Karolinska Institutet

Programme Friday December 5ᵗʰ

Network Medicine and AI:
Shaping the Future of Biomedical Research and Healthcare

Network medicine and artificial intelligence are transforming biomedical research and healthcare by enabling deeper insights into disease mechanisms, personalized treatment strategies, and innovative system-level solutions.

This event brings together world-leading experts and Karolinska Institutet researchers to explore how these approaches are shaping the future of medicine—from complex network analysis to AI-driven precision health. Join us for a day of cutting-edge science, collaboration, and visionary perspectives on the next era of healthcare innovation.

Venue: Lecture hall Andreas Vesalius: Berzelius väg 3, Solna

09.00   **Welcome**

Paolo Parini, MD
Professor of Clinical Chemistry and Senior Physician Department of Medicine, Huddinge and Department of Laboratory Medicine. Academic coordinator for KI´s collaboration with the Network Medicine Alliance.

09.15   **Network Medicine and Artificial Intelligence: Path to Precision Medicine**

Invited speaker Joseph Loscalzo
Samuel A. Levine Professor of Medicine, Hersey Distinguished Professor of the Theory and Practice of Medicine, Harvard Medical School.

Physician-in-Chief Emeritus, Brigham and Women's Hospital, US.

09.55   **Data-driven patient safety: improved antibiotic stewardship and surveillance of infections**

Pontus Naucler
Professor of Infectious Diseases at the Department of Medicine, Solna

10.25   **Coffee break**

10.45   **From Network Medicine to the Foodome**

Invited speaker Albert-László Barabási
Network Science Institute and Department of Physics, Northeastern University Division of Network Medicine, Harvard University
Department of Network and Data Science, Central European University.

11.25   **Integrating Spatial Transcriptomics and corresponding tissue section imaging data for breast cancer research**

Carsten Daub
Associate Professor and group leader for the Clinical Transcriptomics research group at the Department of Biosciences and Nutrition.
Director of the Center for Bioinformatics and Biostatistics at KI Campus Flemingsberg and Platform Scientific Director of the Genomics Platform at SciLifeLab.

12.00   **Lunch break**
Vegetarian wraps will be served outside the lecture hall

13.00   **A reflection on evidence, expert knowledge and FAIR data in the era of AI**

Invited speaker Sebastiaan Meijer.
Professor of Health Care Logistics, KTH Royal Institute of Technology.
Serving as head of department for Biomedical Engineering and Health Systems (MTH), and vice dean for the school of

Engineering Sciences in Chemistry, Biotechnology and Health (CBH).
Coordinator for EDIH Health Data Sweden.

13.40   **Bridging the ga(s)p in multi-modal network analysis of obstructive lung diseases: PTMics the blind spot in the omics cascade**

Åsa Wheelock
Associate Professor and Principal Researcher at the Department of Medicine, Solna

14.05   **The End of Medicine As We Know iT – And Why Health Has A Chance**

Invited speaker Harald Schmidt

Professor of Pharmacology, Chairman Department of Pharmacology and Personalised Medicine, Pharmacology and Personalised Medicine School for Mental Health & Neuroscience Fac. Health, Medicine and Life Sciences, Maastricht University

14.50   **Coffee break**

15.20   **Network Medicine GPT – A foundation model for disease mechanism mining and drug repurposing**

Invited speaker Jan Baumbach
Institute for Computational Systems Biology, University of Hamburg. Professor and Director of the Institute for Computational Systems Biology

16.00   **Developing novel quality controls for cell therapy using AI**

Anna Falk
Associate Professor and Principal Investigator at the Department of Neuroscience, Karolinska Institutet

16.25   **Concluding remarks**

Meet our invited speakers

Joseph Loscalzo, MD, PhD

Samuel A. Levine Professor of Medicine and Hersey Distinguished Professor of the Theory and Practice of Medicine, Harvard Medical School; Physician-in-Chief Emeritus, Brigham and Women's Hospital.

Dr. Loscalzo is a globally recognized leader in cardiovascular medicine and systems biology. His research has transformed our understanding of vascular biology, oxidative stress, and nitric oxide signaling. As a pioneer of network medicine, he integrates complex systems approaches to uncover disease mechanisms and therapeutic targets. He has authored over 1,000 peer-reviewed publications, co-edited Harrison's Principles of Internal Medicine, and holds multiple patents. His contributions have earned him numerous honors, including the American Heart Association Merit Award (2024) and election to the National Academy of Medicine.

Albert–László Barabási, PhD

Robert Gray Dodge Professor of Network Science, Northeastern University; affiliated with Harvard Medical School and Central European University.

Professor Barabási is one of the founders of network science, best known for discovering scale-free networks and introducing the Barabási–Albert model, which revolutionized the study of complex systems. His work spans physics, biology, and medicine, applying network theory to predict disease pathways and drug targets. He has published extensively in Nature, Science, and PNAS, and authored influential books such as Linked and Network Science. With an h-index over 170, Barabási is among the most cited scientists worldwide. He received the Lise Meitner Award (2024) for groundbreaking contributions to complex systems research.

Website: https://barabasi.com/

Sebastiaan Meijer, PhD

Professor of Health Care Logistics, KTH Royal Institute of Technology; Vice Dean of the School of Engineering Sciences in Chemistry, Biotechnology and Health; Head of Biomedical Engineering and Health Systems.

Professor Meijer specializes in simulation-based design and participatory modeling for complex adaptive healthcare systems. His work addresses challenges in patient flow, hospital logistics, and health data integration, using gaming and simulation to support decision-making. He has authored over 80 publications and leads EDIH Health Data Sweden, a European initiative for digital innovation in healthcare. His research has influenced policy and practice in health system resilience and performance optimization.

Harald Schmidt, MD, PhD, PharmD

Professor and Chair of Pharmacology and Personalized Medicine, Maastricht University, and Guest professor at the University of Potsdam and the Medizinische Hochschule Brandenburg.

Dr. Schmidt is a leading authority in network pharmacology and precision medicine, aiming to redefine drug discovery through systems approaches. His research focuses on identifying disease modules and repurposing drugs for complex disorders. He has published over 200 papers, co-founded biotech companies developing drugs now in late-stage clinical trials, and coordinated large-scale EU research initiatives. His achievements have been recognized with prestigious awards, including the Phoenix Research Prize, Pro Scientia Prize, and an ERC Advanced Grant. He also serves as Co-Editor-in-Chief of *Network and Systems Medicine*.

Website: https://haraldschmidt.online/

Jan Baumbach, PhD

Professor and Director, Institute for Computational Systems Biology, University of Hamburg.

Dr. Baumbach leads research at the intersection of systems medicine, bioinformatics, and AI, focusing on privacy-preserving analytics and federated learning for healthcare. His group develops computational tools to integrate multi-omics data for personalized medicine and drug repurposing. He has published over 200 scientific papers, coordinated major EU projects on computational biomedicine, and serves as a Humboldt Scout. Recent work includes innovative approaches to secure data sharing across hospitals and predictive modeling for chronic diseases.

Lab website: https://www.cosy.bio/

Meet our KI researchers

Pontus Nauclér, MD, PhD

Professor of Infectious Diseases, Department of Medicine, Solna, Karolinska Institutet; Senior Physician, Karolinska University Hospital.

Dr. Nauclér's research focuses on improving diagnosis and treatment of severe infections such as sepsis and pneumonia, while reducing unnecessary antibiotic use to combat resistance. He integrates clinical data, AI, and epidemiology to develop precision antibiotic strategies. Appointed Professor in 2025, he leads projects funded by Vinnova and coordinates Sweden's participation in the Vaccelerate vaccine research network.

Carsten Daub, PhD

Associate Professor (Docent) and Group Leader, Department of Biosciences and Nutrition, Karolinska Institutet; Director, Centre for Bioinformatics and Biostatistics; Scientific Director, SciLifeLab.

Dr. Daub specializes in transcriptomics and bioinformatics, focusing on gene regulation in disease. He previously led major projects at RIKEN and now heads the Clinical Transcriptomics group at KI. His work has contributed to global initiatives such as FANTOM5 and the Human Protein Atlas, advancing precision medicine through large-scale data integration.

Åsa Wheelock, PhD

Associate Professor (Docent) of Translational Resipratory Medicine and Principal Investigator, Department of Medicine, Solna, Karolinska Institutet.

Dr. Wheelock leads a systems biology program on chronic lung diseases such as COPD and asthma, combining multi-omics and clinical phenotyping to identify molecular subtypes and biomarkers for personalized medicine. She received the Hjärt-Lungfonden Major Research Grant for her work on early detection and prevention of COPD and is a recognized expert in translational respiratory research.

Anna Falk, PhD

Associate Professor (Docent) and Group Leader, Department of Neuroscience, Karolinska Institutet.

Dr. Falk's research explores human brain development and neuropsychiatric disorders using iPS cell-derived neural models and brain organoids. She has led projects funded by the Swedish Foundation for Strategic Research and SciLifeLab, pioneering translational approaches for regenerative therapies and personalized treatment strategies in neurodegenerative diseases.

Some Final Words

The KI Steering Group for the Network Medicine Alliance (KI NMA) is delighted to welcome all participants to this symposium, which highlights how network medicine and artificial intelligence are shaping the future of biomedical research and healthcare.

We extend our sincere gratitude to Endomet for supporting part of this event.

For more information about the international Network Medicine Alliance, please visit: https://www.network-medicine.org/.

Looking Ahead

At Karolinska Institutet, KI NMA will continue to strengthen global partnerships and explore new opportunities to integrate network medicine and AI into research and clinical practice, driving innovation for improved health outcomes. We are committed to fostering knowledge exchange and collaboration that will advance this rapidly evolving field.

We warmly invite all participants to stay connected and engage with us at Karolinska Institutet during 2026. Details about upcoming opportunities will be available on our website—please see the link and QR code below.

We hope these days have inspired new ideas and opened doors to future collaborations. Finally, we extend our heartfelt thanks to all speakers for sharing their expertise and insights.

https://ki.se/en/collaboration/international-collaboration/international-academic-networks-and-organisations/the-network-medicine-alliance