

## PhD Student Position: Machine Learning in Biology & Medicine

We are recruiting ambitious PhD students who want to pursue a scientific leadership career in machine learning / artificial intelligence with applications in precision medicine, high-throughput biology, synthetic biology, or cell therapy. Successful candidates will pursue PhD research at the Institute of Artificial Intelligence at the Medical University of Vienna, with ample opportunities to integrate into the local and European research landscape, including the European Laboratory for Learning and Intelligent Systems (ELLIS), CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences, and the AITHYRA Research Institute for Biomedical Artificial Intelligence of the Austrian Academy of Sciences.



A typical candidate will have a background in computational sciences (bioinformatics, ML/AI, statistics, computer science, mathematics, physics, engineering, etc.). We also consider applicants with a background in biology or medicine who have strong quantitative skills and a keen interest in pursuing computational projects (it is possible to combine computational and wet-lab research). We provide an environment that is ideally suited for advancing academic careers (3 of 5 PhD student alumni and 6 of 7 postdoc alumni of the lab have already reached principal investigator positions: <https://tinyurl.com/bocklab-alumni>), while also providing opportunities to engage in technology transfer and commercialization (research at CeMM has led to multiple successful spinoff companies). The theme, setup, and timeline of the PhD project (including collaborations and research stays abroad) are flexible and can be discussed individually with the prospective candidates. Through ELLIS and other consortia, there is the option to spend part of the PhD abroad in a collaborating machine learning lab with complementary expertise.

### PhD Project Ideas

We offer a range of potential PhD projects connecting ML/AI research with biomedical applications. For example: (1) Deep learning methods for rational programming of cells and development of cell-based therapies. (2) Multimodal language models for chat-based analysis of single-cell data, building on our CellWhisperer method (<https://nature.com/articles/s41587-025-02857-9>). (3) Interpretable deep learning based on gene-regulatory networks and epigenetic landscapes to understand trajectories of development and diseases such as cancer, autoimmunity, and neural disorders. (4) Cell-state-specific DNA engineering and enhancer design for adaptive cell and gene therapies based on our DNA-CRAFT method (<https://arxiv.org/abs/2604.20488>). (5) Development of agentic “robot bioinformaticians” that autonomously make biological discoveries with lab-in-the-loop capabilities; (6) Work with clinicians to advance ML-based personalized medicine for cancer. We are also very open to PhD students bringing their own ideas and provide an environment that is exceptionally collaborative and team-oriented.

### The Research Group (<https://bocklab.org>)

We seek to advance biomedicine with technology-driven research, combining experimental and computational approaches to understand and program epigenetic cell states and to develop cell-based therapies for cancer and immune diseases. Main areas of research include:

- **Bioinformatics.** Computational methods are essential for data-driven biomedical research. We develop algorithms and software for large-scale data analysis, and we pursue clinical collaborations to establish medical impact.
- **Single-cell biology.** Epigenetic cell states contribute broadly to the regulation of human organs. As part of the [Human Cell Atlas](#), we use single-cell and spatial sequencing to dissect their role in tissue homeostasis and pathogenesis.
- **Machine learning.** Huge datasets pose new analytical challenges. As part of the [European Laboratory for Learning and Intelligent Systems](#), we develop methods for interpretable deep learning and artificial intelligence in biomedicine.
- **Biotechnology.** Groundbreaking discoveries are often enabled by new technology. We develop and apply innovative methods in the areas of single-cell sequencing, CRISPR screening, epigenome editing, and synthetic biology.
- **Cell therapy.** CAR T cells have shown dramatic efficacy for blood cancers and spearhead a broader shift toward personalized cell-based therapies. We use high-throughput technology to design synthetic immune cells as therapeutics.

### The Principal Investigator (<https://scholar.google.com/citations?user=9qSsTclAAAAJ>)

Christoph Bock is a Principal Investigator at the CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences and Professor of [Bio]Medical Informatics at the Medical University of Vienna. He is also the scientific coordinator of the Biomedical Sequencing Facility at CeMM, member of the Human Cell Atlas Organizing Committee, fellow of the European Lab for Learning and Intelligent Systems (ELLIS), and co-founder of two Vienna-based start-up companies (Mylia, Neurolentech). He has received major research awards, including consecutive ERC Starting, Consolidator, and Advanced Grants (2016-2032), the Otto Hahn Medal of the Max Planck Society (2009), Overton Prize of the International Society for Computational Biology (2017), and the Erwin Schrödinger Prize of the Austrian Academy of Sciences (2022), and he has been included in the global list of “Highly Cited Researchers” by Clarivate Analytics (ISI Web of Science) each year since 2019.

### The Host Institutions (<https://www.cemm.at/research> & <https://meduniwien.ac.at/ai>)

The CeMM Research Center for Molecular Medicine of the Austrian Academy of Sciences is one of Europe’s leading biomedical research institutes. In recent years, CeMM researchers published >10 papers in Nature/Cell/Science/NEJM and >40 papers in Nature/Science/Cell sister journals, with a team of ~150 scientists. Research at CeMM is exceptionally collaborative and has strong focus on medical impact, based on a molecular understanding of cancer and immune diseases. A study by “The Scientist” put CeMM among the [top-5 best places to work](#) in academia worldwide. Vienna is frequently ranked as the world’s most livable city. It is a United Nations city with a large English-speaking community.

The Medical University of Vienna is Europe’s largest medical school and one of the oldest in the world. It was founded in 1365 as the medical faculty of the University of Vienna, and it has operated as an autonomous university since 2004. Within the university’s data science department, the Institute of Artificial Intelligence focuses on machine learning / artificial intelligence for biomedical research and clinical applications.

Please apply via the ELLIS PhD Program (<https://ellis.eu/news/ellis-phd-program-call-for-applications-2026>, call opening October 1<sup>st</sup>) and via the CeMM PhD Program (<https://cemm.at/phd-program>, call opening in December), which provides an excellent local embedding.