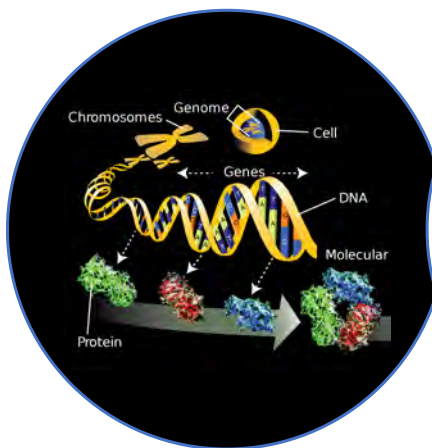


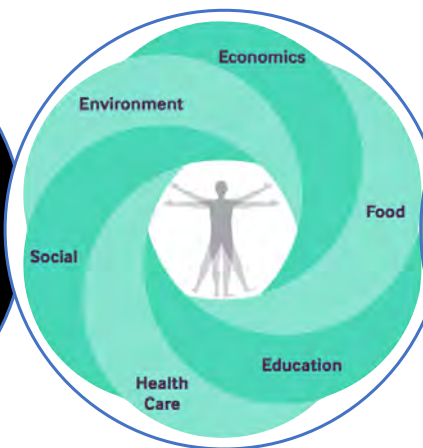
ADVANCED ANALYTICS and BIG DATA

EINSTEIN GLOBAL ADVANCED TECHNOLOGY for EQUITY

Framework



Biology
(Omics)



Ambient
(Context)



Behavior
(Self)

Big Data

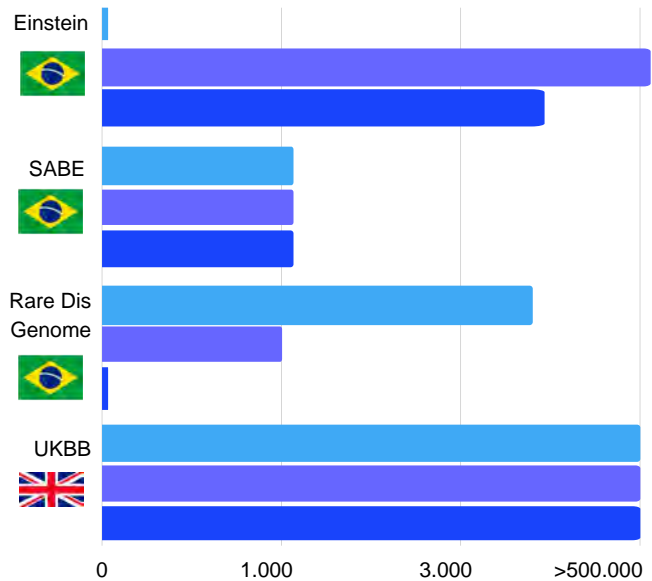
What



DATABASE

Currently in Brazil there is no single database* with genomic, clinical and lifestyle data organized on a platform available for the creation of analytical models in large-scale Precision Medicine.

* scenario: several initiatives, but non-connected



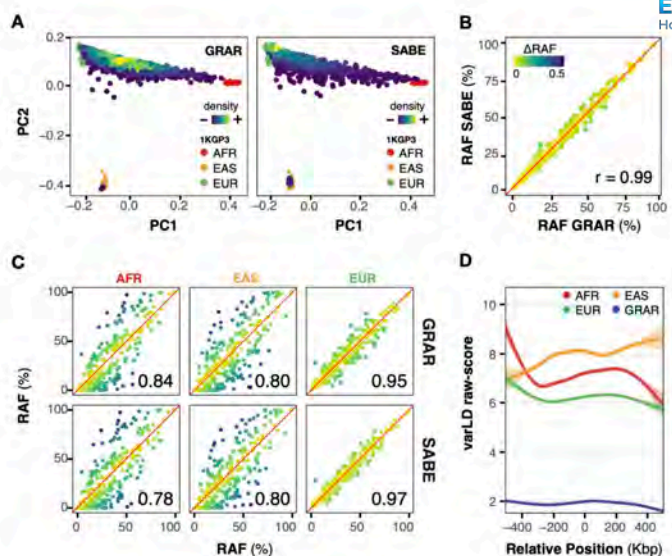
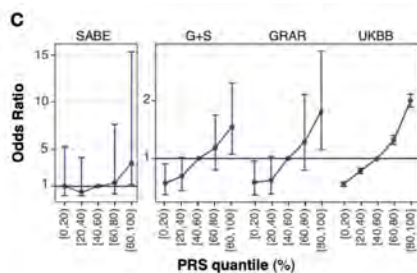
Federated Analytics (FA)



Regular article

Assessing the Risk Stratification of Breast Cancer Polygenic Risk Scores in a Brazilian Cohort

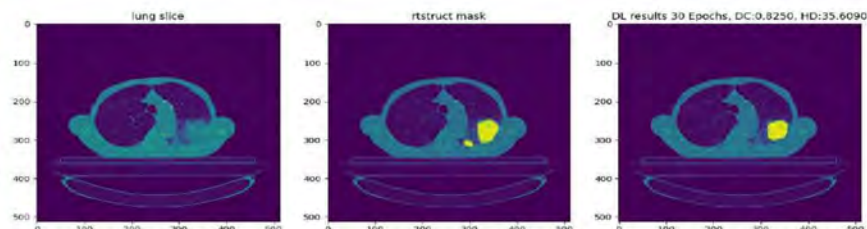
Rodrigo Araújo Sequeira Barreiro ^{1,2}, Tatiana Ferreira de Almeida ^{1,2}, Catarina dos Santos Gomes ^{1,2}, Frederico Manfredini ¹, Allysson Allan de Farias ¹, Gabriela Chiuffa Nunes ¹, Gabriel Mesquita de Souza ¹, Etienne Duim ¹, Jaqueline de Sá Correia ¹, Antonio Victor Campos Coelho ¹, Marcel Pinheiro Caraciolo ¹, Yeda Aparecida Oliveira Duarte ¹, Mayana Zatz ^{1,2,3}, Edson Amora ¹, João Bosco Oliveira ¹, Bárbara Domingues Bitarello ^{1,2}, Helena Brentani ^{1,2}, Michel Satya Naslavsky ^{1,2,3}



ARGOS

"Accessing worldwide imaging data with federated deep learning"

(AR)tificial intelligence for (G)ross tumour v(O)lume (S)egmentation



- Fully open-sourced code for federated deep learning
- 22 institutional partners across 10 countries
- Executed **legal agreements in multiple jurisdictions** incl EU, Switzerland, US, China and India
- **Inclusivity and diversity** – low resource threshold for small clinics and LMICs; each contributes 200+ cases
- In-kind funding from participants



OHDSI

- * 3.266 colaboradores
- * 80 países
- * 21 fuso horários
- * 6 continentes
- * 1 comunidade



Rede de dados

- * 453 bases de dados
- * 41 países
- * 928 milhões de registros de pacientes únicos (12% de toda população mundial)



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2022

Einstein is an OHDSI partner

Center for IA, HPC, ImT and global data

GATE: Global Advanced Technologies for Equity



GATE encapsulates a visionary initiative aimed at harnessing **advanced technologies** to address **global equity** challenges. The initiative aligns itself with principles of innovation, ethical inquiry, and a transformative approach to solving complex problems. It has a **deep commitment** to using the power of AI, Data, IoMT and HPC **to create equitable solutions** across various sectors, including healthcare and promote inclusive opportunities worldwide, particularly in South America.

GATE: Center for IA, HPC, ImT and global data

G.lobal

A.dvanced

T.echnologies for E.quity

Global Data Connection

- Global (Mayo / BIOS / ALIS)
- New sources: BioSensors
- B.D. MultiOmics*/P4M

Data is the input for all technologies discussed here. Create new **data superstructure** (new generation of Big Data with a design **dedicated to accessing global data**). Ensure access to a large volume and variety of complex data (**MultiOmics***), fed in real time by **bioSensors** and their integration to enable analysis. Create a **data hub in South America** and its inclusion in global databases, contributing to reducing bias and inequity in the use of AI.

Advanced Analytics

- A.I. Center
- A.I. multimodal/foundational
- A.I. MultiOmics*

Transform data and create valuable structures and processes. Develop and participate in **global teams in the creation of advanced AI algorithms** (Foundational / Multimodal / Generative and Quantum Machine Learning) and data processing at scale (**MultiOmics***) **P4 medicine**: personalized, participatory, predictive and preventive. Expand participation in the network of National AI Centers (in addition to BIOS) and test-beds for responsible AI adoption.

High Performance Computing

- Quantum Computing
- Decentralized Computing
- Edge Computing

Focus on creating self-sustainable computing environment for model integrating high-performance technologies in an integrated concept to serve LA countries. Stimulate and establish **partnerships** with universities and research institutions **with global reach** that have experience in advanced computing and healthcare. Access to cutting-edge research and create **opportunities to incorporate new talents** into the team.

Health Equity

- Activities: Public Programs
- Targeted PROADIs
- Climate and Environment

Projects aimed at establishing a **direct connection between practical applications of advanced technologies in solving inequalities and reducing environmental impacts** on health in **diverse populations** in Brazil and Latin America. Prospecting for **medicines and sensors applied to problems of vulnerable populations**. Example Intelligent Assistants (for doctors and patients) to improve and expand care for less favored populations.

*genomics, proteomics and other biological bases will be the largest source of Big Data in the next decade, surpassing astronomy and social media