Computational Health at UNIP\textsc{i}

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Health and computer science

- Medicine
- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science
- Bioinformatics
- Systems biology
- Computational chemistry
- Health informatics
- Computational biology
- Health informatics
- Chemistry
Pediatric Acute-onset Neuropsychiatric Syndrome (PANS)

- Recently classified disease - children suddenly develop tics, obsessive behaviour, fears, sleep and eating disorders

Mechanisms of the disease still unknown!

- Psychological?
- Bacterial infection?

Metabolomics + Proteomics

Clinical history

Biomarkers
Mechanisms
Better therapy

Stanford University

COSBI
Machine learning for disease diagnosis

- Diagnosis - classification problem

PANS data → PANS diagnosis

Machine learning

IBS data → IBS diagnosis

Challenge deadline 15th January
Sleeping patterns and health

Food

Wrist band data

Sleep quality

Stress, feelings

Activity

Hormones: cortisol, melatonin, ..

HOW DO THEY ALL WORK TOGETHER?
Dynamic models for health

Time series data → Pathways → Dynamic computational model

\[
\frac{dx_i}{dt} = \alpha_i \prod_{j=1}^{n} x_j - \beta_i \prod_{j=1}^{n} x_{ij} \]

Drug testing → simulations → Drug design

Disease mechanisms
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References
1. https://sparkglobal.io/