

# Wei Chen

Github : [www.github.com/wchen459](https://www.github.com/wchen459)

[wei.wayne.chen@northwestern.edu](mailto:wei.wayne.chen@northwestern.edu)

LinkedIn : [www.linkedin.com/in/wei-chen-467abb86](https://www.linkedin.com/in/wei-chen-467abb86)

+1 (240) 472-5845

## EDUCATION

**University of Maryland**, College Park, Maryland, USA

Ph.D., Mechanical Engineering Aug 2015 – Aug 2019

*Topic:* Data-Driven Geometric Design Space Exploration and Design Synthesis

*Adviser:* Mark D. Fuge

*Committee:* Mark D. Fuge (Chair), David W. Jacobs, Shapour Azarm, Linda Schmidt,  
& Katrina Groth

**Chongqing University**, Chongqing, China

M.S., Mechanical Engineering

Sep 2012 – Jun 2015

B.S., Mechanical Engineering

Sep 2008 – Jun 2012

## WORK EXPERIENCE

**Postdoctoral Scholar, Northwestern University**

Apr 2021 – Present

Evanston, Illinois

**Research Scientist, Siemens**

Sep 2019 – Mar 2021

Princeton, New Jersey

**Research Assistant, University of Maryland**

Aug 2015 – Aug 2019

College Park, Maryland

**Graduate Intern, Siemens**

Jun 2018 – Aug 2018

Princeton, New Jersey

## PUBLICATIONS Journals

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

**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.

**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.

**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.

**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.

**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.

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.

## Conferences

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)*. doi:10.1145/3447548.3467414

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)*. American Society of Mechanical Engineers (ASME). (Accepted)

**Chen, W.** & Ramamurthy, A. (2021, January). Deep Generative Model for Efficient 3D Airfoil Parameterization and Generation. In *AIAA Scitech 2021 Forum* (p. 1690). doi:10.2514/6.2021-1690.

**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)*. American Society of Mechanical Engineers (ASME). doi:10.1115/DETC2020-22729.

**Chen, W.**, Chiu, K., & Fuge, M. (2019, January). Aerodynamic design optimization and shape exploration using generative adversarial networks. In *AIAA Scitech 2019 Forum* (p. 2351). doi:10.2514/6.2019-2351. (**Invited talk**)

**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)*. American Society of Mechanical Engineers (ASME). doi:10.1115/DETC2018-85339.

**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)*. American Society of Mechanical Engineers Digital Collection. doi:10.1115/DETC2016-60112.

### Workshops

**Chen, W.** & Ahmed, F. (2020, July). MO-PaDGAN: Generating Diverse Designs with Multivariate Performance Enhancement. In: Workshop on Negative Dependence and Submodularity: Theory and Applications in Machine Learning, *37th International Conference on Machine Learning (ICML)*.

### Preprints

Wang, J., **Chen, W.**, Fuge, M., & Rai, R. (2020). IH-GAN: A Conditional Generative Model for Implicit Surface-Based Inverse Design of Cellular Structures. arXiv preprint arXiv:2103.02588. (Submitted to *Computer Methods in Applied Mechanics and Engineering*)

**Chen, W.**, & Ahmed, F. (2020). MO-PaDGAN: Reparameterizing Engineering Designs for Augmented Multi-objective Optimization. arXiv preprint arXiv:2009.07110. (Submitted to *Applied Soft Computing*)

**Chen, W.** & Fuge, M. (2020). Adaptive Expansion Bayesian Optimization for Unbounded Global Optimization. arXiv preprint arXiv:2001.04815.

**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 (both self and independent) from international conferences and journals is 231 with H-index 8 (as of Jul 1, 2021). Please see my Google Scholar page <https://scholar.google.com/citations?user=ULTyOWMAAAAJ&hl> for more details.

## RESEARCH GRANTS

Proposal “Generation of Structurally-Functional Parametric Mechanical Shapes” won Siemens’s Innovation Core Technology (ICT) funding (Award amount: 300kEUR)

Research leads to the project “Invertible Design Manifolds for Heat Transfer Surfaces (INVERT)” funded by ARPA-E’s DIFFERENTIATE program

Primary contributor to the project “Topology and Synthesis of Design Manifolds” funded by DARPA-RA-16-63 Young Faculty Award (YFA)

## ACADEMIC SERVICE

### Journal Reviewer

Journal of Mechanical Design

Computer-Aided Design

Design Science

AIAA Journal

IEEE Transactions on Industrial Electronics

International Journal of Production Research

Frontiers of Information Technology & Electronic Engineering

### Conference Reviewer

ASME International Design Engineering Technical Conference (IDETC)

## INVITED TALKS

Massachusetts Institute of Technology

Jun 21, 2021

University of Maryland, College Park

April 9, 2021

## STUDENTS ADVISED

Ashwin Jeyaseelan (Microsoft)

B.S. Computer Science 2017

Noa Chazan (Facebook)

B.S. Computer Science 2015