

Wei Chen

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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

Evanston, Illinois

Apr 2021 – Present

Research Scientist, Siemens

Princeton, New Jersey

Sep 2019 – Mar 2021

Research Assistant, University of Maryland

College Park, Maryland

Aug 2015 – Aug 2019

Graduate Intern, Siemens

Princeton, New Jersey

Jun 2018 – Aug 2018

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