

## Brief Curriculum Vitae | Mikio SAKAI

### SHORT BIO

Dr. Mikio Sakai is a Full Professor in the Department of Nuclear Engineering and Management at The University of Tokyo. He received his Ph.D. from The University of Tokyo in 2006, and joined the university as an Assistant Professor in 2007. He was promoted to Associate Professor in 2008 and became a Full Professor in 2023. Professor Sakai has maintained long-standing international collaborations. He has held visiting appointments at Imperial College London since 2016, first as Visiting Reader from 2016 to 2023 and currently as Visiting Professor since 2023. He has also served as a Visiting Professor at the University of Surrey from 2019 to 2025. His research focuses on the modeling and simulation of granular and multiphase flows, parallel computation, and data-driven methodologies, including AI-based surrogate modeling and data science approaches for powder and particle systems. He is internationally recognized as a leading expert in computational granular dynamics and has delivered numerous invited lectures at international conferences. Professor Sakai's research excellence has been acknowledged through several prestigious awards, including the SCEJ Award for Outstanding Research Achievement from The Society of Chemical Engineers, Japan, the IP Award from the Information Center of Particle Technology, and the JACM Computational Mechanics Award from the Japan Association for Computational Mechanics. In addition to his research contributions, Professor Sakai plays a significant leadership role in the powder technology community. He served as Chairperson of the 10th International Conference on Discrete Element Methods. He is a Director of the Society of Powder Technology of Japan, Head of its Modeling and Simulation Division, and Chairperson of the AI Technical Committee of the Association of Powder Process Industry and Engineering, Japan. He currently serves as an Editor for Chemical Engineering Science and Granular Matter.

### PERSONAL INFORMATION

Name : Mikio SAKAI  
 Position : Full Professor (Department Chair) , The University of Tokyo  
 h-index : 35 (SCOPUS)  
 Address : 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656 JAPAN  
 Tel/FAX : +81-3-5841-6977  
 E-mail : mikio\_sakai@n.t.u-tokyo.ac.jp  
 URL : <https://dem.t.u-tokyo.ac.jp/index.html>  
 SCOPUS : <https://www.scopus.com/authid/detail.uri?authorId=8320813800>



### EDUCATION

Ph.D., Department of Quantum Engineering and Systems Science,  
 School of Engineering, The University of Tokyo, 2006

### WORK EXPERIENCE

#### Academic Appointments

2023 - present : Full Professor, Department of Nuclear Engineering and Management,  
 School of Engineering, The University of Tokyo  
 2008 - 2023 : Associate Professor, School of Engineering, The University of Tokyo  
 2007 - 2008 : Assistant Professor, School of Engineering, The University of Tokyo

#### Visiting Appointments

2023 - present : Visiting Professor, Imperial College London, UK  
 2019 - 2025 : Visiting Professor, University of Surrey, UK  
 2016 - 2023 : Visiting Reader, Imperial College London, UK

### SELECTED PROFESSIONAL SERVICES

2018 - present : Editor, Granular Matter (Springer)  
 2015 - present : Editor/Associate Editor, Chemical Engineering Science (Elsevier)  
 2025 - present : Guest Executive Editor, Powder Technology (Elsevier)  
 2020 : Guest Editor, Powder Technology (Elsevier)  
 2024 - 2026 : Division Chair, Computational Science and Engineering Division,  
 Atomic Energy Society of Japan  
 2025 : Chairperson, 10th International Conference on Discrete Element Methods (DEM10)

### SELECTED FUNDING (Principal Investigator, Recent 5 years)

#### Grant

2025 – 2027 : Eichi Project, International Collaborative Research Program  
 (Japan–UK Joint Research for Nuclear Decommissioning)

2024 – 2026 : JSPS KAKENHI Grant-in-Aid for Challenging Research (Exploratory)  
 2021 – 2024 : JSPS KAKENHI Grant-in-Aid for Scientific Research (A)  
 2021 – 2023 : JSPS KAKENHI Grant-in-Aid for Challenging Research (Exploratory)

**Large-scale industry-funded collaborative research**

2024 - 2027 : Digital Twin Fundamental Technology Course for Next Generation Resource Circulation Solutions  
 2023 - 2026 : Digital Twin Fundamental Technology Course for Next Generation Powder Process Systems

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**SELECTED AWARDS**

2025	: ICCCI Outstanding Contribution Award	International Conference on the Characterization and Control of Interfaces for High Quality Advanced Materials
2023	: JACM Computational Mechanics Award	Japan Association for Computational Mechanics
2023	: The SCEJ Award for Outstanding Research Achievement	Society of Chemical Engineers, Japan
2019	: IP Award	Information Center of Particle Technology
2016	: JACM Fellows Award	Japan Association for Computational Mechanics
2014	: Frontier Award	Fluid & Particle Processing Division, The Society of Chemical Engineers, Japan
2011	: Best Paper Award	The Society of Powder Technology, Japan

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**PUBLICATIONS**

**Journal papers: 119**

Selected papers

- K.-E. Yang, S. Li, M. Sakai, "Development and validation of a multi-timescale reduced-order model for high-speed simulations of solid-fluid systems," *Phys. Fluids*, 37 (2025) 083423.
- S. Li, M. Sakai, "Advanced graph neural network-based surrogate model for granular flows in arbitrarily shaped domains," *Chem. Eng. J.*, 500 (2024) 157349.
- G. Duan, S. Li, M. Sakai, "Feasibility analysis of POD-based reduced order model with application in Eulerian-Lagrangian simulations," *Ind. Eng. Chem. Res.*, 63 (2023) 780-796.
- K. Tamura, Y. Mori, K. Takabatake, M. Sakai, "Validation study on a toroidal approximation-based capillary force model in the discrete element method simulation," *Phys. Fluids*, 34, 023319 (2022)
- Y. Mori, M. Sakai, "Development of a robust Eulerian-Lagrangian model for the simulation of an industrial solid-fluid system," *Chem. Eng. J.*, 406, 126841 (2021).
- X. Sun, M. Sakai, "Three-dimensional simulation of gas-solid-liquid flows using the DEM-VOF method," *Chem. Eng. Sci.*, 134, 531-548 (2015)
- X. Sun, M. Sakai, Y. Yamada, "Three-dimensional simulation of a solid-liquid flow by the DEM-SPH method," *J. Comput. Phys.*, 248, 147-176 (2013)
- M. Sakai, S. Koshizuka, "Large-Scale Discrete Element Modeling in Pneumatic Conveying," *Chem. Eng. Sci.*, 64, 533-539 (2009)

**Invited lectures: 112**

Selected lectures

- M. Sakai, "Bridging DEM Simulations and Data Science: New Frontiers in Industrial Powder Processing," International Congress on Particle Technology 2025 (Partec 2025), September 23–25, 2025, Nuremberg, Germany [keynote]
  - M. Sakai, "What technologies are essential in development of the DEM-based digital twin?," 9th International Conference on Discrete Element Methods (DEM9), Erlangen, Germany, Sept 17-21, 2023 [plenary]
  - M. Sakai, "On a simulation-based digital twin towards the realization of smart manufacturing in the powder industry," The Asian Pacific Confederation of Chemical Engineering (APCCChE) 2023, Manila, Philippines, Sept 4-8, 2023 [plenary]
  - M. Sakai, "Powder Process Digital Twin: Advancements in Discrete Element Method Simulation," International Symposium on Simulation and Modelling of Particulate Systems (SIMPAS-2023), 25-28 August 2023, Suzhou, China [plenary]
  - M. Sakai, "State-of-the-art modeling of computational granular dynamics for a simulation-based digital twin," 9th World Congress on Particle Technology, Madrid, 18-22 Sept., 2022 [keynote]
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