Prof. Peng SONG Curriculum Vitae

Contact Information

Information Systems Technology and Design Pillar
Singapore University of Technology and Design
8 Somapah Rd, Singapore 487372

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peng_song@sutd.edu.sg
https://sutd-cgl.github.io

Research Interests

Computer Graphics. In particular, geometry modeling and processing, computational design, and digital fabrication.

Academic Positions

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

Research Scientist 2017 - 2019
School of Computer and Communication Sciences
École Polytechnique Fécdécrale de Lausanne, Switzerland
Mentor: *Mark Pauly*

Associate Researcher 2014 - 2017
School of Computer Science and Technology
University of Science and Technology of China
Mentor: *Ligang Liu*

Research Fellow 2013 - 2014
School of Computer Science and Engineering
Nanyang Technological University, Singapore
Mentor: *Chi-Wing Fu*

Education

Nanyang Technological University, Singapore 2010 - 2013
PhD in Computer Science
Thesis: *Interaction Techniques for 3D Visual Exploration on Large Displays*
Advisor: *Chi-Wing Fu*

Harbin Institute of Technology (Shenzhen), China 2007 - 2009
Master's Degree in Control Science and Engineering
Thesis title: *Volumetric Stereo and Silhouette Fusion for 3D Object Modeling*

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

Journal Publications (ACM TOG)

1. 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.
2. 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.
3. **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.**
4. **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)
5. **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.

6. 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)*, Article No. 91, 2015. (*joint 1st authors)

7. **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)

8. **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 (additional)

9. 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)*, conditionally accepted, 2019.

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

11. 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.

12. **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.

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

14. **Peng Song**, Chi-Wing Fu, Prashant Goswami, Jianmin Zheng, Niloy J. Mitra, and Daniel Cohen-Or. "An Interactive Computational Tool for Large Reciprocal Frame Structures," *Nexus Network Journal*, 16(1):109-118, 2014.

15. 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.

16. **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

17. **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)

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

19. **Peng Song**, and Xiaoping Chen. "Pairwise Surface Registration Using Local Voxelizer," *Pacific Graphics*, short paper, 1-6, 2015.

20. 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.

21. 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.

22. **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.

23. 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.

24. 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.

25. **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.

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

27. **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.

Book Chapters

28. **Peng Song** and Xiaojun Wu. "Multi-View Stereo Reconstruction Technique," In *Depth Map and 3D Imaging Applications: Algorithms and Technologies*, chapter 2, 10-26, IGI Global, USA, 2012.

Research Grants

Design, Optimization and Fabrication of Insect-like Robots 2019 - 2022
SUTD Start-up Research Grant, Singapore, **PI**, S$100,000

A Software Solution for Large Format Printing 2020 - 2021
National Additive Manufacturing Innovation Cluster @ SUTD, Singapore, **Co-PI**, S$100,320

Affordance-assisted Irregular Object Recognition for Service Robots 2015 - 2017
National Natural Science Foundation of China, **PI**, ¥260,000

3D Object Grasp Planning for Service Robots 2015 - 2017
Anhui Provincial Natural Science Foundation, China, **PI**, ¥80,000

3D Object Recognition Based on Partial Shape Matching 2015 - 2016
Research Funds for the Central Universities, China, **PI**, ¥100,000

Automatic Non-human Production with Injection Molding Machines 2014 - 2015
Science and Technology Service Network Initiative of the Chinese Academy of Sciences, China
Co-PI, ¥400,000

Patents

A Computational Approach for Constructing Interlocking Polyhedrons 2019.04.26
Peng Song and Ligang Liu
USTC, Chinese Patent, ZL201610418176.8

An Optimization Method for Approximating 3D shape with Convex Polyhedrons 2019.04.26
Peng Song and Ligang Liu
USTC, Chinese Patent, ZL201610418178.7

A Computational Approach for Designing Interlocking Structures 2017.11.07
Peng Song and Ligang Liu
USTC, Chinese Patent, ZL201410664520.2

Teaching

Digital Geometry Processing, **Assistant** 2018 Fall
EPFL, Switzerland

Advances in Computer Graphics, **Co-teacher** 2017 Summer
University of Science and Technology of China

Advances in Computer Graphics, **Co-teacher** 2014 Summer
University of Science and Technology of China

Introduction to Robotics Programming, **Coordinator**, **Co-teacher** — 2014 Summer
University of Science and Technology of China

Introduction to Computational Thinking, **Assistant** — 2012 Fall
Nanyang Technological University, Singapore

Computer Graphics and Visualization, **Assistant** — 2012 Spring
Nanyang Technological University, Singapore

Advising

Yucheng Sun — 2019.11-present
Visiting student, SUTD & Master student, USTC

Ziqi Wang — 2017.10-present
PhD candidate, EPFL

Samara (Yingying) Ren — 2018.06-2018.08
Intern, EPFL & Undergraduate, UIUC

Keke Tang — 2015-2017
PhD, USTC

Hongfei Xu — 2016-2017
Master, USTC

Conference Talks

DESIA: A General Framework for Designing Interlocking Assemblies (with Ziqi Wang) — 2018.12
ACM SIGGRAPH Asia

Computational Design of Wind-up Toys — 2017.11
ACM SIGGRAPH Asia

Reconfigurable Interlocking Furniture (with Chi-Wing Fu) — 2017.11
ACM SIGGRAPH Asia

Hand-Posture-Augmented Multitouch Interactions for Exploratory Visualization — 2016.12
ACM SIGGRAPH Asia

CofiFab: Coarse-to-Fine Fabrication of Large 3D Objects (with Bailin Deng) — 2016.07
ACM SIGGRAPH

Reciprocal Frame Structures Made Easy (with Chi-Wing Fu) — 2013.07
ACM SIGGRAPH

Recursive Interlocking Puzzles — 2012.11
ACM SIGGRAPH Asia

A Handle Bar Metaphor for Virtual Object Manipulation with Mid-Air Interaction — 2012.05
ACM CHI

WYSIWYF: Exploring and Annotating Volume Data with a Tangible Handheld Device — 2011.05
ACM CHI

Invited Talks

Computational Design of Functional Assemblies — 2019.10
University of Science and Technology of China, Hefei, China
Invited by Renjie Chen

Computational Design of Functional Assemblies — 2019.10
Zhejiang University, Hangzhou, China
Invited by Kun Zhou

Computational Design of Functional Assemblies — 2019.10

ShanghaiTech University, Shanghai, China
Invited by Xiaopei Liu

Computational Design of Functional Assemblies 2019.10
Nanjing University of Aeronautics and Astronautics, Nanjing, China
Invited by Mingqiang Wei

Computational Design of Complex Assemblies 2019.02
University College London, London, UK
Invited by Niloy J. Mitra

3D Interlocking Assemblies: Design and Applications 2018.08
Disney Research, Zürich, Switzerland
Invited by Moritz Bächer

Computational Design and Fabrication of Structures and Mechanisms 2017.12
GAMES Webinar
Invited by Ligang Liu

An Interlocking Method for 3D Assembly Design and Fabrication 2017.06
EPFL, Lausanne, Switzerland
Invited by Mark Pauly

3D Interlocking Structure Design, Fabrication, and Applications 2016.11
Chinagraph, Hangzhou, China
Invited by Shi-min Hu

CofiFab: Coarse-to-Fine Fabrication of Large 3D Objects 2016.04
Shenzhen University, Shenzhen, China
Invited by Hui Huang

Professional Services

Program Committee Member

- SIGGRAPH Asia 2019 Courses
- Pacific Graphics 2019
- CAD/Graphics 2019
- Chinagraph 2018
- CAD/Graphics 2017
- SIGGRAPH Asia 2016 Technical Brief and Poster

Section Chair

- GAMES Webinar 2018, 2017

Reviewer of Research Funding

- National Science Foundation of USA, CISE/IIS, 2018

Reviewer of Technical Paper

- SIGGRAPH
- SIGGRAPH Asia
- IEEE Visualization
- CHI
- Pacific Graphics
- ACM Transactions on Graphics
- IEEE Transactions on Visualization and Computer Graphics
- IEEE Transactions on Image Processing

- Computer Graphics Forum
- Graphical Models
- Computers & Graphics
- The Visual Computer
- Automation in Construction
- Robotica et al.

Press

New Computational Method Provides Optimized Design of Wind up Toys 2017.11
EurekAlert, By Melanie A. Farmer

3D Printed Wind-up Toys Can be Made Automatically using New Computational System 2017.11
www.3ders.org, By Benedict

Algorithmic Designs of Wind-up Toys 2017.11
I Programmer, By Lucy Black

16 Wild Research Experiments That Could Change Design 2016.07
CO.DESIGN, By Mark Wilson

Furniture Design Swaps Glue and Screws for "Keys" 2015.06
PSFK, By Jason Brick

New Auto. Software Simplifies Furniture Assemblies into Fastener-Free Flat Pack Designs 2015.06
SolidSmack, By Simon Martin

This 3D Software Designs Furniture That Assembles Without Screws or Glue 2015.06
GIZMODO, By Andrew Liszewski

Awards

ACM China Rising Star Award (Hefei Region) 2016

ICIA Best Paper Award in Information 2009

Outstanding graduates of HIT (Shenzhen) 2009

Language

Chinese (mother tongue) **English** (fluent)

References

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

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

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