

Jie Xu

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Education:

- **Massachusetts Institute of Technology** 2016.9 - present
PhD in CSAIL, Electrical Engineering and Computer Science (*Overall GPA: 5.0/5.0*)
- **Tsinghua University** 2012.9 - 2016.7
Bachelor of Engineering in Computer Science and Technology (*Overall GPA: 93.2/100 Rank: 1/116, Major GPA: 94.9/100*)

Research Interests:

- **Robotics:** Control, Co-Design, Sim-to-Real
- **Computer Graphics:** (Differentiable) Physics-based Simulation, Computational Design and Fabrication
- **Machine Learning:** Reinforcement Learning, Evolutionary Strategy

Academic Awards:

- **ACM International Collegiate Programming Contest** 2012 - 2015
 - *Gold Medal* in the ACM-ICPC World Finals 2015
(ranked 4th among 12,720 teams from 2,534 universities in 101 countries)
 - *Champion* in the ACM-ICPC Asia Xi'an Regional Contest 2014
 - *Gold Medal* in the ACM-ICPC Asia Shanghai Regional Contest 2014
 - *Gold Medal* in the ACM-ICPC Asia Tianjin Regional Contest 2012
- *Gold Medal* in **National Olympiad in Informatics** 2011

Publication:

- **Accelerated Policy Learning with Parallel Differentiable Simulation**
Jie Xu, Viktor Makoviychuk, Yashraj Narang, Fabio Ramos, Wojciech Matusik, Animesh Garg, Miles Macklin
International Conference on Learning Representations (ICLR), 2022
- **DiffCloth: Differentiable Cloth Simulation with Dry Frictional Contact**
Yifei Li, Tao Du, Kui Wu, Jie Xu, Wojciech Matusik
ACM Transactions on Graphics, 2022
- **Graph Grammar-based Automatic Design for Heterogeneous Fleets of Underwater Robots**
Allan Zhao, Jie Xu, Juan Salazar, Wei Wang, Pingchuan Ma, Daniela Rus, and Wojciech Matusik
IEEE International Conference on Robotics and Automation (ICRA), 2022
- **An Integrated Design Pipeline for Tactile Sensing Robotic Manipulators**
Lara Zlokapa, Yiyue Luo, Jie Xu, Michael Foshey, Kui Wu, Pulkit Agrawal, Wojciech Matusik
IEEE International Conference on Robotics and Automation (ICRA), 2022
- **An End-to-End Differentiable Framework for Contact-Aware Robot Design**
Jie Xu, Tao Chen, Lara Zlokapa, Michael Foshey, Wojciech Matusik, Shinjiro Sueda, Pulkit Agrawal
Robotics: Science and Systems (RSS), 2021
- **A System for General In-Hand Object Re-Orientation**
Tao Chen, Jie Xu, Pulkit Agrawal
Conference on Robot Learning (CoRL), 2021 (*Oral, Best Paper Award*)
- **Evolution Gym: A Large-Scale Benchmark for Evolving Soft Robots**
Jagdeep Singh Bhatia, Holly Jackson, Yunsheng Tian, Jie Xu, Wojciech Matusik
Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS), 2021
- **Multi-Objective Graph Heuristic Search for Terrestrial Robot Design**
Jie Xu, Andrew Spielberg, Allan Zhao, Daniela Rus, Wojciech Matusik
IEEE International Conference on Robotics and Automation (ICRA), 2021
- **Prediction-Guided Multi-Objective Reinforcement Learning for Continuous Robot Control**
Jie Xu, Yunsheng Tian, Pingchuan Ma, Daniela Rus, Shinjiro Sueda, Wojciech Matusik
International Conference on Machine Learning (ICML), 2020
- **RoboGrammar: Graph Grammar for Terrain-Optimized Robot Design**
Allan Zhao, Jie Xu, Mina Konaković Luković, Josephine Hughes, Andrew Spielberg, Daniela Rus, Wojciech Matusik
ACM Transactions on Graphics, 39(6), (In proceeding of SIGGRAPH Asia), 2020
- **Learning to Fly: Computational Controller Design for Hybrid UAVs with Reinforcement Learning**
Jie Xu, Tao Du, Michael Foshey, Beichen Li, Bo Zhu, Adriana Schulz, Wojciech Matusik
ACM Transactions on Graphics, 38(4), (In proceeding of SIGGRAPH), 2019
- **Interactive Design Space Exploration and Optimization for CAD Models**
Adriana Schulz, Jie Xu, Bo Zhu, Changxi Zheng, Eitan Grispan, Wojciech Matusik
ACM Transactions on Graphics, 36(4), (In proceeding of SIGGRAPH), 2017
- **View Suggestion for Interactive Segmentation of Indoor Scenes**
Sheng Yang, Jie Xu, Kang Chen, Hong-Bo Fu
Computational Visual Media, June 2017, Volume 3, Issue 2
- **Extracting Sharp Features from RGB-D images**
Yan-Pei Cao, Tao Ju, Jie Xu, Shi-Min Hu

Computer Graphics Forum, Vol. 35, No. 8, pp. 138-174, 2017.

Teaching:

- **Teaching Assistant (MIT 6.839/6.807)** 2019 Fall
MIT 6.839 Advanced Computer Graphics/6.807 Computational Design and Fabrication

Professional Experience:

- **Research Intern at NVIDIA** 2021.6 - 2021.8
Advisor: Miles Macklin, Viktor Makoviychuk, Tae-Yong Kim Simulation Technology Team, NVIDIA
– Research Topic: **Differentiable Physics-based Simulation and Applications**
- **Research Intern at Snap Inc.** 2020.5 - 2020.8
Advisor: Prof. Shree K. Nayar Computational Imaging Laboratory, Snap Research
– Research Topic: **Data-driven Motion Generation**
- **Research Assistant at CMU** 2015.7 - 2015.9
Advisor: Prof. Stelian Coros Robotics Institute, Carnegie Mellon University
– Research Topics: **Simulation, Animation & Robot Design**
– Projects:
 - * Interactive Modelling System for Designing 3D Printable Robots
 - * Shell Simulation
- **Research Assistant at Tsinghua University** 2014.3 - 2016.7
Advisor: Prof. Shi-Min Hu Graphics & Geometric Computing Group, Tsinghua
– Research Topic: **Point Cloud-based Geometry Processing**
– Projects:
 - * View Suggestion for Interactive Segmentation of Indoor Scenes
 - * Extracting Sharp Features from RGB-D images
 - * Interactive Image-Guided Modeling of Extruded Shapes

Other Project Experience:

- **Research Project on Computational Fluid Dynamics** 2017.3 - 2017.9
Advisor: Prof. Wojciech Matusik CSAIL, Massachusetts Institute of Technology
– **Accelerated Steady-State Navier-Stokes Solver for Aerodynamics Computing**
 - * Developed an efficient steady-state incompressible Navier-Stokes solver. The solver can efficiently compute the aerodynamics effect on airplane wings at different angles of attack, thus enabling computational design of aerial vehicle by simulating a virtual wind tunnel test without fabricating real models.
 - * Based on the incompressible steady Navier-Stokes equations, we replaced the convection term with the convection value in the previous step by applying the semi-lagrangian technique. Furthermore, we applied a 2nd order accurate boundary condition to improve the fidelity of the results. Our method is 5x faster than state-of-the-art Navier-Stokes aircraft aerodynamics solver with comparable accuracy.

Scholarships:

- **Outstanding Graduate in Tsinghua University** 2016
Awarded the most excellent graduates all over the university. (63 out of 3000+ graduates)
- **Google Excellence Scholarship** 2015
Awards the students who demonstrate superior academic achievement, 58 students are selected nationwide
- **China Computer Federation Outstanding Undergraduate Award** 2015
Awards the students who have excellent academic and researching performance, 4 students in Tsinghua
- **Comprehensive Excellence Scholarship in Tsinghua University** 2013
The scholarship for comprehensive performance

Technical Skills:

- **Programming Languages:** C++, Python, MATLAB, Html, Java and Pascal
- **Tools, Libraries:** PyTorch, Eigen, OpenGL, OpenCV, PCL