

HARNESSING BIG DATA FOR PRECISION MEDICINE AND HEALTHCARE

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Organized by L3S & Leibniz AI Lab

Intelligent, Reliable and Responsible Systems

- Artificial Intelligence, Machine Learning, Vision, Semantics
+ Security, Data Protection, Distributed Systems
+ Law, Sociology, Ethics
- 4 European Marie Curie PhD Networks
- 6 ERC Grants in the last 10 years
- 20+ L3S members, mainly from Hannover and Braunschweig
- 180+ PhD and Postdoc researchers

Innovation with strong interdisciplinary collaborations

- Intelligent Production
- Intelligent Mobility
- Personalized Medicine
- Digital Education
- plus biodiversity and others



14 Mio. Euro annual budget (of which 2 Mio. Euro are base funding)

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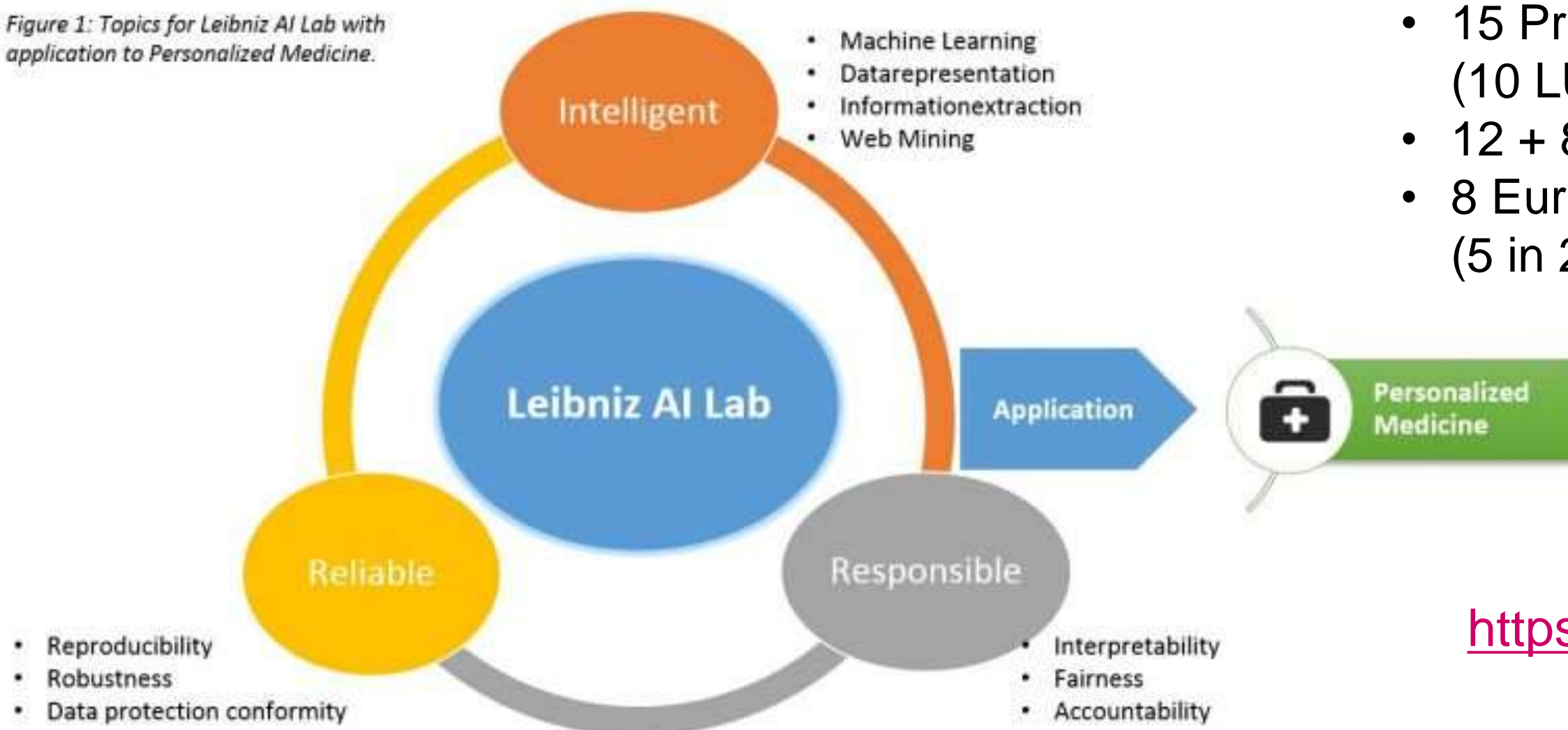
1 of 3 International Future Labs for Artificial Intelligence in Germany

- financed with about 5 Mio. Euro (BMBF) 2020 – 2023

30 - 50 Researchers

- 8 + 4 professors from Australia, New Zealand, India, Singapore and California (Stanford)
- 15 Professors from Hannover (10 LUH, 5 MHH)
- 12 + 8 PhD and Postdoc researchers
- 8 European Professors (5 in 2020 and 2021)

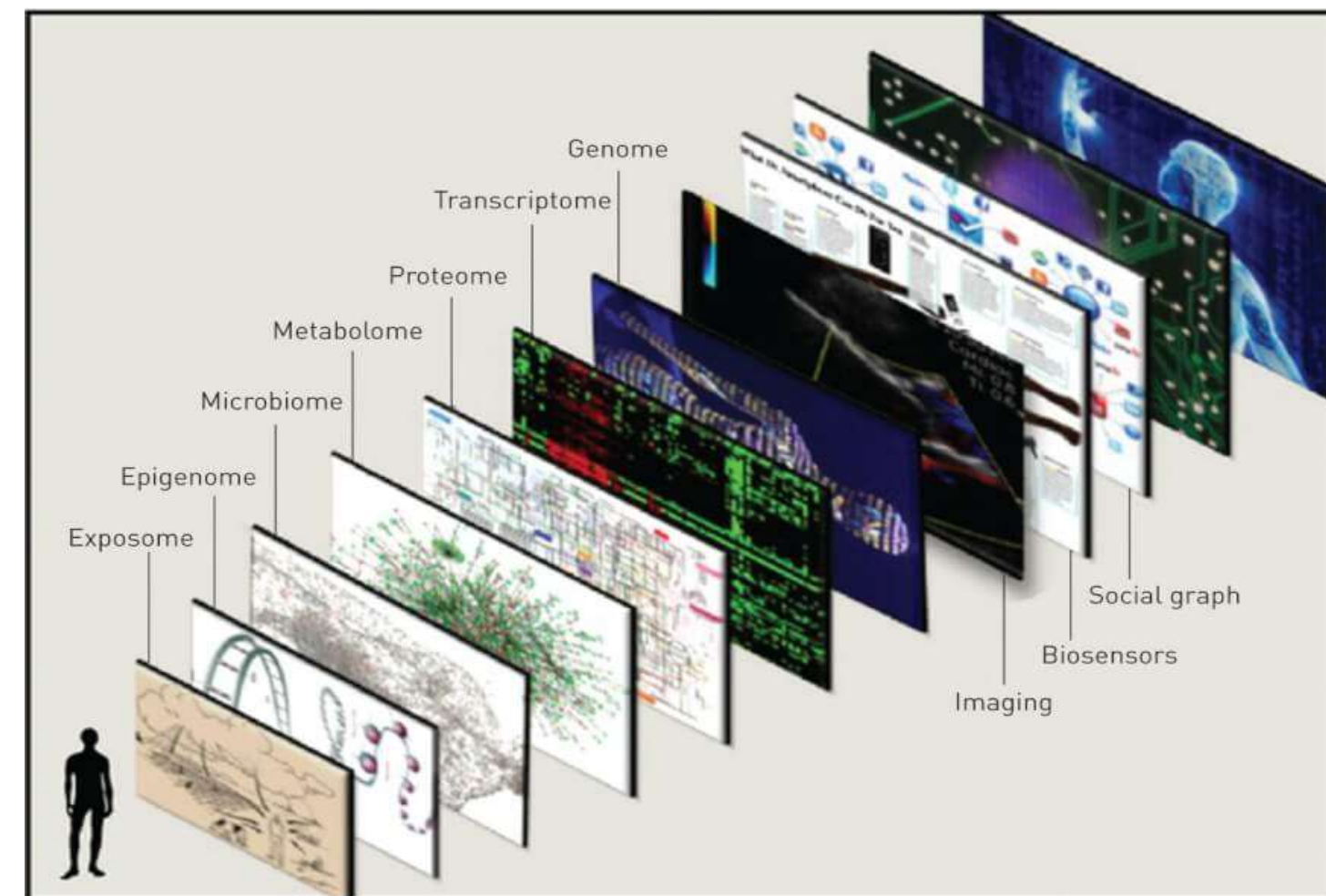
Figure 1: Topics for Leibniz AI Lab with application to Personalized Medicine.



<https://leibniz-ai-lab.de/>

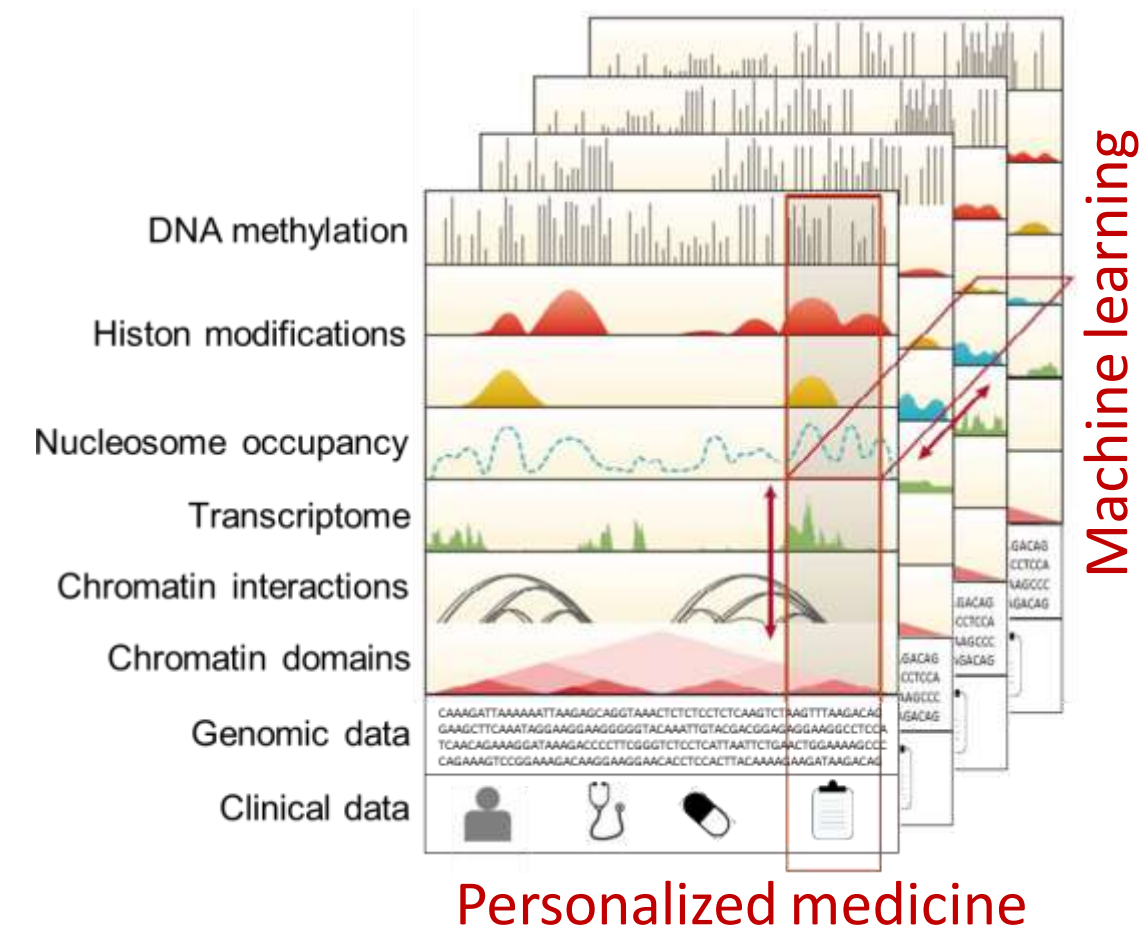
Medical Use Cases (together with Medical School Hannover)

- Leukemia
- Mental Health
- Breast Cancer



Pediatric Leukaemia

- most common cancer among children
- most frequent cause of early age death from cancer
- Germany ~600 children diagnosed annually
- Hannover Human Genetics Dept is the Reference Lab in Germany / partner of European & International studies

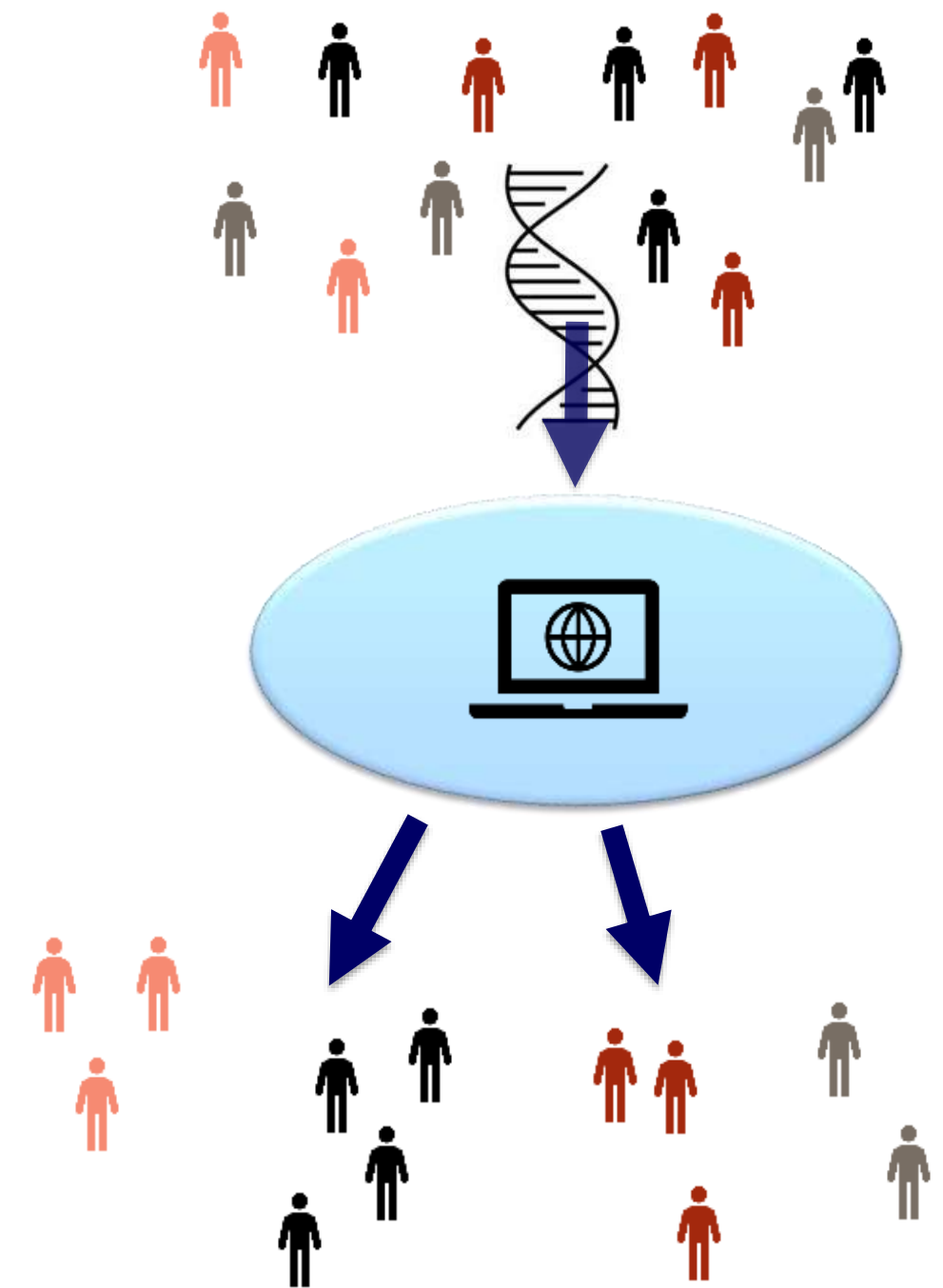


Goal: Multidimensional integration of genomic, epigenomic & clinical data to personalize pediatric oncology

Psychiatric Disorders

- Reverse phenotyping of psychosis with genetic information from around 50,000 patients diagnosed with schizophrenia
- Multi modal data (imaging, genomic, epigenomic) analysis for early diagnosis of neurodegenerative disorders

More on psychiatric disorders by Helge Frieling in the next session



Breast Cancer

- Most common cancer in women (1:10)
- >1 million new cases annually worldwide
- >70K cases alone in Germany
- >250 K deaths annually worldwide
- Data from "Network Breast Cancer"

Regional Network



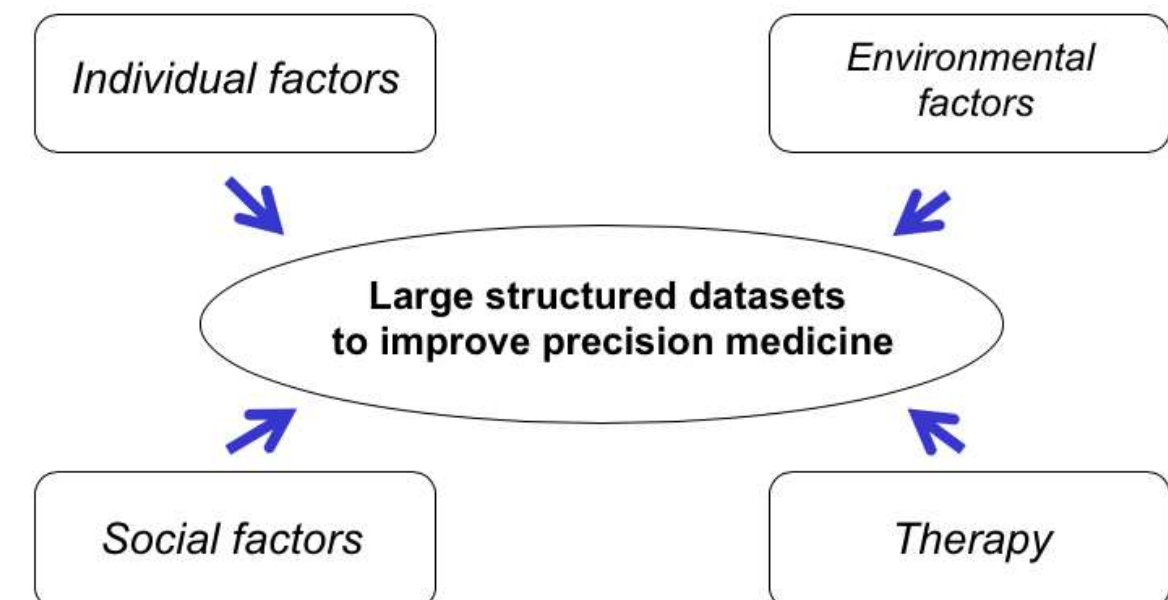
„Network Breast Cancer“
(Status Aug 31, 2020: 4710 Patients)

Certified Breast Centers in

- Hameln
- Hannover
- Hildesheim
- Stadthagen



Goal: Identify factors for therapeutic success in patients diagnosed with breast cancer.



Schedule June 10

Introduction to Future Lab	9:00 – 9:10
Session: Computational Methods in Medicine	
Yang Li	9:15 – 9:45
Bodo Rosenhahn	9:50 – 10:30
Bidisha Samanta	10:35 – 11:10
Manuel Gomez Rodriguez	11:15 – 12:05
Session: Mental Health	
Helge Frieling	3:00 – 3:35
Surya Ghosh	3:40 – 4:15
Akane Sano	4:20 – 5:10
Tim Althoff	5:15 – 6:05

Schedule June 11

Session: Medical Text and Data Mining

Robert Hoehndorf

9:00 – 09:50

Stefan Schulz

09:55 – 10:45

Animesh Mukherjee

10:50 – 11:20

Antje Wulff

11:25 – 12:00

Session: Epidemiology

Fernando Peruani

3:10 – 4:00

Gautam Menon

4:05 – 4:55

Madhav Marathe

5:00 – 5:55

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We will be tweeting live from the event!

If you are tweeting from the event, please tag us

@AILeibniz and use the Hashtags

#BigDataInMedicine and #LeibnizAIworkshop.

Thank you!