Peng SONG   Curriculum Vitae

Contact Information	Pillar of Information Systems Technology and Design Singapore University of Technology and Design (SUTD) 8 Somapah Rd, Singapore 487372	(+65) 64994892 songpenghit@gmail.com https://songpenghit.github.io

Research Interests

Computer Graphics. In particular, geometric modeling, computational design, and computational fabrication.

Academic Positions

Assistant Professor   2019 - present
Pillar of Information Systems Technology and Design
Singapore University of Technology and Design, Singapore

Research Scientist   2017 - 2019
School of Computer and Communication Sciences
École Polytechnique Fécdécrale de Lausanne, Switzerland

Associate Researcher   2014 - 2017
School of Computer Science and Technology
University of Science and Technology of China, China

Research Fellow   2013 - 2014
School of Computer Science and Engineering
Nanyang Technological University, Singapore

Education

Nanyang Technological University, Singapore   2010 - 2013
PhD in Computer Science

Harbin Institute of Technology (Shenzhen), China   2007 - 2010
Master's Degree in Control Science and Engineering

Harbin Institute of Technology, China   2003 - 2007
Bachelor's Degree in Automation

Journal Publications (ACM TOG)

1. Rulin Chen, Pengyun Qiu, **Peng Song**, Bailin Deng, Ziqi Wang, and Ying He. Masonry Shell Structures with Discrete Equivalence Classes. *ACM Transactions on Graphics (SIGGRAPH)*, 42(4), Article No. 115, 2023.

2. Yingjie Cheng, **Peng Song**, Yukun Lu, Wen Jie Jeremy Chew, and Ligang Liu. Exact 3D Path Generation via 3D Cam-Linkage Mechanisms. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 41(6), Article No. 225, 2022.

3. Rulin Chen, Ziqi Wang, **Peng Song**, and Bernd Bickel. Computational Design of High-level Interlocking Puzzles. *ACM Transactions on Graphics (SIGGRAPH)*, 41(4), Article No. 150, 2022. **Technical Papers Award Honorable Mention.**

4. Yingjie Cheng, Yucheng Sun, **Peng Song**, and Ligang Liu. Spatial-Temporal Motion Control via Composite Cam-follower Mechanisms. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 40(6), Article No. 270, 2021.

5. Ziqi Wang, **Peng Song**, and Mark Pauly. MOCCA: Modeling and Optimizing Cone-joints for Complex Assemblies. *ACM Transactions on Graphics (SIGGRAPH)*, 40(4), Article No. 181, 2021.

6. Ziqi Wang, **Peng Song**, Florin Isvoranu, and Mark Pauly. Design and Structural Optimization of Topological Interlocking Assemblies. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 38(6), Article No. 193, 2019.

7. Ziqi Wang, **Peng Song**, and Mark Pauly. DESIA: A General Framework for Designing Interlocking Assemblies. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 37(6), Article No. 191, 2018.

8. **Peng Song**, Xiaofei Wang, Xiao Tang, Chi-Wing Fu, Hongfei Xu, Ligang Liu, and Niloy J. Mitra. Computational Design of Wind-up Toys. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 36(6), Article No. 238, 2017. **Featured ACM SIGGRAPH Press Release.**

9. **Peng Song***, Chi-Wing Fu*, Yueming Jin, Hongfei Xu, Ligang Liu, Pheng-Ann Heng, and Daniel Cohen-Or. Reconfigurable Interlocking Furniture. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 36(6), Article No. 174, 2017. (*joint 1st authors)

10. **Peng Song**, Bailin Deng, Ziqi Wang, Zhichao Dong, Wei Li, Chi-Wing Fu, and Ligang Liu. CofiFab: Coarse-to-Fine Fabrication of Large 3D Objects. *ACM Transactions on Graphics (SIGGRAPH)*, 35(4), Article No. 45, 2016.

11. Chi-Wing Fu*, **Peng Song***, Xiaoqi Yan, Lee Wei Yang, Pradeep Kumar Jayaraman, and Daniel Cohen-Or. Computational Interlocking Furniture Assembly. *ACM Transactions on Graphics (SIGGRAPH)*, 34(4), Article No. 91, 2015. (*joint 1st authors)

12. **Peng Song***, Chi-Wing Fu*, Prashant Goswami, Jianmin Zheng, Niloy J. Mitra, and Daniel Cohen-Or. Reciprocal Frame Structures Made Easy. *ACM Transactions on Graphics (SIGGRAPH)*, 32(4), Article No. 94, 2013. (*joint 1st authors)

13. **Peng Song**, Chi-Wing Fu, and Daniel Cohen-Or. Recursive Interlocking Puzzles. *ACM Transactions on Graphics (SIGGRAPH Asia)*, 31(6), Article No. 128, 2012.

Journal Publications (TVCG, CGF)

14. Zebin Chen, **Peng Song**, and F. Peter Ortner. Hierarchical Co-generation of Parcels and Streets in Urban Modeling. *Computer Graphics Forum (Eurographics)*, 43(2), accepted, 2024.

15. Zhenyuan Liu, Jingyu Hu, Hao Xu, **Peng Song**, Ran Zhang, Bernd Bickel, and Chi-Wing Fu. Worst-case Rigidity Analysis and Optimization for Assemblies with Mechanical Joints. *Computer Graphics Forum (Eurographics)*, 41(2), 507 - 519, 2022.

16. Yucheng Sun, Wenqing Ouyang, Zhongyuan Liu, Ning Ni, Yann Savoye, **Peng Song**, and Ligang Liu. Computational Design of Self-actuated Deformable Solids via Shape Memory Material. *IEEE Transactions on Visualization and Computer Graphics*, 28(7), 2577 - 2588, 2022.

17. Ziqi Wang, **Peng Song**, Mark Pauly. State of the Art on Computational Design of Rigid Assemblies. *Computer Graphics Forum (Eurographics)*, 40(2), 633 - 657, 2021. **State-of-the-Art Report.**

18. Hao Xu, Tianwen Fu, **Peng Song**, Mingjun Zhou, Chi-Wing Fu, and Niloy J. Mitra. Computational Design and Optimization of Non-Circular Gears. *Computer Graphics Forum (Eurographics)*, 39(2), 399 - 409, 2020.

19. Keke Tang, **Peng Song**, Xiaofei Wang, Bailin Deng, Chi-Wing Fu, and Ligang Liu. Computational Design of Steady 3D Dissection Puzzles. *Computer Graphics Forum (Eurographics)*, 38(2), 291-303, 2019.

20. Chih-Kuo Yeh, **Peng Song**, Peng-Yen Lin, Chi-Wing Fu, Chao-Hung Lin, and Tong-Yee Lee. Double-sided 2.5D Graphics. *IEEE Transactions on Visualization and Computer Graphics*, 19(2), 225-235, 2013.

Journal Publications (additional)

21. Keke Tang, Yuhong Chen, Weilong Peng, Yanling Zhang, Meie Fang, Zheng Wang, and **Peng Song**. RepPVConv: Attentively Fusing Reparameterized Voxel Features for Efficient 3D Point Cloud Perception. *The Visual Computer* , 39, 5577 - 5588, 2023.

22. **Peng Song**. Interlocking Assemblies: Applications and Methods. *Materials Today: Proceedings (International Conference on Additive Manufacturing for a Better World)*, 70, 78 - 82, 2022.

23. Keke Tang, Yuexin Ma, Dingruibo Miao, **Peng Song**, Zhaoquan Gu, Zhihong Tian, and Wenping Wang. Decision Fusion Networks for Image Classification. *IEEE Transactions on Neural Networks and Learning Systems*, 1 - 14, 2022.

24. **Peng Song**, Zhongqi Fu, and Ligang Liu. Grasp Planning via Hand-Object Geometric Fitting. *The Visual Computer*, 34(2), 257-270, 2018.

25. Keke Tang, **Peng Song**, and Xiaoping Chen. 3D Object Recognition in Cluttered Scenes With Robust Shape Description and Correspondence Selection. *IEEE Access*, 5, 1833-1845, 2017.

26. **Peng Song**, Zhongqi Fu, Ligang Liu, and Chi-Wing Fu. Printing 3D Objects with Interlocking Parts. *Computer Aided Geometric Design (GMP)*, 35-36, 137-148, 2015.

27. **Peng Song**. Local Voxelizer: A Shape Descriptor for Surface Registration. *Computational Visual Media*, 1(4), 279-289, 2015.

28. **Peng Song**, Xiaojun Wu, and Michael Yu Wang. Volumetric Stereo and Silhouette Fusion for Image-based Modeling. *The Visual Computer*, 26(12), 1435-1450, 2010.

Conference Publications

29. JingZhi Tay, F. Peter Ortner, **Peng Song**, Anna Claudia Yenardi, and Zebin Chen Design Space Recommendation: Assisting Users to Manage Complexity in Urban Design Optimisation. *International Conference on Computer-Aided Architectural Design Futures*, 333 - 344, 2023.

30. Keke Tang, Jianpeng Wu, Weilong Peng, Yawen Shi, **Peng Song**, Zhaoquan Gu, Zhihong Tian, and Wenping Wang. Deep Manifold Attack on Point Clouds via Parameter Plane Stretching. *AAAI*, 2420 - 2428, 2023.

31. **Peng Song**, Ziqi Wang, and Marco Livesu. Computational Assemblies: Analysis, Design and Fabrication. *Eurographics*, Tutorial, 2022.

32. **Peng Song***, Xiaoqi Yan*, Wooi Booh Goh, Alex Qiang Chen, and Chi-Wing Fu. Hand-Posture-Augmented Multitouch Interactions for Exploratory Visualization. *SIGGRAPH Asia*, Technical Brief, Article No. 27, 2016. (*joint 1st authors)

33. Keke Tang, **Peng Song**, and Xiaoping Chen. Signature of Geometric Centroids for 3D Local Shape Description and Partial Shape Matching. *ACCV*, 311-326, 2016.

34. Nicolas Mellado, **Peng Song**, Xiaoqi Yan, Chi-Wing Fu, and Niloy J. Mitra. Computational Design and Construction of Notch-free Reciprocal Frame Structures. *Advances in Architectural Geometry (AAG)*, 181-197, 2014.

35. Xiaoqi Yan, **Peng Song**, Chi-Wing Fu, Wooi Boon Goh, and Kwan-Liu Ma. Exploring Volume Visualization with Whole-hand Multitouch Gestures. *Pacific Graphics*, short paper, 7-10, 2013.

36. **Peng Song**, Wooi Boon Goh, William Hutama, Chi-Wing Fu, and Xiaopei Liu. A Handle Bar Metaphor for Virtual Object Manipulation with Mid-Air Interaction. *CHI*, 1297-1306, 2012.

37. Seon Joo Kim, Hongwei Ng, Stefan Winkler, **Peng Song**, and Chi-Wing Fu. Brush-and-Drag: A Multi-touch Interface for Photo Triaging. *MobileHCI*, 59-68, 2012.

38. William Hutama, **Peng Song**, Chi-Wing Fu, and Wooi Boon Goh. Distinguishing Multiple Smart-Phone Interactions on a Multi-touch Wall Display using Tilt Correlation. *CHI*, 3315-3318, 2011.

39. **Peng Song**, Wooi Boon Goh, Chi-Wing Fu, Qiang Meng, and Pheng-Ann Heng. WYSIWYF: Exploring and Annotating Volume Data with a Tangible Handheld Device. *CHI*, 1333-1342, 2011.

40. **Peng Song**, Xiaojun Wu, Michael Yu Wang, and Jianhuang Wu. Expansion-Based Depth Map Estimation for Multi-View Stereo. *IROS*, 3213-3218, 2010.

41. **Peng Song**, Xiaojun Wu, and Michael Yu Wang. A Robust an Accurate Method for Visual Hull Computation. *IEEE International Conference on Information and Automation (ICIA)*, 784-789, 2009.

Research Grants	*3D Geometric Tiling for Modeling and Realization of 3D Tileable Assemblies* MOE Academic Research Fund (AcRF) Tier 2, Singapore, **PI**, S\$671,592	2024 - 2027
	Modeling and Design of 3D Freeform Gears for Exact 3D Motion Generation MOE Academic Research Fund (AcRF) Tier 2, Singapore, **PI**, S\$493,323	2023 - 2026
	Design, Fabrication, and Evaluation of Custom-fit PAP Masks for Patients with Sleep-disordered Breathings CGH – SUTD HealthTech Innovation Fund, Singapore, **PI**, S\$250,000	2022 - 2024
	Novel Cam-Linkage Mechanisms for 3D-Printable Microrobots in Challenging Environments TL@SUTD Seed Research Project Grant, Singapore, **PI**, S\$85,000	2022
	Assembly-aware Design of 3D-printable Microrobots TL@SUTD Seed Research Project Grant, Singapore, **PI**, S\$85,000	2020 - 2021
	Design, Optimization and Fabrication of Insect-like Robots SUTD Start-up Research Grant, Singapore, **PI**, S\$100,000	2019 - 2022
	Affordance-assisted Irregular Object Recognition for Service Robots National Natural Science Foundation of China, China, **PI**, ¥260,000	2015 - 2017

Teaching	50.017 Graphics and Visualisation, **Instructor** SUTD, Singapore	2024, 2023, 2022, 2021, 2020
	50.052 Extended Reality, **Instructor** SUTD, Singapore	2023
	10.020 Data Driven World, **Instructor** SUTD, Singapore	2023, 2022, 2021
	50.034 Introduction to Probability and Statistics, **Instructor** SUTD, Singapore	2020
	50.006 User Interface Design and Implementation, **Instructor** SUTD, Singapore	2020

Advising	**PhD Student**	
	• Siqi Li	2023 - present
	• Rulin Chen	2021 - present
	• Yingjie Cheng (co-advised with Prof. Ligang Liu)	2020 - 2023
	• Ziqi Wang (co-advised with Prof. Mark Pauly)	2017 - 2021
	Research Assistant	
	• Pengyun Qiu	2022 - present
	• Zebin Chen	2022 - present
	• Praveer Tewari	2023
	• Chao Ning	2020
	Visiting Student	
	• Yuhang Wang	2023 - present
	• Yukun Lu	2022 - 2023
	• Donglin Hu	2022
	• Yingjie Cheng	2021 - 2022
	• Yucheng Sun	2019 - 2021
	Undergraduate Researcher	
	• Chew Wen Jie Jeremy	2021 - 2022

Keynote Talks	*Computational Design of Geometric Puzzles* Symposium on Solid and Physical Modeling (SPM)	2022.06.28

Invited Talks	*Computational Design of Geometric Puzzles* Asiagraphics Web Seminar	2023.03.28
	Optimization Algorithms for AI-based Design Raffles Institution's Gap Semester Event, Singapore	2022.08.22
	Computational Assemblies for Digital Fabrication GAMES Webinar	2022.06.02
	Computational Design of Mechanisms Computational Fabrication Seminar	2022.04.21
	Computational Assemblies for Digital Fabrication Regular Seminar Series of Cardiff University	2022.03.2
	Path Generation Mechanism Modeling and Optimization International Symposium on Intelligence Design (ISID)	2022.03.15
	Structurally Stable Assemblies: Theory, Algorithms, and Applications CUHK Regular Department Seminar Series	2021.07.20
	Computational Design of Complex Assemblies DManD Symposium, SUTD, Singapore	2020.09.01
	3D Interlocking Assemblies: Design and Applications GAMES Webinar	2020.03.12
	Computational Design of Functional Assemblies Zhejiang University, Hangzhou, China	2019.10.30
	Computational Design of Functional Assemblies University of Science and Technology of China, Hefei, China	2019.10.28
	Computational Design of Complex Assemblies University of Waterloo, Waterloo, Canada	2019.03.25
	Computational Design of Complex Assemblies University of Sydney, Sydney, Australia	2019.03.07
	Computational Design of Complex Assemblies University College London, London, United Kingdom	2019.02.26
	3D Interlocking Assemblies: Design and Applications Disney Research, Zürich, Switzerland	2018.08.27
	An Interlocking Method for 3D Assembly Design and Fabrication EPFL, Lausanne, Switzerland	2017.06.12
	CofiFab: Coarse-to-Fine Fabrication of Large 3D Objects Shenzhen University, Shenzhen, China	2016.04.01

Professional Services

Editorial Board of Academic Journals

• Computers & Graphics, Associate Editor	2024 - present
• Graphical Models, Associate Editor	2024 - present

Research Event Organizer

• Computational Fabrication Seminar	2022, 2021

Executive Committee Member

• Asiagraphics	2022 - present

Program Committee Member

• Symposium on Geometry Processing (SGP)	2024
• Symposium on Solid and Physical Modeling (SPM)	2024, 2023, 2022
• Geometric Modeling and Processing (GMP)	2024
• Computational Visual Media (CVM)	2024, 2023
• SIGGRAPH Asia - Technical Papers	2023
• Computer Graphics International (CGI)	2023
• CAD/Graphics	2023, 2021, 2019, 2017
• Pacific Graphics	2019
• SIGGRAPH Asia - Courses	2019
• SIGGRAPH Asia - Technical Brief and Poster	2016

Awards

SIGGRAPH Technical Papers Award Honorable Mention	2022
ACM China Rising Star Award (Hefei Region)	2016
ICIA Best Paper Award in Information	2009
Outstanding graduates of HIT (Shenzhen)	2009

References

Prof. **Jianmin Zheng**   Collaborator
School of Computer Science and Engineering
Nanyang Technological University, Singapore
E-mail: asjmzheng@ntu.edu.sg

Prof. **Chi-Wing Fu**   PhD Advisor
Department of Computer Science and Engineering
The Chinese University of Hong Kong, Hong Kong
E-mail: philip.chiwing.fu@gmail.com

Prof. **Mark Pauly**   Collaborator
School of Computer and Communication Sciences
École Polytechnique Fécdécrale de Lausanne, Switzerland
E-mail: mark.pauly@epfl.ch

Prof. **Niloy J. Mitra**   Collaborator
Department of Computer Science
University College London, United Kingdom
E-mail: niloym@gmail.com

Prof. **Daniel Cohen-Or**   Collaborator
School of Computer Science
Tel Aviv University, Israel
E-mail: cohenor@gmail.com