AI InScide Out - An Unconference for the AI Community & Beyond

On October 16-17, 2023, the AI Health Innovation Cluster (AIH) and the ELLIS Unit Heidelberg hosted the *AI InScide Out* unconference at the European Molecular Biology Laboratory (EMBL) in Heidelberg. Going beyond the aims for a more "conventional" conference, the unconference took a community-driven approach to encourage researchers of all career levels to actively present and contribute. Participants shared their latest insights and findings, reflected on barriers and challenges, and discussed the most promising areas for future AI research in health, life, and natural sciences. The overall theme of the unconference was therefore "Advances, Issues, and Opportunities".

"During this two-day meeting, we have connected experts in bioinformatics, medical image computing, statistics, and foundational AI with discipline experts in the health and life sciences," said Oliver Stegle, co-spokesperson of AIH, head of the Division of Computational Genomics at DKFZ, and associate group leader at EMBL. "Building communities and creating new interdisciplinary bridges is vital in order to facilitate breakthroughs in the life sciences through AI. The unconference attracted more than 180 participants, ranging from early-career and mid-level to senior scientists. We are very excited about this turnout."

The event drew high-caliber international keynote speakers who contribute to a variety of scientific disciplines. Jennifer Listgarten from UC Berkeley shared her insights on machine learning-based protein engineering, Julia Vogt from ETH Zuerich talked about multimodal machine learning in medicine, and Karsten Borgwardt from the Max Planck Institute of Biochemistry focused on machine learning-assisted sepsis and antibiotic resistance prediction.

In addition, speakers from the region presented the breadth of how AI is already benefiting health, life, and natural science research and included Britta Velten from the University of Heidelberg (*Probabilistic Models for a Multi-Dimensional Understanding of Biological Systems*), Paul Jaeger from the German Cancer Research Center and Helmholtz Imaging (*Navigating Validation Pitfalls towards Innovative ML Research*), Tilman Plehn from the University of Heidelberg (*Machine Learning for the LHC*), and Maria Zimmermann-Kogadeeva from EMBL (*Leveraging Data-Driven Approaches to Investigate the Interactions between the Human Gut Microbiota and Medical Drugs*).

The unconference program included a flash talk competition with a total of 26 presentations on *advances, issues, and opportunities* in AI - i.e., results that push the boundaries of AI in health and life science research, research that hit a major roadblock, and projects that have taken an interesting turn, revealing potentially critical AI research directions in the future. The winners from each category facilitated 45-minute "deep dive sessions" on the following day. Further, the unconference featured two poster sessions exhibiting regional and international AI research, with AIH fellows comprising one third of the presenters. Lastly, scientific and personal exchange among the attendees also occurred over lunch, dinner, and coffee breaks.

Attendees appreciated the interdisciplinary approach of the unconference, the high diversity of the participants, and the open discussions that took place. Unlike most conferences, the *AI InScide Out* unconference was equally focused on the failures and challenges of AI, which are usually not found in

publications or presented at conferences, but are important to discuss in order to find different routes and alternative approaches.

Kevin Domanegg from the Science Education and Public Engagement office at EMBL summarized his experience: “AI is revolutionizing virtually all areas of science, becoming an essential component of scientific discovery. It empowers scientists to enhance and accelerate their research, and there is considerable optimism regarding AI-driven tools’ ability to extract valuable insights from the complex datasets encountered in research. Nevertheless, it is crucial to acknowledge and openly discuss the challenges and limitations associated with this technology. Everyone had the chance to share their own experiences and thoughts, which I find invaluable in such a dynamic field. I believe Heidelberg is an excellent place to be right now, and I am very hopeful and eager to witness its transformation into a center of excellence for AI-based research.”