

Yuki MATSUKAWA, Ph.D. (Engineering)

Assistant Professor,
Department of Mechanical Engineering,
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Meiji University



Last Updated: 2026/09/02

My research focuses on fluid mechanics, particularly turbulent transition in wall-bounded shear flows. I primarily use direct numerical simulations to investigate the onset and sustaining mechanisms of supercritical and subcritical transitions, as well as localized turbulent structures, in combined shear flows, where multiple shear components coexist and interact. In addition to numerical investigations, I conduct theoretical studies of flow stability and conservation laws in helically symmetric flows, aiming to develop a unified understanding of turbulent transition phenomena.

Contact

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- [Google Scholar](#), [ResearchGate](#), [researchmap](#), [ORCID](#), [X](#)

Education

Apr. 2023–Mar. 2026	Doctoral course, Department of Mechanical and Aerospace Engineering, Graduate School of Science and Technology, Tokyo University of Science Advisor: Prof. Takahiro Tsukahara
Apr. 2021–Mar. 2023	Master's course, Department of Mechanical Engineering, Graduate School of Science and Technology, Tokyo University of Science Advisor: Prof. Takahiro Tsukahara
Apr. 2016–Mar. 2020	Department of Mechanical Engineering, Faculty of Science and Technology, Tokyo University of Science Advisor: Prof. Takahiro Tsukahara

Research and Work Experience

Apr. 2026–Present	Assistant Professor, Department of Mechanical Engineering, School of Science and Technology, Meiji University
May 2025–July 2025	Visiting Researcher, Technische Universität Darmstadt (TU Darmstadt)
Apr. 2024–Mar. 2026	Research Fellow (DC2), Japan Society for the Promotion of Science (JSPS)
Apr. 2023–Mar. 2024	Support for Pioneering Research Initiated by the Next Generation, Japan Science and Technology Agency (JST)

Awards

Feb. 2026	Graduate Research Encouragement Award (Distinguished Ph.D. Student), The Society of Automotive Engineers of Japan [Award winners list]
Jan. 2025	Best Presentation Award, The 36th Inter-institutional Joint Seminar on Turbulent Flow Control [Award page]
Sep. 2023	Early Career Researcher's Outstanding Presentation Award, The Japan Society of Fluid Mechanics Annual Meeting 2023 [Award page]
Mar. 2023	Miura Award (Distinguished Master Student), The Japan Society of Mechanical Engineers [Award winners list]
Sep. 2021	Best Paper Award, The 8th Asian Symposium on Computational Heat Transfer and Fluid Flow (ASCHT2021) [Award page]
Jun. 2021	Outstanding Presentation Award, The 22nd Eight-inter-institutional Seminar on Turbulent Flow Control [Award page]

Committee Activities

Jun. 2023–Mar. 2024	Tokyo University of Science Noda Campus Doctoral Course Student Association
Aug. 2022	Committee of Summer School for Early Career Researchers in Fluid Mechanics 2022

Teaching and Supervision

Courses Taught

FY2026–Present	Fluid Science Seminar (Spring Semester) 2nd-year undergraduate students, Department of Mechanical Engineering, School of Science and Technology, Meiji University
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FY2026–Present	Basic Mechanical Drawing (Spring Semester) 2nd-year undergraduate students, Department of Mechanical Engineering, School of Science and Technology, Meiji University
FY2026–Present	Engineering Mechanics Seminar (Fall Semester) 1st-year undergraduate students, Department of Mechanical Engineering, School of Science and Technology, Meiji University
FY2026–Present	Mechanical Engineering Experiments A (Fall Semester) 2nd-year undergraduate students, Department of Mechanical Engineering, School of Science and Technology, Meiji University

Student Supervision

FY2026–Present	2 undergraduate students Department of Mechanical Engineering, School of Science and Technology, Meiji University
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Teaching Assistantships

FY2021–FY2024	Experiments on Mechanical and Aerospace Engineering 2 (2nd Semester) 3rd-year undergraduate students, Department of Mechanical and Aerospace Engineering, Faculty of Science and Technology, Tokyo University of Science
FY2021–FY2022	Exercise on Fluid Mechanics (2nd Semester) 3rd-year undergraduate students, Department of Mechanical Engineering, Faculty of Science and Technology, Tokyo University of Science
FY2021	Computer Programming 2 (1st Semester) 2nd-year undergraduate students, Department of Mechanical Engineering, Faculty of Science and Technology, Tokyo University of Science

Research Grants and Projects

- [4] “Mechanistic Elucidation and Theoretical and Numerical Analyses of Supercritical and Subcritical Turbulent Transitions in Combined Shear Flows”
Japan Society for the Promotion of Science (JSPS), Grants-in-Aid for Scientific Research (KAKENHI), Grants-in-Aid for Research Activity Start-up,
July 2026–March 2028
Principal Investigator: Yuki Matsukawa
- [3] “Multiphysics Origami Engineering Connecting Geometry and Mechanics”
Japan Society for the Promotion of Science (JSPS), Grants-in-Aid for Scientific Research (KAKENHI), Grant-in-Aid for Transformative Research Areas (B),
April 2026–March 2027

Principal Investigator: Sachiko Ishida; Co-Investigators: Yoshitsugu Naka and Yuki Matsukawa

- [2] “Elucidation of Supercritical and Subcritical Turbulent Transition Phenomena in Combined Shear Flows toward Engineering Applications”
Japan Society for the Promotion of Science (JSPS), Grants-in-Aid for Scientific Research (KAKENHI), Grant-in-Aid for JSPS Fellows (DC2),
April 2024–March 2026
Principal Investigator: Yuki Matsukawa
- [1] Japan Science and Technology Agency (JST), Support for Pioneering Research Initiated by the Next Generation (SPRING)
April 2023–March 2024

Professional Memberships

- The Japan Society of Mechanical Engineers (JSME)
- The Japan Society of Fluid Mechanics (JSFM)
- The Heat Transfer Society of Japan (HTSJ)

Journal Papers

- [2] Y. Matsukawa and T. Tsukahara, “Switching between supercritical and subcritical turbulent transitions in inner cylinder rotating Taylor–Couette–Poiseuille flow,” *International Journal of Heat and Fluid Flow*, **112** (2025), 109667. [[Web Page](#) (Open Access)]
- [1] Y. Matsukawa and T. Tsukahara, “Subcritical transition of Taylor–Couette–Poiseuille flow at high radius ratio,” *Physics of Fluids*, **34**(7) (2022), 074109. [[Web Page](#) (Open Access)]

Presentations

Proceedings (with Peer Review)

- [1] Y. Matsukawa, R. Araki and T. Tsukahara, “Flow state transition process and oblique pattern of Taylor–Couette–Poiseuille flow at a medium cylinder ratio,” 10th International Union for Theoretical and Applied Mechanics Symposium on Laminar–Turbulent Transition (IUTAM Transition 2024), Nagano (Japan), 2–6th Sep. (2024), Poster presentation, P34, 2 pages. [[Web Page](#)]

Conference Papers/Abstract/Talks (without Peer Review)

- [14] R. Ono, K. Kohyama, Y. Matsukawa and T. Tsukahara, “Response of turbulent band formation to temporally decreasing Reynolds number in plane channel flow,” 14th International Symposium on Turbulence and Shear Flow Phenomena (TSFP14), Heidelberg (Germany), 28–31th July (2026), 6 page. [[Web Page](#)]
- [13] R. Ono, Y. Matsukawa, K. Kohyama and T. Tsukahara, “DNS study on the regularity of turbulent spot formation in plane channel flow,” 17th World Congress on Computational Mechanics & 10th European Congress on Computational Methods in Applied Sciences

- and Engineering (WCCM-ECCOMAS 2026), Munich (Germany), 19–24th July (2026), 1 page. [[Web Page](#)]
- [12] R. Ono, Y. Matsukawa, K. Kohyama and T. Tsukahara, “Stochastic transient formation of turbulent band in channel flow,” The 11th Bifurcations and Instabilities in Fluid Dynamics (BIFD2026), L’Aquila (Italy), 6–10th July (2026), 1 page. [[Web Page](#)]
 - [11] S. Akbari, Y. Matsukawa and M. Oberlack, “Helical symmetric turbulence in annular pipe flow and its related conservation laws,” 78th Annual Meeting of the APS Division of Fluid Dynamics (APS-DFD2025), Houston (USA), 23–25th Nov. (2025), 1 page. [[Web Page](#)]
 - [10] R. Ono, Y. Matsukawa and T. Tsukahara, “Response and its probability of localized turbulence pattern formation to decreasing Reynolds number in channel flow,” The 11th JSME-KSME Thermal and Fluids Engineering Conference (J-K TFEC11), Okinawa (Japan), 22–25th Oct. (2025), 4 pages. [[Web Page](#)]
 - [9] Y. Matsukawa, R. Araki and T. Tsukahara, “Anisotropic turbulence in transition phenomena of Taylor–Couette–Poiseuille flow,” interdisciplinary Turbulence initiative XI (iT_i XI), Bertinoro (Italy), 27–30th July (2025), Poster presentation, 2 pages. [[Web Page](#)]
 - [8] Y. Matsukawa, R. Araki and T. Tsukahara, “Flow state transition of mixed convection in vertical channel with horizontal pressure gradient,” 13th International Symposium on Turbulence and Shear Flow Phenomena (TSFP13), Montreal (Canada), 25–28th June (2024), Poster presentation, 4 pages. [[Web Page](#)]
 - [7] Y. Matsukawa and T. Tsukahara, “Parameter dependence of switching between supercritical and subcritical turbulent transitions in inner-cylinder rotating Taylor–Couette–Poiseuille flow,” 10th International Symposium on Turbulence, Heat and Mass Transfer (THMT2023), Rome (Italy), 11–15th Sep. (2023), 5.1, 7 pages. [[Web Page](#)]
 - [6] Y. Matsukawa and T. Tsukahara, “Different flow state transition processes of Taylor–Couette–Poiseuille flow based on Taylor vortex,” 22nd International Couette–Taylor Workshop (ICTW2023), Barcelona (Spain), 28–30th June (2023), 1 page. [[Web Page](#)]
 - [5] Y. Matsukawa and T. Tsukahara, “Different transition processes of Taylor–Couette–Poiseuille flow based on modulated wavy Taylor vortex,” 9th Asian Joint Workshop on Thermophysics and Fluid Science (AJWTF2022), Utsunomiya (Japan), 27–30th Nov. (2022), 4028, 5 pages. [[Web Page](#)]
 - [4] Y. Matsukawa and T. Tsukahara, “Laminarization in subcritical Taylor–Couette–Poiseuille flow with increasing pressure gradient,” Nineteenth International Conference on Flow Dynamics (ICFD2022), Sendai (Japan), 9–11th Nov. (2022), OS15-10, 4 pages. [[Web Page](#)]
 - [3] T. Tsukahara, C. Izumi, Y. Matsukawa and K. Takeda, “Patterning of turbulent natural convection in vertical channel,” The 8th Asian Symposium on Computational Heat Transfer and Fluid Flow (ASCHT2021), Qingdao (China, online), 23–26th Sep. (2021), ASCHT2021-041.
 - [2] Y. Matsukawa and T. Tsukahara, “Subcritical transition of Taylor–Couette–Poiseuille flow,” The 8th Asian Symposium on Computational Heat Transfer and Fluid Flow (ASCHT2021), Qingdao (China, online), 23–26th Sep. (2021), ASCHT2021-241, 6 pages, **Best Paper Award**.
 - [1] Y. Matsukawa and T. Tsukahara, “Occurrence and disappearance of localized turbulence in Taylor–Couette–Poiseuille flow,” 21st International Couette–Taylor Workshop (ICTW2021), Netherlands (online), 5–9th July (2021), Talk 17, 1 page. [[Web Page](#)]