Statistics group (MiLOS)	2025
- Application of constrained Bayesian optimization algorithm to high-dimensional chemical process flowsheet optimization (patent application in progress)	

PROFESSIONAL SERVICES

Journal reviewer: IEEE Access, Industrial & Engineering Chemistry Research, IEEE Transactions on Control Systems Technology
Conference reviewer: American Control Conference (2025), AISTATS (2026), AAAI (2026), NeurIPS (2026)

INVITED TALKS

- Improving the Robustness of Vanilla Bayesian Optimization In High Dimensions with Isotropic Gaussian Processes, CAST Division, *AIChE Annal Meeting*, November 2026.
- NeST-BO: Fast Local Bayesian Optimization via Newton-Step Targeting of Gradient and Hessian Information, *Midwest Machine Learning Symposium* (lightning talk), June 2026
- Pushing the Boundaries of Bayesian Optimization for Novelty and High-Dimensional Search, *Student Seminar at Chemical and Biological Department, UW-Madison*, October 2025.
- Efficient guaranteed global optimization of posterior mean functions for Gaussian processes. Plenary Session, CAST Division, *AIChE Annal Meeting*, October 2024.

FIRST-AUTHORED PAPERS

- Tang, W. T.**, Muthyala, M., & Paulson, J. Isotropic Gaussian Processes Improve Vanilla Bayesian Optimization in High Dimensions. *arXiv preprint arXiv:2610.05780* (submitted to *ICLR 2027*, under review). [\[link\]](#)
- Tang, W. T.***, Yilin Xie*, Kudva, A., Paulson, J & Tsay, C. Global Optimization of Gaussian Processes: Formulations and Computational Comparison. (submitted to *Computational Optimization and Application*, under review)
- Tang, W. T.**, Chakrabarty, A., & Paulson, J. A. BEACON: a Bayesian optimization inspired strategy for efficient novelty search. *Digital Discovery*, 2026. [\[link\]](#)
- Tang, W. T.** & Paulson, J. Rethinking Trust-Region Bayesian Optimization in High Dimensions. *AISTATS Workshop OPTIMAL: Optimisation and Post-Bayesian Inference in Machine Learning*, 2026. [\[link\]](#)
- Tang, W. T.**, Kudva, A., Tsay, C & Paulson, J. An Efficient Spatial Branch-and-Bound Algorithm for Global Optimization of Gaussian Process Posterior Mean Function. *arXiv preprint arXiv:2605.00855*. [\[link\]](#) (submitted to *Journal of Global Optimization*, under review)
- Tang, W. T.**, Kudva, A., & Paulson, J. A. NeST-BO: Fast Local Bayesian Optimization via Newton-Step Targeting of Gradient and Hessian Information. *International Conference on Artificial Intelligence and Statistics*, 2026. [\[link\]](#)
- Tang, W. T.**, Vinod, A.P., Germain, F., Paulson, J.A., Laughman, C.R., Chakrabarty. A. AI-Driven Scenario Discovery: Diffusion Models and Multi-Armed Bandits for Building Control Validation. *Energy & Buildings*, 116207, 2025 [\[link\]](#)
- 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*, 357: 130030, 2024. [\[link\]](#).
- Tang, W. T.**, & Paulson, J. A. CAGES: Cost-Aware Gradient Entropy Search for Efficient Local Multi-Fidelity Bayesian Optimization. In

Proceedings of the Conference on Decision and Control, 1547–1552, 2024. [\[link\]](#) [Winner of IEEE CSS TC Process Control Outstanding Student Paper Prize]

10. **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. *NeurIPS Workshop on Bayesian Decision Making and Uncertainty*, Vancouver, Canada, 2024. [\[link\]](#)
11. **Tang, W. T.**, Chien, C. K., & Ward, J. D. Stacked Side-Stream distillation sequences. *Chemical Engineering Science*. 280: 119075, 2023. [\[link\]](#)
12. **Tang, W. T.** & Ward, J. D. Energy and exergy analysis of a stacked complex sequence and alternatives for ternary distillation. *Separation and Purification Technology*. 304: 122384, 2023. [\[link\]](#)
13. **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*. 61 (36), 13488-13504, 2023. [\[link\]](#)
14. **Tang, W. T.** & Ward, J. D. Stacked complex sequences for ternary zeotropic distillation. *Computers & Chemical Engineering*. 161: 107744, 2022. [\[link\]](#)

CO-AUTHORED PAPERS

1. Kudva, A., **Tang, W. T.**, & Paulson, J. A. Multi-Objective Bayesian Optimization for Networked Black-Box Systems: A Path to Greener Profits and Smarter Designs. In *Optimization of Sustainable Process Systems: Multiscale Models and Uncertainties*, edited by Can Li. [\[link\]](#)
2. Aimiwu, G., Khan, F., Mualen, D., **Tang, W.T.**, Brunelli, N.A., Paulson, J.A., Winter, J.O. and Wyslouzil, B., Experimental and computational investigation of mixing dynamics in millifluidic jet mixing reactors. *Chemical Engineering Journal*, 164078, 2025. [\[link\]](#)
3. Zhang, Q., Avraamidou, S., Paulson, J.A., Thakkar, V., Wang, Z., Chiang, L., Braun, B., Rathi, T., Chakrabarty, A., Sorouifar, F., **Tang, W.T.**, Guertin, France; Munoz, Paola; Sampat, Apoorva. Navigating the Trade-offs and Synergies of Economic and Environmental Sustainability Using Process Systems Engineering. In *Proceedings of the American Control Conference*, (pp. 1725-1742), Denver, 2025. [\[link\]](#)
4. Chakrabarty, A., Vanfretti, L., Wang, Y., Zhan, S., Mineyuki, T., **Tang, W. T.**, ... & Laughman, C. R. Time-series generative networks for synthesizing realistic scenarios in occupant-centric building simulation. *Building Simulation* (pp. 1-19). Tsinghua University Press, 2025 [\[link\]](#)
5. 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. In *Proceedings of the IEEE Conference on Control Technology and Applications*, 547–554, 2024. [\[link\]](#)
6. 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*. 2024. [\[link\]](#)
7. Gan, C. S., **Tang, W. T.**, & Ward, J. D. Combinatorial energy intensification of a ternary distillation process. *Chemical Engineering and Processing-Process Intensification*. 204: 109952, 2024. [\[link\]](#)
8. 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*. 181:108515, 2024. [\[link\]](#)
9. 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*. 146, 107196, 2021. [\[link\]](#)

PATENT

1. **Tang, W. T.**, & Ward, J. D. The Separation Method of Ternary Mixture. Taiwan Patent, TW I892018 B, August 1, 2025.

MEETING ABSTRACTS

1. **Tang, W.T.**, & Paulson, J. A. Improving High-Dimensional Trust Region Bayesian Optimization with Trust-Region-Aware Length-Scale Priors. In *2026 AIChE Annual Meeting*.
2. **Tang, W.T.**, & Paulson, J. A. Iso-Bo: Improving the Robustness of Vanilla Bayesian Optimization In High Dimensions with Isotropic Gaussian Processes. In *2026 AIChE Annual Meeting*.
3. **Tang, W.T.**, & Paulson, J. A. PALM-Lcb: Structure-Exploiting Global Optimization of Gaussian Process Lower Confidence Bounds. In *2026 AIChE Annual Meeting*.
4. **Tang, W.T.**, & Paulson, J. A. Newton-Step-Targeted Local Bayesian Optimization for High-Dimensional Black-Box Problems. In *2026 AIChE Annual Meeting*.
5. **Tang, W.T.**, & Paulson, J. A. Specialized Spatial Branch-and-Bound for Global Optimization of Gaussian Process Posteriors. In *2026 INFORMS Optimization Society Conference*.
6. **Tang, W.T.**, & Paulson, J. A. Newton-step-targeted local Bayesian optimization for high dimensional black-box problems. In *2025 INFORMS Annual Meeting*.
7. **Tang, W. T.**, Vinod, A.P., Germain, F., Paulson, J.A., Laughman, C.R., Chakrabarty, A. Automated Discovery of Diverse Disturbance Scenarios Via Combinatorial Multi-Arm Bandits and Time-Series Diffusion Models: Application to Building Control Systems. In *2025 AIChE Annual Meeting*.
8. **Tang, W. T.**, Chakrabarty, A., & Paulson, J. A Bayesian Approach to Novelty Search for Efficient Exploration of Expensive-to-Evaluate Function Landscapes with Unknown Internal Structure. In *2025 AIChE Annual Meeting*.
9. **Tang, W. T.**, Chakrabarty, A., & Paulson, J. TR-Beacon: A Trust Region Bayesian Novelty Search Algorithm for High-Dimensional, Expensive Black-Box Systems. In *2025 AIChE Annual Meeting*.
10. Kudva, A., **Tang, W. T.**, & Paulson, J. A. Mobons: A Multi-Objective Bayesian Optimization Framework for Graph-Structured Networks of Black-

- Box Systems. In *2025 AIChE Annual Meeting*.
11. Donnelly, B. D., **Tang, W. T.**, Kudva, A., Bevers, N., Timilsina, A., Khanal, S., Paulson, J. A. Composite Trust Region Bayesian Optimization for High-Dimensional Agroecosystem Model Calibration and Local Sensitivity Analysis. In *2025 AIChE Annual Meeting*.
 12. Aimiwu G, Khan F, Mualen D, **Tang W. T.**, Brunelli N, Paulson J, Winter J, Wyslouzil BE. Millifluidic Jet Mixing Reactor for High-Throughput Nanoparticle Manufacturing: A Combined Experimental and Computational Study. In *2025 AIChE Annual Meeting*.
 13. **Tang, W.T.**, & Paulson, J. A. Local Multi-Fidelity Bayesian Optimization for Cost-Effective, High-Dimensional Policy Search. In *2025 TWCCC Fall Meeting*
 14. **Tang, W. T.**, Chakrabarty, A., & Paulson, J. A. BEACON: A Bayesian Novelty Search Algorithm for Efficient Material Property Discovery. In *2025 TWCCC Fall Meeting*
 15. **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, CAST Plenary Presentation]**
 16. **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*.
 17. Kudva, A., **Tang, W. T.**, & Paulson, J. A. Bonsai: A Hyper-Sample-Efficient Framework for Robust Global Optimization of Expensive Function Network Systems Under Uncertainty. In *2024 AIChE Annual Meeting*.
 18. **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*.
 19. **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*
 20. **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*
 21. **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]**
 22. Kudva, A., **Tang, W. T.**, & Paulson, J. A. Efficient Flexibility Analysis of Computationally Expensive Black-Box Simulators Using Quantile-Based Bayesian Optimization. In *2023 AIChE Annual Meeting*.
 23. **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
 24. **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]**

REFEREES

1. Dr. Joel Paulson (joel.paulson@wisc.edu)
2. Dr. Victor Zavala (zavalatejeda@wisc.edu)
3. Dr. Calvin Tsay (c.tsay@imperial.ac.uk)
4. Dr. Ankush Chakrabarty (achakrabarty@ieee.org)