TIANYU WANG

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BIOGRAPHY

Now I am a senior R&D engineer at Faceunity Technology at Hangzhou and a visiting researcher at State Key Lab of CAD&CG, Zhejiang University. I was a research assistant advised by Prof. Jin Huang in Physics&Geometry group, State Key Lab of CAD&CG, Zhejiang University and a R&D intern at Xmov Technology at Shanghai. My research interest includes **(a). physically based differentiable simulation, (b). inverse problems for fabrication and design (c). human digitization**.

EDUCATION

Zhejiang University, Hangzhou, China *Sept. 2016 - Mar. 2020*
M.Eng. in Computer Science Advisor: Prof. Jin Huang
Sichuan University, Chengdu, China *Sept. 2012 - Jun. 2016*
B.Eng. in Computer Science

PUBLICATION

Tianyu Wang, Dongping Li, Xiaowei Liu, Jiong Chen, Huamin Wang, Kun Zhou
A Two-Way Interior Point Method for Collision Handling in Deformable Body Simulation
to be submitted to *SIGGRAPH 2022*

Tianyu Wang
Super-resolution of shallow water equation simulation based on GAN
Master Thesis at Zhejiang University 2020

Jiong Chen, Hujun Bao, **Tianyu Wang**, Mathieu Desbrun, Jin Huang
Numerical Coarsening using Discontinuous Shape Functions
ACM Transaction Graphics 37(4)(SIGGRAPH 2018), Vancouver, Canada, 2018

INDUSTRY EXPERIENCE

Senior R&D Engineer, Faceunity Technology Co. Ltd, Hangzhou May 2020 - Now

· **Co-developed a GPU-based cloth simulation CAD software as the core engineer**

R&D Intern, Xmov Technology Co. Ltd, Shanghai Sept. 2019 - Jan. 2020
Mentor: Prof. Jinxiang Chai

· **Developed an open-sourced single view based hair modeling system**
· **Developed static hair/cloth retargeting algorithms for artists**

RESEARCH EXPERIENCE

Visiting Researcher, State Key Lab of CAD&CG, ZJU Oct. 2021 - Now
Host: Prof. Kun Zhou

· **Lead research on collision handling of deformable body (to be submitted to SIGGRAPH 2022)**

Research Assistant, State Key Lab of CAD&CG, ZJU Sept. 2016 - Mar. 2020
Advisor: Prof. Jin Huang

· **Research on super-resolution of shallow water equation simulation (Master Thesis 2020)**
· **Participated in research on numerical coarsening of FEM based simulation (SIGGRAPH 2018)**

SELECTED RELATED PROJECTS

Cloth or solid simulation using mass-spring model
In the National Key R&D Program of China, I implemented three versions of mass-spring based simulation: using classical Newton method, using local-global strategy based on the paper *Fast Simulation of Mass-Spring Systems*, using modified fast mass-spring based on the paper *A Chebyshev Semi-Iterative Approach for Accelerating Projective and Position-based Dynamics* with a CUDA version Jacobi solver acceleration for sparse matrix for its one simulation module independently.

Numerical coarsening of FEM based solid simulation
Research for numerical coarsening acceleration solving of FEM based solid simulation with heterogeneous materials and non-linear constitutive laws on coarse grid. See our paper *Numerical Coarsening using Discontinuous Shape Functions* published in the ACM Transactions on Graphics 2018 for the algorithm details. In this process, I implemented a basic FEM based solid simulation framework quickly first and then did the major two papers' comparison experiments almost by myself. And the first author Jiong Chen and I frequently communicated to analyze the experiment results and shared our observations to promote it.

Super-resolution of shallow water equation simulation based on GAN
Research for SWE simulation data's super-resolution using GAN. My master thesis proposes to achieve the SWE data super-resolution using GAN. By taking account of the temporal smoothness demand, rotation equivalence requirement, the possible negative value, this thesis proposes some modifications to the state of the art and obtains verified better results. See the *SWE report* for details.

Single view or sparse multi-view based hair modeling
Research&Development for using a small number of images as input to reconstruct the 3D hair model to accelerate the process of hair asset production for artists. First, I surveyed 18 representative papers from 2012 to 2019 published at SIGGRAPH(Asia) or CVPR focusing on hair modeling and gave myself a clear feeling of its evolution. Then, according to these four aspects:(a).whether this algorithm is stable(some deep learning based methods are not stable for practical use),(b).whether the input of this algorithm matches the input from the current available hardware,(c).whether the output of this algorithm is physically available for simulation,(d).whether the data flow in this algorithm can be refined by artists flexibly, I select the combination of algorithms and make some modifications to make a tool for artists. The 2D feature extraction module, the hair model's data augmentation by clustering and recombination and hair model deformation based on image have been achieved. Now this project is still in progress. See the *hair report* for details.

Static hair/cloth retargeting
Research&Development for retargeting a hair/cloth model from one suited figure to another different figure. Very quick(in four days) to find and implement a solution of hair retargeting by ARAP energy based deformation and the artists gave a good feedback of my work. After surveying some cloth retargeting papers in SIGGRAPH/CVPR, find a suitable solution for the artists. See the *retargeting report* for details.

HONORS AND AWARDS

Graduate of Merit/Triple A graduate, Zhejiang University, 2018
Award of Honor for Graduate, Zhejiang University, 2018
Wen Chixiang Scholarship, Zhejiang University, 2018
Silver Medal, ACM-ICPC China Provincial Programming Contest, Chengdu Site, 2013 and 2014
2nd University Scholarship, Sichuan University, 2013

SKILLS

English	TOEFL score: 102 (R:29 L:24 S:21 W:28)
Programming Languages	C, C++, Python
Main Toolkit	CUDA, Eigen, NumPy, Tensorflow, PyQt, OpenGL, LaTeX, Git
Software	ParaView, MeshLab, Maya, Blender, Origin, Office