



Seminar

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From Big Data to Deeper Knowledge of the Human

Tuesday, 2 February 2021, 2:15 p.m.

Due to the precautions imposed by the current Corona pandemic, the Thunberg Hall will be closed to the public until further notice.

You are therefore invited to join the seminar via Zoom instead:
<https://uu-se.zoom.us/j/65037953876>

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ABOUT JAN KOMOROWSKI

Jan Komorowski is an international leader in the area of Artificial Intelligence for Life Sciences. His research focuses on modelling biological systems from big genomic data by using and developing machine learning and statistical methods. At the center of his work are models of complex regulatory mechanisms, as they change in response to genetic and environmental factors. His research laboratory and students pursue studies of, among other things, transcriptome data, mutation and DNA modification data, metabolomics, screening and clinical data in the context of cancer, diabetes and viral diseases.

Komorowski holds a Senior Professorship in Bioinformatics at Uppsala University. He was an Assistant Professor at Harvard University, Adjunct Professor at MIT, and Full Professor of Computer Science at the Norwegian Institute of Technology in Trondheim. In 2002, he was appointed Full Professor and Chair of Bioinformatics at Uppsala University and Director of the Linnaeus Centre for Bioinformatics, which he led until 2010. He was Visiting Professor at Åbo Akademi University in Turku. Since 2020, he has been an Affiliate Scientist at University of Washington's Washington National Primate Research Center, Seattle. In 2018, he received the honorary title of Kurt Mothes Visiting Professorship at Martin Luther University in Halle-Wittenberg. Komorowski is also a Visiting Professor at the Institute of Computer Science, Polish Academy of Sciences, Warsaw.

Komorowski has published extensively in, for example, *Nature Genetics*, *Genome Research*, *Nature*, *Nucleic Acid Research*, *Nature Communications* and *Bioinformatics*. His current h-indices are: 30 - Web of Science and 45 - Google Scholar. 20 PhD students have graduated under his advisership. He is extensively cited: over 7,500 citations by Web of Science and almost 16,000 by Google Scholar. Komorowski currently holds a prestigious NIH award to develop computational models of immune protection by SIV/HIV vaccines, and is Area Chair of the 2021 International Joint Conference on Artificial Intelligence. In 2019, he chaired the Science for Life Laboratory Summit AI for Life Sciences.

ABSTRACT

Major breakthroughs in biotechnology allow generation of unprecedented amounts of data about living systems. The main challenge this data creates is the difference of languages and concepts used on one side by the information sciences and traditional life sciences on the other side. However, we should not forget that these developments are placed in a human, environmental and financial context, which carries certain constraints and obligations.

As a bioinformatician I am trying to bridge the two communities. In this talk I shall briefly review our own research results, which include, but are not limited to retrieving knowledge about genes and proteins from research articles published in the PubMed database, characterizing pathogenicity of the Avian Influenza Virus and discovering mechanisms of protection against the SIV infection in Green monkeys (*Chlorocebus sabaeus*).

Although the results of such research might be important in themselves there also are consequential ethical and financial issues that often are neglected but need to be brought forward. Finally, the success of bioinformatics and in particular machine learning methods applied to life sciences achieved despite the methodological differences suggests that a similar revolution may happen on the border territories between quantitative sciences and some parts of research in humanities.