Curriculum Vitæ

Vlad Giurgiu

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General Information



Date and place of birth:	January 12, 1993; Braşov, Romania
Affiliation:	Institute of Fluid Mechanics and Heat Transfer, TU Wien
Location:	Vienna, Austria

Google Scholar | ORCID | Web of Science | ResearchGate | LinkedIn | GitHub

Education

05/2021 – 05/2025	PhD (*with distinction*) – Mechanical Engineering, TU Wien (Austria). Thesis: "Complete rotation rates of curved microplastic fibers in wall turbulence" (link). Advisor: Prof. A. Soldati. Defence: 21.05.2025.
06/2018 – 05/2021	MSc – Mechanical Engineering, TU Wien (Austria). Thesis: "The TU Wien Turbulent Water Channel: measurements and statistics". Advisors: Prof. A. Soldati, Dr. M. De Paoli.
03/2013 – 05/2018	BSc – Mechanical Engineering, TU Wien (Austria). Thesis: "Rayleigh–Taylor Convection in Confined Porous Media". Advisors: Prof. A. Soldati, Dr. M. De Paoli.

Academic Positions

10/2025 – today	ERC Project Assistant (Postdoc), Institute of Fluid Mechanics and Heat Transfer, TU Wien (Austria). ERC Starting Grant MORPHOS "Flow-induced morphology modifications in porous multiscale systems" (PI: Dr. M. De Paoli). Experimental design of a facility for convection in 3D-printed porous media: mechanical, sensor and control-system design, programming, manufacturing, assembly, and experiments.
05/2021 – 05/2025	Project Assistant (PhD candidate), Institute of Fluid Mechanics and Heat Transfer, TU Wien (Austria). Part-time until 08/2022. Closed-loop flow control of the TU Wien Turbulent Water Channel and a multi-camera high-speed imaging setup; experimental design, 3D Lagrangian tracking of fibres (position, orientation, full rotation rate); machine-learning-enhanced PIV; MATLAB pipelines for large Lagrangian datasets, statistics and uncertainty quantification.

Industry Experience

04/2026 – today	External Consultant, Bühler Group (Austria). Consulting on experimental setups and numerical simulations for industrial baking equipment.
09/2018 – 08/2022	Mechanical Engineer, Research and Development, Bühler Group, Leobendorf (Austria). Part-time from 04/2021. CFD and heat-transfer simulations of baking moulds, ovens, gas lines and dough baking (Ansys Mechanical, Ansys Discovery Live, OpenFOAM), including meshing, parameter studies and geometry optimisation; pressure and velocity measurements in gas lines; development of an optical method for the density distribution of baked products; results presented to the R&D team, to management, and at the Ansys User Conference 2019.

Research Interests

Convective heat and mass transport in porous media; flow-induced morphology changes; carbon dioxide sequestration.

Dynamics of anisotropic particles (microplastic fibres) in wall-bounded turbulence; optical methods (PIV, PTV).

Reduction of energy consumption and emissions in industrial food-processing equipment.

Scientific Production

Refereed Journal Publications

J6 Zaza D., **Giurgiu V.**, Iovieno M., and Soldati A. (2026). Angular velocity of Kolmogorov-scale fibers as proxy for turbulent dissipation. *Physical Review Letters*, 136(5), 054001. link

J5 Caridi G. C. A., **Giurgiu V.**, De Paoli M., and Soldati A. (2025). Complete solid-body rotation rate measurements of micro-plastic curved fibers in turbulence. *Experiments in Fluids*, 66(5), 102. link

J4 **Giurgiu V.**, Beckedorff L., Caridi G. C. A., Lagemann C., and Soldati A. (2024). Machine learning-enhanced PIV for analyzing microfiber-wall turbulence interactions. *International Journal of Multiphase Flow*, 181, 105021. link

J3 **Giurgiu V.**, Caridi G. C. A., De Paoli M., and Soldati A. (2024). Full rotational dynamics of plastic microfibers in turbulence. *Physical Review Letters*, 133(5), 054101. link

J2 **Giurgiu V.**, Caridi G. C. A., Alipour M., De Paoli M., and Soldati A. (2023). The TU Wien Turbulent Water Channel: Flow control loop and three-dimensional reconstruction of anisotropic particle dynamics. *Review of Scientific Instruments*, 94(9), 095101. link

J1 De Paoli M., **Giurgiu V.**, Zonta F., and Soldati A. (2019). Universal behavior of scalar dissipation rate in confined porous media. *Physical Review Fluids*, 4(10), 101501. link

In Preparation

– **Giurgiu V.** et al. A Horton-Rogers-Lapwood facility for measurements of a morphing matrix in buoyancy-driven flow. In preparation for *Review of Scientific Instruments*.

Software

S3 `rcps-3dprint` – open-source Python pipeline that converts simulated random close packings of spheres into watertight, 3D-printable porous samples (MIT licence), **Giurgiu V.** (2026). link

S2 `fibercode2D` – MATLAB codes that separate fibres from tracers in 2D PIV images, track the fibres and couple their rotation to the surrounding flow (vorticity, shear rate, swirling strength); used in J4 (MIT licence), **Giurgiu V.** and Beckedorff L. (2024). link

S1 `fibercode3D` – MATLAB codes that detect, track and fit fibres in tomographic (MART) reconstructions and compute their spinning and tumbling rates; used in J2, J3, J5, and J6 (MIT licence), **Giurgiu V.**, De Paoli M., and Alipour M. (2024). link

Conference Proceedings

P2 **Giurgiu V.**, Caridi G. C. A. (presenter), De Paoli M., and Soldati A. (2024). Microfiber rotational dynamics in turbulence. *21st International Symposium on Application of Laser and Imaging Techniques to Fluid Mechanics*, Lisbon, Portugal, pp. 1–7. link

P1 **Giurgiu V.** (presenter), Caridi G. C. A., Alipour M., De Paoli M., and Soldati A. (2023). Messung der Winkelgeschwindigkeit von schlanken, gekrümmten Fasern der Kolmogorov Größe. *30th GALA Symposium "Experimentelle Strömungsmechanik"*, Munich, Germany, pp. 43-1–43-8. link

Invited Presentations

I1 Measurements of spinning and tumbling rates of Kolmogorov scale micro-plastic fibres, May 2024, *Workshop CoDyPaT* (G. Verhille), IRPHE, Marseille, France.

Conference Contributions

C9 **Giurgiu V.** (presenter), De Paoli M. (2026). Experimental investigation of heat transport in convective porous media flows. *Gordon Research Seminar and Conference "Flow and Transport in Permeable Media"*, Les Diablerets, Switzerland. (talk and poster)

C8 Zaza D. (presenter), **Giurgiu V.**, Iovieno M., and Soldati A. (2025). Can Kolmogorov-scale fibers measure the mean turbulent dissipation? *78th Annual Meeting of the APS Division of Fluid Dynamics*, Houston, USA.

C7 **Giurgiu V.** (presenter), Caridi G. C. A., De Paoli M., and Soldati A. (2024). Complete rotation rates of Kolmogorov-sized curved fibers. *1st European Fluid Dynamics Conference*, Aachen, Germany. (talk)

C6 **Giurgiu V.** (presenter), Caridi G. C. A., De Paoli M., and Soldati A. (2024). Measurements of spinning and tumbling rates of micro-plastic fibres. *EGU General Assembly 2024*, Vienna, Austria. link (talk)

C5 **Giurgiu V.** (presenter), Caridi G. C. A., De Paoli M., and Soldati A. (2023). Measurements of spinning and tumbling rates of Kolmogorov scale micro-plastic fibres. *76th Annual Meeting of the APS Division of Fluid Dynamics*, Washington DC, USA. (talk)

C4 **Giurgiu V.** (presenter), Alipour M., De Paoli M., and Soldati A. (2022). Long, non-axisymmetric fibres in turbulent channel flow. *TI 2022 – Turbulence and Interactions*, Procchio, Isola d'Elba, Italy. (talk and poster)

C3 **Giurgiu V.** (presenter) and Figoni M. (2019). Optimierung von Strömung in Waffelbackanlagen mit Ansys Discovery Live. *Ansys User Conference*, Linz, Austria. (talk)

C2 **Giurgiu V.** (presenter), De Paoli M., Zonta F., and Soldati A. (2018). Rayleigh–Taylor instability of miscible fluids in confined porous media. *12th European Fluid Mechanics Conference*, Vienna, Austria. (talk)

C1 **Giurgiu V.**, De Paoli M. (presenter), Zonta F., and Soldati A. (2017). Rayleigh–Taylor convection of immiscible fluids in three-dimensional porous media. *70th Annual Meeting of the APS Division of Fluid Dynamics*, Denver, USA.

Press and Outreach

2024 - 2026	Lange Nacht der Forschung, TU Wien – public presentation on geological CO_2 storage.
2025	Phantom High-Speed case study on the fibre-turbulence experiments. link
2024	*Physics* (APS) Synopsis "Measuring the rotation of polluting plastic particles" on J3. link
2024	*futurezone* (DE) "Mit Laser und Highspeed-Kameras wirbelndem Mikroplastik auf der Spur". link
ongoing	*Artists in the Lab* – visual artists visit the TU Wien laboratory and create commissioned work on fluid mechanics. link
in development	*Earth Seed* – interactive website teaching children about climate change. link

Reviewer

Physical Review Letters, Journal of Fluid Mechanics, International Journal of Multiphase Flow, European Journal of Mechanics – B/Fluids, Water Resources Research.

Teaching and Supervision

2022 – today	Supervision of 3 MSc students, TU Wien
2021 – today	Lecturer "Applied Fluid Mechanics Laboratory" (PIV, density-driven flows in porous media), TU Wien (∼20 students)
2017 – 2021	Lecturer and tutor "Fluid Mechanics 1", TU Wien (∼60 students)
2017 – 2021	Lecturer and tutor "Fluid Mechanics 2", TU Wien (∼40 students)

Skills and Languages

Experimental	PIV, PTV, ML-enhanced PIV, multi-camera high-speed imaging, tomographic reconstruction, BOS, densitometry, uncertainty quantification, sensor integration and PID control, SLA 3D printing
Numerical	OpenFOAM, Ansys Mechanical, Ansys Discovery Live
Programming	MATLAB, LabVIEW, Git, LaTeX, Prompt engineering
Design	CATIA v5, SolidWorks
Languages	Romanian (native), English (C2), German (C1)
Driving licence	A, B