

PHYSICS COLLOQUIUM

Speaker:

Prof. Pascal Friederich

Institute of Nanotechnology &
Institute of Anthropomatics and Robotics,
Karlsruhe Institute of Technology



Topic:

AI for Materials Science: From Autonomous Optimization of Organic Semiconductors to the Generation of Novel Ideas

*Time and
place:*

Tuesday, November 3, 2026, **2:50 pm** – hybrid event

The colloquium will be held in REC/C213.

Online participation possible:

Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-WiSe25

<https://tu-dresden.zoom-x.de/j/63138178900?pwd=TIImGawPz1dtDA6VzO2N1Xdqql7bE6b.1>

Host:

Prof. Sebastian Reineke

Abstract:

AI and machine learning methods are playing an increasingly important role in science. In materials science and chemistry, they can accelerate the screening, design, and discovery of new molecules and materials in multiple ways, e.g. by virtually predicting properties of molecules and materials, by extracting hidden relations from large amounts of simulated or experimental data, or even by interfacing machine learning algorithms for autonomous decision-making directly with automated high-throughput experiments. In this talk, I will focus on our research activities automated data analysis and autonomous decision-making in self-driving labs for organic semiconductors [1], as well as our work on predicting new research directions in materials science using large language models and concept graphs [2].

[1] Wu et al., Science 386, 6727 (2024), [science.org/doi/abs/10.1126/science.ads0901](https://doi.org/10.1126/science.ads0901)

[2] Marwitz et al., Nature Machine Intelligence 8, 535–544 (2026), doi.org/10.1038/s42256-026-01206-y

Bio:

After his Ph.D. in physics, Pascal Friederich received a Marie-Sklodowska-Curie Postdoctoral Fellowship at Harvard University and the University of Toronto where he worked on machine learning methods for chemistry. In 2020 Pascal Friederich was appointed assistant professor at the Informatics Department of the Karlsruhe Institute of Technology (KIT), leading the AI for Materials Science (AiMat) research group. His research focuses on developing and applying machine learning methods for property prediction, simulation, understanding, and design of molecules and materials. Pascal Friederich's work was awarded the Heinz-Maier-Leibnitz Prize of the German Research Foundation as well as the Manfred-Fuchs-Prize of the Heidelberg Academy of Sciences. Since September 2025, Pascal Friederich has been a full professor at KIT.

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