Wei "Wayne" Chen

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ACADEMIC APPOINTMENTS

Assistant Professor, Texas A&M University
J. Mike Walker '66 Department of Mechanical Engineering — August 2023 – Present
College Station, Texas

EDUCATION

University of Maryland, College Park, Maryland, USA
Ph.D., Mechanical Engineering — Aug 2015 – Aug 2019
Informatics for Design, Engineering And Learning (IDEAL) Lab

Chongqing University, Chongqing, China
M.S., Mechanical Engineering — Sep 2012 – Jun 2015
B.S., Mechanical Engineering — Sep 2008 – Jun 2012

PROFESSIONAL EXPERIENCE

Postdoctoral Scholar, Northwestern University — Apr 2021 – July 2023
Integrated DEsign Automation Laboratory (IDEAL)
Evanston, Illinois

Research Scientist, Siemens Technology — Sep 2019 – Mar 2021
Design & Simulation Systems Group
Princeton, New Jersey

HONORS & AWARDS

Advanced Materials Top Viewed Article (April 2025)
Doksoo Lee, **Wei (Wayne) Chen**, Liwei Wang, Yu-Chin Chan, Wei Chen
"Data-driven design for metamaterials and multiscale systems: a review"

ASME *Journal of Mechanical Design* Reviewer of the Year Award (Feb 2023)

ASME's Design Engineering Division Design Automation Committee Best Paper Award (Aug 2022)
Doksoo Lee, Yu-Chin Chan, **Wei (Wayne) Chen**, Liwei Wang, Wei Chen
"T-METASET: Task-Aware Generation of Metamaterial Datasets by Diversity-Based Ac- tive Learning"

2021 *Journal of Mechanical Design* Editors' Choice Honorable Mention (Jul 2022)
Wei (Wayne) Chen and Faez Ahmed
"PaDGAN: Learning to Generate High-Quality Novel Designs"

SELECTED PUBLICATIONS

Journal (* indicates equal contributions)

21. Zheng, J., Jahnke, C., & **Chen, W.** (2025). GUST: Quantifying Free-Form Geometric Uncertainty of Metamaterials Using Small Data. *Journal of Mechanical Design.* (Accepted) doi:10.1115/1.4069971.
20. Zhang, W., Tang, M., Mu, H., Yang, X., Zeng, X., Tuo, R., **Chen, W.** & Gao, W. (2025). Inverse Design of Nonlinear Mechanics of Bio-inspired Materials Through Interface Engineering and Bayesian Optimization. *Extreme Mechanics Letters*, 102359. doi:10.1016/j.eml.2025.102359.
19. Van Bossuyt, D. L., Allaire, D., Bickford, J. F., Bozada, T. A., **Chen, W.**, Cutitta, R. P., Cuzner, R., Fletcher, K., Giachetti, R., Hale, B., Huang, H. H., Keidar, M., Layton, A., Ledford, A., Lesse, M., Lussier, J., Malak, R., Mesmer, B., Mocko, G., Oriti, G., Selva, D., Turner, C., Watson, M., Wooley, A., & Zeng, Z. (2025). The Future of Digital Twin Research and Development. *Journal of Computing and Information Science in Engineering*, 25(8), 080801. doi:10.1115/1.4068082.

18. Khan, S., Masood, Z., Usama, M., Kostas, K., Kaklis, P., & **Chen, W.** (2025). Physics-Informed Geometric Operators to Support Surrogate, Dimension Reduction and Generative Models for Engineering Design. *Advanced Engineering Informatics*, 63, 102937. doi:10.1016/j.aei.2024.102937.

17. **Chen, W.**, Sun, R., Lee, D., & Portela, C. M. (2024). Generative Inverse Design of Metamaterials with Functional Responses by Interpretable Learning. *Advanced Intelligent Systems*, 2400611. doi:10.1002/aisy.202400611.

16. Lee, D.*, **Chen, W.***, Wang, L.*, Chan, Y. C., & Chen, W. (2024). Data-Driven Design for Metamaterials and Multiscale Systems: A Review. *Advanced Materials*, 2305254. doi:10.1002/adma.202305254.

15. Zhang, H., **Chen, W.**, Rondinelli, J. M., & Chen, W. (2023). ET-AL: Entropy-targeted active learning for bias mitigation in materials data. *Applied Physics Reviews*, 10(2), 021403. doi:10.1063/5.0138913.

14. **Chen, W.**, Lee, D., Balogun, O., & Chen, W. (2023). GAN-DUF: Hierarchical Deep Generative Models for Design Under Free-Form Geometric Uncertainty. *Journal of Mechanical Design*, 145(1), 011703. doi:10.1115/1.4055898.

13. Lee, D., Chan, Y., **Chen, W.**, Wang, L., van Beek, A., & Chen, W. (2023). t-METASET: Task-Aware Acquisition of Metamaterial Datasets through Diversity-based Active Learning. *Journal of Mechanical Design*, 145(3), 031704. doi:10.1115/1.4055925.

12. Zhang, H., **Chen, W.**, Iyer, A., Apley, D. W., & Chen, W. (2022). Uncertainty-Aware Mixed-Variable Machine Learning for Materials Design. *Scientific Reports*, 12(1), 19760. doi:10.1038/s41598-022-23431-2.

11. Wang, J., **Chen, W.**, Da, D., Fuge, M., & Rai, R. (2022). IH-GAN: A Conditional Generative Model for Implicit Surface-Based Inverse Design of Cellular Structures. *Computer Methods in Applied Mechanics and Engineering*, 396, 115060. doi:10.1016/j.cma.2022.115060.

10. Heyrani Nobari, A., **Chen, W.**, & Ahmed, F. (2021). RANGE-GAN: Design Synthesis Under Constraints Using Conditional Generative Adversarial Networks. *Journal of Mechanical Design*, 144(2). doi:10.1115/1.4052442.

9. Chen, Q., Wang, J., Pope, P., **Chen, W.**, & Fuge, M. (2021). Inverse Design of 2D Airfoils using Conditional Generative Models and Surrogate Log-Likelihoods. *Journal of Mechanical Design*, 144(2). doi:10.1115/1.4052846.

8. **Chen, W.**, & Ahmed, F. (2021). MO-PaDGAN: Reparameterizing Engineering Designs for Augmented Multi-Objective Optimization. *Applied Soft Computing*, 113, 107909. doi:10.1016/j.asoc.2021.107909.

7. **Chen, W.** & Ahmed, F. (2020). PaDGAN: Learning to Generate High-Quality Novel Designs. *Journal of Mechanical Design*, 143(3). doi:10.1115/1.4048626.

6. **Chen, W.**, Chiu, K., & Fuge, M. (2020). Aerodynamic Design Optimization and Shape Exploration Using Generative Adversarial Networks. *AIAA Journal*, 58(11), 4723-4735. doi:10.2514/1.J059317.

5. **Chen, W.** & Fuge, M. (2019). Synthesizing Designs with Interpart Dependencies Using Hierarchical Generative Adversarial Networks. *Journal of Mechanical Design*, 141(11), 111403. doi:10.1115/1.4044076.

4. **Chen, W.** & Fuge, M. (2018). Active Expansion Sampling for Learning Feasible Domains in an Unbounded Input Space. *Structural and Multidisciplinary Optimization*, 57(3), 925-945. doi:10.1007/s00158-017-1894-y.

3. **Chen, W.** & Fuge, M. (2017). Beyond the Known: Detecting Novel Feasible Domains over an Unbounded Design Space. *Journal of Mechanical Design*, 139(11), 111405. doi:10.1115/1.4037306.

2. **Chen, W.**, Fuge, M., & Chazan, J. (2017). Design Manifolds Capture the Intrinsic Complexity and Dimension of Design Spaces. *Journal of Mechanical Design*, 139(5), 051102. doi:10.1115/1.4036134.

1. Luo, J., **Chen, W.**, & Fu, G. (2014). Hybrid-Heat Effects on Electrical-Current Aided Friction Stir Welding of Steel, and Al and Mg Alloys. *Journal of Materials Processing Technology*, 214(12), 3002-3012. doi:10.1016/j.jmatprotec.2014.07.005.

Patent

1. **Chen, W.** & Ramamurthy, A. (2021). Deep neural networks for synthesis and optimization of smooth surfaced 3D objects (International Publication Number WO2021247662A1). World Intellectual Property Organization.

Conference (Full Length, Peer-Reviewed)

9. **Chen, W.**, Lee, D., Balogun, O., & Chen, W. (2022, August). Hierarchical Deep Generative Models for Design Under Free-Form Geometric Uncertainty. In *ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. St. Louis, MO. Vol. 86236, p. V03BT03A042.
8. Lee, D., Chan, Y. C., **Chen, W.**, Wang, L., van Beek, A., & Chen, W. (2022, August). T-METASET: Task-Aware Generation of Metamaterial Datasets by Diversity-Based Active Learning. In *ASME 2022 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. St. Louis, MO. Vol. 86229, p. V03AT03A011.
7. Nobari, A., **Chen, W.**, & Ahmed, F. (2021, August). PcDGAN: A Continuous Conditional Diverse Generative Adversarial Network For Inverse Design. In *Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD '21)*. Virtual. pp. 606-616. doi:10.1145/3447548.3467414.
6. Nobari, A., **Chen, W.**, & Ahmed, F. (2021, August). Range-GAN: Range-Constrained Generative Adversarial Network for Conditioned Design Synthesis. In *ASME 2021 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. Virtual. Vol. 85390, p. V03BT03A039. doi:10.1115/DETC2021-69963.
5. **Chen, W.** & Ramamurthy, A. (2021, January). Deep Generative Model for Efficient 3D Airfoil Parameterization and Generation. In *AIAA Scitech 2021 Forum*. Virtual. p. 1690. doi:10.2514/6.2021-1690.
4. **Chen, W.** & Ahmed, F. (2020, August). PaDGAN: A Generative Adversarial Network for Performance Augmented Diverse Designs. In *ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. Virtual. Vol. 84003, p. V11AT11A010. doi:10.1115/DETC2020-22729.
3. **Chen, W.**, Chiu, K., & Fuge, M. (2019, January). Aerodynamic design optimization and shape exploration using generative adversarial networks. In *AIAA Scitech 2019 Forum*. San Diego, CA. p. 2351. doi:10.2514/6.2019-2351. (**Invited talk**)
2. **Chen, W.**, Jeyaseelan, A., & Fuge, M. (2018, August). Synthesizing designs with inter-part dependencies using hierarchical generative adversarial networks. In *ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. Quebec City, Canada. Vol. 51753, p. V02AT03A007. doi:10.1115/DETC2018-85339.
1. **Chen, W.**, Chazan, J., & Fuge, M. (2016, August). How designs differ: Non-linear embeddings illuminate intrinsic design complexity. In *ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (IDETC-CIE)*. Charlotte, NC. Vol. 50107, p. V02AT03A014. doi:10.1115/DETC2016-60112.

Preprint

3. Mu, H. D., Tang, M., Gao, W., & **Chen, W.** (2025). GUIDe: Generative and Uncertainty-Informed Inverse Design for On-Demand Nonlinear Functional Responses. arXiv preprint arXiv:2509.05641.

2. **Chen, W.** & Fuge, M. (2020). Adaptive Expansion Bayesian Optimization for Unbounded Global Optimization. arXiv preprint arXiv:2001.04815.
1. **Chen, W.** & Fuge, M. (2018). BézierGAN: Automatic Generation of Smooth Curves from Interpretable Low-Dimensional Parameters. arXiv preprint arXiv:1808.08871.

CITATIONS

The total number of citations from international journals and conferences is **1564** with H-index **19** (as of October 30, 2025). Please see my Google Scholar page https://scholar.google.com/citations?user=UlTyOWMAAAAJ&hl for more details.

AWARDED GRANTS

"Design-by-Learning and Learning-from-Design: White-Box Data-Driven Design of 2D Material-Based Biosensors and Its Impact on Designers"
Role: **PI**, Award amount: $479,982
National Science Foundation, 2025

"Quantifying 'Free-Form' Geometric Uncertainty in Robust Architected Material Design via Generative AI"
Role: **PI**, Award amount: $30,000
Texas A&M University MEEN Seed Grant, 2025

"AI-Driven Design of Compatibilizers for Multi-Stream Plastic Wastes Recycling"
Role: **co-PI**, Award amount: $45,000
Texas A&M University Targeted Proposal Teams (TPT) Collaborative Seed Grant, 2025

"Generation of Structurally-Functional Parametric Mechanical Shapes"
Role: **PI**, Award amount: €300,000
Siemens Innovation Core Technology (ICT) funding, 2020

ACADEMIC SERVICE

Guest Editor
Special Issue on Generative AI for Design, Manufacturing Processes, and Materials Systems, *Journal of Computing and Information Science in Engineering (JCISE)*

Conference Organizer
Organizing Committee, *The 25th International Conference on Engineering Design (ICED 25)*

Workshop Organizer
Co-organizer, *From Data to Design: Challenges and Opportunities across Industry and Academia*, *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE)*

Conference Session Chair
Chair, AI-Driven Design Innovation, *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC-CIE)*

Co-chair, Architected Materials/Metamaterials, *ASME Aerospace Structures, Structural Dynamics, and Materials Conference (SSDM)*

Committee Member
ASME Design Automation Conference (DAC) Dissertation Award Committee, 2025

Journal Reviewer
Journal of Mechanical Design
Structural and Multidisciplinary Optimization
Computer-Aided Design
Extreme Mechanics Letters
Nanoscale
Design Science
AIAA Journal
Small Science

Cell Reports Physical Science
Engineering Applications of Artificial Intelligence
Applied Soft Computing
Computational Materials Science
Journal of Computing and Information Science in Engineering (JCISE)
Journal of Manufacturing Processes
Journal of Computational Design and Engineering
Engineering Optimization
Cognitive Computation
Journal of Industrial Information Integration
IEEE Transactions on Industrial Electronics
IEEE Transactions on Engineering Management
Artificial Intelligence for Engineering Design, Analysis and Manufacturing
Journal of Verification, Validation and Uncertainty Quantification
International Journal of Production Research
Frontiers of Information Technology & Electronic Engineering

Conference Reviewer
ASME IDETC-CIE
ASME SSDM
ACM Symposium on Computational Fabrication (SCF)
SME North American Manufacturing Research Conference (NAMRC)

INVITED TALKS

"Uncertainty-Aware Generative Design for Engineered Materials: Avoiding Hallucination in AI for Inverse Design"
NSF Artificial Intelligence in Engineering Design and System Engineering (AI-EDSE) Workshop, Oct 16, 2025

"From Forward Modeling to Inverse Design"
ASME IDETC 2025 Workshop *From Data to Design: Challenges and Opportunities across Industry and Academia*, Aug 17, 2025

"Generative Machine Learning for Engineered Materials: Inverse Design, Uncertainty Quantification, and Bio-Inspiration"
Emerging Ideas in AI for Materials and Mechanical Design 2025, Duke University, May 19, 2025

"Redesigning the Design Space: Reshaping Design Problems with Generative Machine Learning"
GE Aerospace Seminar, Nov 7, 2024

"Generative Inverse Design to Achieve Functional Responses Using Forward Machine Learning Models"
ASME IDETC 2024 Early Career Research, Aug 26, 2024

"Challenges and Opportunities in Data-Driven Design for Metamaterials and Multiscale Systems"
ASME IDETC 2024 Workshop: From Data to Design: Challenges and Opportunities, Aug 25, 2024

"Redesigning the Design Space: Reshaping Design Spaces with Generative Machine Learning"
AM Talks: A CAMDI Seminar Series, Center for Additive Manufacturing and Design Innovation (CAMDI), The University of Texas at Austin, Mar 29, 2024

"GAN-DUF: Hierarchical Deep Generative Models for Design Under Free-Form Geometric Uncertainty"
SIAM UQ24 mini-symposium "Generative Models for Physics-based Forward and Inverse Problems", Feb 27, 2024

"Generative Design of Multiscale Heterostructures with Blended Multiclass Metamaterials"
SES 2023 Eringen Medal Symposium, Oct 10, 2023

"PaDGAN: Learning to Generate High-Quality Novel Designs"
ASME IDETC 2022 Spotlight Session, Aug 16, 2022

"Aerodynamic design optimization and shape exploration using generative adversarial networks"
AIAA Scitech 2019 Forum, Jan 11, 2019

TEACHING EXPERIENCE

MEEN 423 Machine Learning for Mechanical Engineers
Machine learning techniques with applications to the analysis and design of mechanical, fluid, thermal, material and multidisciplinary systems; linear and kernel support vector machines; neural networks; Bayesian techniques; decision trees and random forests; dimension reduction and model selection; data management and learner validation strategies; tools and application studies.

MEEN 401 Introduction to Mechanical Engineering Design
The design innovation process; need definition, functional analysis, performance requirements and evaluation criteria, conceptual design evaluation, down-selected to an embodiment; introduction to systems and concurrent engineering; parametric and risk analysis, failure mode analysis, material selection, and manufacturability; cost and life cycle issues, project management.

STUDENTS ADVISING

PhD Student

Nirmal Panta	Mechanical Engineering	Aug 2025 – Present
Jipeng Cui	Mechanical Engineering	Aug 2024 – Present
Haoxuan Mu	Mechanical Engineering	Aug 2023 – Present

MS Student

Jacob Martin	Mechanical Engineering	May 2025 – Present
Vinay Chandra	Computer Science	May 2024 – Present
Jiahui (Cal) Zheng	Mechanical Engineering	Aug 2023 – Present
Bhavyasree Mohan	Computer Science	Feb 2024 – Sep 2024

Undergraduate Student

Ryan Landa	Mechanical Engineering, TAMU	May 2025 – Present
Mohamed Abdelmonem	Mechanical Engineering, TAMU at Qatar	May 2025 – Present
Adithi Iyer Ganesan	Electronic Systems Engineering Technology, TAMU	Jan 2025 – Present
Cole Jahnke	Mechanical Engineering, TAMU	Aug 2024 – May 2025
Wisam Gadam	Mechanical Engineering, TAMU at Qatar	May 2024 – Present
Eddie Guerrero	Pre-Engineering, TAMIU	May 2024 – Aug 2024
Aayush Garg	Computer Science, TAMU	Feb 2024 – May 2024

PhD Committee Member

Hossein Geshani	Mechanical Engineering, TAMU	TBD
Ziye Deng	Mechanical Engineering, TAMU	TBD
Suryapavan Cheruku	Mechanical Engineering, TAMU	TBD
Yalan Shu	Mechanical Engineering, TAMU	TBD
Chin-Cheng (Jim) Shih	Mechanical Engineering, TAMU	TBD
Shaoliang Yang	Mechanical Engineering, Santa Clara University	TBD
Qiyu Li	Mechanical Engineering, TAMU	TBD
Mahtab Heydari	Mechanical Engineering, TAMU	TBD
Shantanu Vyas	Mechanical Engineering, TAMU	2025
Soheyl Massoudi	Mechanical Engineering, EPFL	2024
Gabriel Apaza	Aerospace Engineering, TAMU	2024

OUTREACH ACTIVITIES

Hosted summer interns in the *Texas Summer Research Experience (Qatar to Texas) Program*
TAMU, College Station, TX — 2024 and 2025

Presented "AI for Engineering Design" at the *Future Focus Fair*
Bryan High School, Brayn, TX — Jan 28, 2025

Hosted summer interns in the *Undergraduate Summer Research REU Program (S-REU)*
TAMU, College Station, TX — May 2024 – Aug 2024

Served as a judge for the STEM research projects of high school students at the *Texas Science & Engineering Fair (TXSEF)*
TAMU, College Station, TX — Mar 23, 2024

Hosted a Society of Women Engineers (SWE) activity table at the annual *Kits, Cats, and Kids Block Party*
Evanston Township High School, Evanston, IL — Sep 15, 2022