Shuo LI (李碩), Ph.D.

AI for Science | Multiphysics Simulation | Digital Twin

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Employment History

2025.04 – Present	**Assistant Professor**, School of Engineering, The University of Tokyo
2023.07 – 2025.03	**Project Assistant Professor**, School of Engineering, The University of Tokyo
2022.10 – 2023.06	**Postdoctoral Researcher**, Resilience Engineering Research Center, The University of Tokyo
2018.11 – 2019.05	**Research Intern,** *CEA-Cadarache*, France

Education

2019.09 – 2022.09	**Ph.D., The University of Tokyo**
	Thesis: Data-driven approaches in computational granular dynamics
2017.09 – 2019.06	**M.S., Sun Yat-sen University**
	Institut Franco-Chinois de l'Énergie Nucléaire (IFCEN)
	Thesis: Numerical analyses on fuel assembly vibration control with non-linear energy sink
2018.02 – 2018.06	**Exchange program, *Institut National Polytechnique de Grenoble (INP-G)***, France
	École Nationale Supérieure de l'Énergie, l'Eau et l'Environnement (ENSE3)
2013.09 – 2017.06	**B.Sc., Sun Yat-sen University**
	Institut Franco-Chinois de l'Énergie Nucléaire (IFCEN)

Industry Collaboration & Research Funding

1) **JSPS KAKENHI – Early-Career Scientists (Grant No. 25K21215)**

   Project: Development of a multiscale reduced-order modeling framework and its applications to large-scale gas–solid flow systems

   Funding: JPY 4.55 million | **Period**: 2025–2028 | **Role**: Principal Investigator (PI)

2) **Social Cooperation Program, The University of Tokyo**

   Project: Digital twin fundamental technology course for next generation powder process systems

   Industry Partners: Shin-Etsu (semiconductor materials), Shionogi (pharmaceutical manufacturing), Showa / Nisshin (food R&D), Murata (electronic components), KKE (CAE software)

   Funding: JPY 72.9 million | **Period**: 2023–2026 | **Role**: Co-Principal Investigator (Co-PI)

3) **Social Cooperation Program, The University of Tokyo**

   Project: Digital twin fundamental technology course for next generation resource circulation solutions

   Industry Partner: Kubota (advanced manufacturing)

   Funding: JPY 124.0 million | **Period**: 2024–2027 | **Role**: Co-Principal Investigator (Co-PI)

Publications

Journal Papers

1) K. Yang, **S. Li**, M. Sakai, An advanced reduced-order model for real-time and high-accuracy computation of industrial gas-solid flow systems, ***Physics of Fluids***, Volume 37, Issue 12, Dec 2025, 123346.

2) K. Yang, **S. Li**, M. Sakai, Development and validation of a multi-timescale reduced-order model for high-speed simulations of solid-fluid systems, ***Physics of Fluids***, Volume 37, Issue 8, Aug 2025, 083423.

3) **S. Li**, M. Sakai, Advanced graph neural network-based surrogate model for granular flows in arbitrarily shaped domains, ***Chemical Engineering Journal***, Volume 500, Nov 2024, 157349.

4) K. Yang, **S. Li**, G. Duan, M Sakai, On fostering predictions in data-driven reduced order model for Eulerian-Lagrangian simulations: Decision of sufficient training data, ***Journal of Chemical Engineering of Japan***, Volume 57, Issue 1, Feb 2024, 2316155.

5) G. Duan, **S. Li**, M. Sakai, Feasibility Analysis of a POD-Based Reduced Order Model with Application in Eulerian–Lagrangian Simulations. ***Industrial & Engineering Chemistry Research***, Volume 63, Jan 2024, Pages 780–796.

6) **S. Li**, G. Duan, M. Sakai, On reduced-order modeling of gas-solid flows using deep learning, ***Physics of Fluids***, Volume 36, Issue 3, Mar 2024, 033340.

7) **S. Li**, G. Duan, M. Sakai, On POD-based modal analysis in simulations of granular flows, ***Powder Technology***, Volume 413, Jan 2023, 118058.

8) **S. Li**, G. Duan, M. Sakai, Development of a reduced-order model for large-scale Eulerian–Lagrangian simulations, ***Advanced Powder Technology***, Volume 33, Issue 8, Aug 2022, 103632.

9) **S. Li**, G. Duan, M. Sakai, POD-based identification approach for powder mixing mechanism in Eulerian–Lagrangian simulations, ***Advanced Powder Technology***, Volume 33, Issue 1, Jan 2022, 103364.

10) **S. Li**, S. Kajiwara, M. Sakai, Numerical investigation on the mixing mechanism in a cross-torus paddle mixer using the DEM-CFD method, ***Powder Technology***, Volume 377, Jan 2021, Pages 89-102.

Conferences

1) **S. Li**, M. Sakai, Towards digital twins for powder processes with AI-accelerated surrogate models, ***8th International Conference on the Characterization and Control of Interfaces for High Quality Advanced Materials (ICCCI-2025)***, Fuji-Yoshida, Japan, Jul 8-11, 2025.

2) **S. Li**, M. Sakai, An AI-accelerated multiscale surrogate modelling framework for CFD–DEM simulations. ***10th International Conference on Discrete Element Methods (DEM-10)***, Himeji, Japan, Jul 1-5, 2025.

3) **S. Li**, M. Sakai, On modeling arbitrary boundary deformations for granular flow simulations, ***SCEJ 90th Annual meeting***, Tokyo University of Science, Mar 12-14, 2025.

4) **S. Li**, M. Sakai, A data-driven multiscale surrogate model for CFD–DEM simulations, ***16th World Congress on Computational Mechanics (WCCM-2024)***, Vancouver, British Columbia, Canada, Jul 21-26, 2024.

5) **S. Li**, G. Duan, M. Sakai, A graph neural network based surrogate model for granular flows with complex boundary geometries. ***9th International Conference on Discrete Element Methods (DEM-9)***, Erlangen, Germany, Sep 17-21, 2023.

6) **S. Li**, G. Duan, M. Sakai, How should the modal-analysis techniques be applied to industrial granular flow simulations?, ***4th International Powder Technology Conference and Exhibition Indonesia 2023 (ICePTI-2023)***, Denpasar, Bali, Indonesia, Aug 21-24, 2023.

7) **S. Li**, G. Duan, M. Sakai, Data-driven reduced-order modeling for parametric multiphase flows in a spouted bed, ***11th International Conference on Multiphase Flow (ICMF-2023)***, Kobe, Japan, Apr 2-7, 2023.

8) **S. Li**, G. Duan, M. Sakai, A deep-learning reduced order modeling framework for a large-scale fluidized bed simulation, ***SCEJ 87th Annual meeting***, Kobe University, Hyogo, Japan, Mar 16-18, 2022.

Skills

Programming Languages

Python, C/C++, MATLAB

Scientific Software & Platforms

Scientific Computing & AI: PyTorch, TensorFlow, Scikit-learn; OpenMP, CUDA

Simulation & Engineering Software: OpenFOAM, ANSYS Fluent, SolidWorks

Visualization & Post-processing: ParaView, Blender

Operating Systems: Linux, macOS, Windows

Languages

Mandarin (Native), **English** (Fluent)

French (Fluent, DELF B2), **Japanese** (Intermediate, JLPT N2)

Awards & Honors

2025.09	**Emerging Research Award**, The Japanese Society for Multiphase Flow
2025.03	**Ashizawa Award for Future Innovation**, The Society of Powder Technology, Japan
2023.03	**Dean's Award**, The University of Tokyo
2017.06	**SYSU Outstanding Graduate Award**, Sun Yat-sen University

Professional Activities

Journal Review Activities

Reviewer for Physics of Fluids, Powder Technology,

Chemical Engineering Science, Industrial & Engineering Chemistry Research

Professional Memberships

Member of the Society of Chemical Engineers, Japan

Member of the Society of Powder Technology, Japan

Member of the Multiphase Flow Society of Japan