SYMPOSIUM

Artificial Intelligence in Public Health Research

9th - 10th NOVEMBER 2023
BERLIN | GERMANY

This symposium is financially supported within the project AI-DAVIS-PANDEMICS by the Federal Ministry of Health (BMG) under grant No. 2523DAT400.
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The Centre is responsible for the strategic support of advances in the field of public health research using the latest AI-based technologies at the RKI. At ZKI-PH, the topics of bioinformatics, computational epidemiology, modern data visualisation as well as big data and systems analysis are combined with the central methodological building blocks of machine learning, AI, decision making research as well as the development of realistic computer simulations in the field of public health research. To meet these challenges, the ZKI-PH develops models and simulations for the corresponding subject areas, promotes the utilisation/transfer of existing solutions into public health applications and prepares the results and underlying data for the public and political stakeholders. The aim of this interdepartmental cooperation in the field of Artificial Intelligence (AI) is to gain a comprehensive understanding of the spread and prevention of diseases in the population and to counter epidemics of the 21st century even more effectively.

Tasks

- Strategic management of the expansion of AI research at the RKI
- Developing, monitoring and strategically supporting new advances and their application in the field of public health research using the latest AI-based technologies
- Steering and coordination of inter- and transdisciplinary research in the field of AI through development, acquisition and implementation of new research and development projects
- Planning and further development of research cooperations within the RKI and with strategic partners in and outside Germany

Structure

- ZKI-PH 1 AI Basics
- ZKI-PH 2 Phylogenomics
- ZKI-PH 3 Image Analysis
- ZKI-PH 4 Climate and Societal Analysis
- ZKI-PH 5 Visualisation
# SYMPOSIUM

## Artificial Intelligence in Public Health Research

### AGENDA DAY 1

**Thursday– 9th November 2023**

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<td>Prof. Dr. Karl Lauterbach</td>
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<td>Prof. Dr. Lars Schaade</td>
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<td>13:30</td>
<td>Keynote</td>
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<td>Trustworthy AI by Human-AI collaboration</td>
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<td>Dr. Hendrik Strobelt</td>
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<td>14:00</td>
<td>AI-Supported Decision-Making in Public Health</td>
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<td>Machine learning and generative AI strategies for event-based surveillance in public health intelligence</td>
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<td>Dr. Stéphane Ghozzi</td>
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<td>Real-time tracking of virus outbreaks with epidemiological data: understanding the outbreak dynamics</td>
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<td>Dr. Abhishek Dasgupta</td>
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<td>Coffee Break &amp; Poster Session</td>
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<td>15:45</td>
<td>AI-Supported Diagnostics and Imaging Tools</td>
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<td>Automatic image analysis for public health research</td>
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<td>Dr. Nils Körber</td>
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<td>Bridging the gap between proof of concepts and real-world deployment of image based deep learning in microscopy</td>
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<td>Prof. Dr. Ida-Maria Sintorn</td>
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<td>Mind the gap: domain shifts in tumor diagnostics</td>
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<td>Frauke Wilm</td>
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<td>Technology Solutions Showcase</td>
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<td>The German Health Data Lab (HDL) - How Germany is making health data available to improve patient care with new technologies</td>
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<td>Enabling AI use for the public environmental sector - Towards the sustainable development and operation of AI applications</td>
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<td>Dr. Robert Wagner</td>
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<td>Wrap-Up Day 1</td>
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AGENDA DAY 2

Friday – 10th November 2023

08:30 Registration & Refreshments

09:30 Privacy-Preserving Artificial Intelligence Tools in Public Health Research

The protection of personal data in health information systems – principles and processes for public health
Keyrellous Adib | World Health Organization (WHO)
Artificial Intelligence, Trustworthiness & HealthCare - how does that go together in practice?
Patrick Pongratz | SAS Institute GmbH
Guarding Health with Maths: Unlocking the Power of Differential Privacy in Public Health Analytics
PD Dr. Georgios Kaissis | Technical University Munich

10:30 Climate Change and Public Health

Using artificial intelligence to create a sustainable world
Prof. Dr. Daniela Haluza | Medical University of Vienna
A machine learning framework for cardiovascular health prediction modeling the interplay between various environmental, neighborhood and socio-economic features: a German-wide application
Nikos Nikolaou | Helmholtz Munich
How machine learning can help to understand climate change impacts on public health in Germany
Junyu Wang | Robert Koch Institute

11:30 Fostering Innovation

Navigating regulation, public health, and clinical care in the pre-competitive space
Prof. Dr. Joe Lennerz | Massachusetts General Hospital & Harvard Medical School

12:00 Outlook & Closing Remarks

12:30 Lunch & Poster Session
Keyrellous Adib
Technical Officer - Data Science and Digital Health
Division of Country Health Policies and Systems (CPS)
Regional Office for Europe | WHO

Dr. Abhishek Dasgupta
Senior Research Software Engineer (RSE)
Computational and Genomic Epidemiology
Department of Biology, Doctoral Training Centre Oxford

Dr. Stéphane Ghozzi
Data Scientist
Department of Pandemic & Epidemic Intelligence Systems (ISY)
Hub for Pandemic & Epidemic Intelligence | WHO

Prof. Dr. Daniela Haluza
Department for Environmental Health
Center for Public Health
Medical University Vienna
Dr. Tilman Hartwig
Chief Data Scientist
Application Lab for AI and Big Data
German Environment Agency (UBA)

Dr. Steffen Heß
Head of the Health Data Lab
Health Data Lab
Federal Institute for Drugs and Medical Devices (BfArM)

PD Dr. Georgios Kaissis
Principal Investigator | Privacy-preserving and Trustworthy AI
Institute for AI and Informatics in Medicine
Technical University Munich (TUM)

Dr. Nils Körber
Head of ZKI-PH 3 | Image Analysis
Centre for Artificial Intelligence in Public Health Research
Robert Koch Institute
Prof. Dr. Jochen Lennerz  
Medical Director, Center for Integrated Diagnostics MGH  
Assoc. Chief, Department of Pathology | Mass General Hospital  
Harvard Medical School

Nikolaos Nikolaou  
Researcher in Epidemiology and Public Health at LMU  
Institute of Epidemiology | Research Center for Environmental Health  
Helmholtz Munich

Patrick Pongratz  
Enterprise Sales Director  
DACH Region  
SAS Institute GmbH

Prof. Dr. Ida-Maria Sintorn  
Head of Collaboration & Outreach  
Department of Information Technology | Vi3 Image Analysis  
University Uppsala
Dr. Hendrik Strobelt
Senior Research Scientist at IBM Research
Explainability Lead at MIT-IBM Watson AI Lab
Visiting Researcher at MIT

Junyu Wang
Data Scientist ZKI-PH 4 | Climate and Societal Analysis
Centre for Artificial Intelligence in Public Health Research
Robert Koch Institute

Frauke Wilm
Data Scientist
AIMI LAB (Artificial Intelligence in Medical Imaging)
Friedrich-Alexander-Universität Erlangen
Infectious diseases and their rapid and widespread spread in pandemics pose enormous challenges to both society and the health system. In such situations, the Robert Koch Institute (RKI) plays a key role in answering the questions regarding appropriate measures to protect the health of the population from a public health perspective. The RKI makes its recommendations to policymakers in such situations on the basis of the latest scientific findings, i.e. evidence- and data-based. To this end, relevant data is collected and evaluated at the RKI during a pandemic. In future, with the help of new AI techniques, it should be possible to process and analyse these - sometimes very large - data volumes faster, more effectively and/or better, in order to be able to draw conclusions and make predictions about a possible spread and suitable measures to contain the pathogen.

Motivation

The aim of the project is to develop systems (AI applications) that help to analyse and visualise relevant (large) amounts of data in pandemic situations and to draw a holistic picture of the pandemic. For this purpose, different data sources are linked and processed at the Centre for Artificial Intelligence in Public Health Research of the Robert Koch Institute (RKI ZKI-PH). For example, reporting data on the incidence of illness or wastewater analyses will be used to provide an accurate picture of the current incidence of infection. Climate data can also be used to identify climatic conditions for the spread of pathogens. In addition to various pathogens for respiratory diseases (e.g. influenza or coronavirus), animal-borne diseases such as the West Nile or Zika virus transmitted by tiger mosquitoes will also be considered in this project.
Perspectives for practice
The aim of the project is to develop systems (AI applications) that help to analyse and visualise relevant (large) amounts of data in pandemic situations and to draw a holistic picture of the pandemic. For this purpose, different data sources are linked and processed at the Centre for Artificial Intelligence in Public Health Research of the Robert Koch Institute (RKI ZKI-PH). For example, reporting data on the incidence of illness or wastewater analyses will be used to provide an accurate picture of the current incidence of infection. Climate data can also be used to identify climatic conditions for the spread of pathogens. In addition to various pathogens for respiratory diseases (e.g. influenza or coronavirus), animal-borne diseases such as the West Nile or Zika virus transmitted by tiger mosquitoes will also be considered in this project.

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