

# Chunlei Li (李春蕾)

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## Summary

I'm a PhD candidate at the VR Lab of Beihang University from 2021, supervised by Prof. Qinqing Zhao (赵沁平), Prof. Yang Gao (高阳), and Prof. Shuai Li (李帅). My research focuses on physical simulation in computer graphics. Currently I am a visiting student at University College London, supervised by Prof. He Wang (王鹤). I am about to graduate in 2026/2027. Interest: Numerical Methods, Physical Simulation, Physical Based Animation, Reinforcement Learning, Computer Graphics, AI4S, PDE.

## Education

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| University College London, Visiting PhD in Computer Science                          | Sept 2025 – Sept 2026 |
| Beihang University (BUAA), PhD in Computer Science                                   | Sept 2021 – Dec 2026  |
| Beihang University (BUAA), MSc in Power Engineering and Engineering Thermophysics    | Sept 2018 – June 2021 |
| University of Michigan, Dearborn, Exchange Student in Energy and Power Engineering   | Sept 2016 – May 2017  |
| North China Electric Power University (Beijing), BSc in Energy and Power Engineering | Sept 2014 – July 2018 |

## Publications

**RLMuscle: Muscle-Driven Character Animation via Reinforcement Learning** Under Review

Chunlei Li, Siyuan Yu, Yang Gao, Shuai Li, Peng Yu, Aimin Hao, He Wang

[chunleili.github.io/project-page-rlmuscle](https://chunleili.github.io/project-page-rlmuscle) (IEEE Transactions on Visualization and Computer Graphics)

Motivation: in most 3D animation pipelines artists hand-tune per-muscle activations, which is time-consuming and lacks physical realism. Novelty: an RL controller trained on a 1D Hill-type surrogate automatically discovers per-muscle activations, which then drive a GPU multigrid-XPBD volumetric simulator with Hill-type fiber constraints, animating a 194-muscle full-body model at 18 ms per frame.

**MGPBD: A Multigrid Accelerated Global XPBD Solver** Aug 2025

Chunlei Li, Peng Yu, Tiantian Liu, Siyuan Yu, Yuting Xiao, Shuai Li, Aimin Hao, Yang Gao, Qinqing Zhao

[10.1145/3721238.3730720](https://doi.org/10.1145/3721238.3730720) (SIGGRAPH)

Motivation: XPBD's Gauss-Seidel solver stalls on low-frequency errors, causing instability in high-resolution, high-stiffness simulations. Novelty: a global UA-AMG preconditioned CG solver with lazy prolongator reuse and lightweight near-kernel construction, greatly improving convergence and stability at low overhead.

**Parallel Constraint Graph Partitioning and Coloring for Realtime Soft-Body Cutting** Apr 2025

Peng Yu, Ruiqi Wang, Chunlei Li, Yuxuan Li, Xiao Zhai, Yuanbo He, Hongyu Wu, Aimin Hao

[10.2312/pg.20251267](https://doi.org/10.2312/pg.20251267) (Pacific Graphics)

Motivation: cutting changes mesh topology on the fly, invalidating the precomputed constraint partitioning and coloring that parallel GPU solvers rely on. Novelty: a parallel constraint-graph re-partitioning and re-coloring scheme that restores solver parallelism instantly, enabling realtime soft-body cutting.

**A Unified Particle-Based Solver for non-Newtonian Behaviors Simulation** Dec 2023

Chunlei Li, Yang Gao, Jiayi He, Tianwei Cheng, Shuai Li, Aimin Hao

[10.1109/TVCG.2023.3341453](https://doi.org/10.1109/TVCG.2023.3341453) (IEEE Transactions on Visualization and Computer Graphics)

Motivation: non-Newtonian materials such as mud, dough and slime span fluid-like and solid-like behaviors that single-purpose solvers cannot capture consistently. Novelty: a unified SPH solver whose constitutive model smoothly

covers viscous, elastic and plastic regimes, reproducing shear-thinning/thickening and viscoelastic effects in one framework.

**Comparison between Two Eulerian-Lagrangian Methods: CFD-DEM & MPPIC on the biomass gasification in a fluidized bed** Feb 2021

Chunlei Li, Qitai Eri

[10.1007/s13399-021-01384-2](https://doi.org/10.1007/s13399-021-01384-2) (Biomass Conversion and Biorefinery)

**Comparative Study of Three Modified sCO<sub>2</sub> Brayton Recompression Cycles Based on Energy and Exergy Analysis with GA Optimization** Jan 2021

Chunlei Li, Qitai Eri

[10.1504/IJEX.2021.115652](https://doi.org/10.1504/IJEX.2021.115652) (International Journal of Exergy)

**Multi-objective Optimization of sCO<sub>2</sub>, sCO<sub>2</sub>/tCO<sub>2</sub> Cycles Based on Energy-Exergy-Economy Balanced Analysis** Apr 2022

Chunlei Li, Qitai Eri

[10.1504/IJEX.2022.122308](https://doi.org/10.1504/IJEX.2022.122308) (International Journal of Exergy)

## Experience

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**R&D, Zeno Tech – Online** June 2022 – Dec 2022

- Intern: R&D of the PBD method in the DCC software using C++.

**R&D, Taichi Graphics – Beijing** Feb 2023 – Sept 2023

- Intern: R&D of the PBD method. Supervised by Dr. Tiantian Liu, development of PBD solver.

**R&D, Alibaba – Beijing** May 2025 – Nov 2025

- R&D of the multigrid accelerated GPU-based muscle simulation in Houdini.

## Awards

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**Top 10 Outstanding Graduate Students Candidate of Beihang University:** Beihang University

**Outstanding Graduate of Beihang University:** Beihang University

**Outstanding Graduate of NCEPU (Beijing):** NCEPU (Beijing)

## Skills

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**Languages:** CET Band 6: 578, CET Band 4: 560, TOEFL: 97, GRE: 323+3.5

**DCC Software:** Houdini(5 years user)

**Physics Engines:** Newton (PR contributor), MuJoCo, PhysX

**World Models:** Experience in debugging DreamZero