AI for Health and Well-being @UNIBO

Prof. Marco Seri
Dipartimento di Scienze mediche e Chirurgiche.
MISSION

To develop, apply, evaluate and disseminate Artificial Intelligence (AI) methods for health and well being

Our interdisciplinary AI research includes the development of transformative medical AI applications to improve

- the understanding of healthy and pathological processes
- advance patient health
FIELDS OF APPLICATION
Development and application of AI models for:

• predictive, personalized, preventive, and participatory (P4) medicine

• healthy aging

• biomarker discovery

• early diagnosis and prediction of patient-specific therapy and treatment

• Big data analytics, including multi-omic biomedical data (genomics, radiomics, etc.) and mitigation of their heterogeneity by harmonization and integrative methods
PROJECTS – UNIBO: a unique coordinated gateway to the Health domain

- UNIBO has been granted a total EU contribution of more than 17 M€ distributed in 30 H2020 projects (5 under IMI-2 JTI, 25 under SC1)

- The University of Bologna is tightly interconnected and works synergically with three main hospitals at Regional and National level – now Scientific Institutes for Research, Hospitalisation and Health Care:
  - **Istituto Ortopedico Rizzoli (IOR)** is a dedicated institution for the study and care of musculoskeletal conditions
  - The **Istituto delle Scienze Neurologiche Bellaria (ISNB)** an excellence in neurological sciences research and care
  - **Policlinico St. Orsola – Malpighi**, the first city hospital with about 2,000 beds
H2020 PROJECTS 2014-20
- 25 projects
- 9.1 M€

ONGOING AND FUTURE PROJECTS

Planned the construction of a database regarding all the research activities in the field of AI for health and well-being

Workshop: December 17th
• First attempt of a **comprehensive cohort studies and biobank mapping**
• Big opportunities for **observational research**
• **7 Departments** involved
• **78 cohorts** mapped
• **15 studies** includes more than 1,000 subjects
• **130,560 subjects** analysed
• **over 60 papers published** in international journals publicly available from these cohort studies

• **6 macro-areas and several topics covered:**
  • **Inflammatory syndrome**
  • **Diet-related diseases**
  • **Hepatology and nephrology**
  • **Cancer**
  • **Neurodegenerative and brain diseases**
  • **Cardiovascular diseases**
In response to the global emergency caused by the Covid-19 pandemic, the University has promptly and actively taken part in national and international initiatives with research projects and innovative contributions involving the multi-disciplinary resources and skills within our community.

The main projects and initiatives developed by UNIBO researchers are available here: Funded Projects.

An overall summary of our covid-related research activities have been collected in a booklet which include horizontal thematic areas and that will shortly available on the dedicated UNIBO webpage together with a “living” database, that currently includes over 90 contributions relating to UNIBO research, skills and resources.
Moreover, within the last H2020 call **SC1-PHE-CORONAVIRUS-2020 – Advancing knowledge for the clinical and public health response to the 2019-nCoV epidemic**, UNIBO has been funded as Beneficiary of two research projects:

**ORCHESTRA** “Connecting European Cohorts to Increase Common and Effective Response to SARS-CoV-2 Pandemic”, and the Innovation Action **INNO4COV-19** “Boosting Innovation for Covid 19 Diagnostic, Prevention and Surveillance”
AI for HEALTH & WELL-BEING: TOPICS

- Robot assisted surgery
- Lifestyle advice
- Virtual nursing assistant
- Continuous screening
- Drug dosage control
- Gait and fall detection
- Physician decision support
- Medical image enhancement
Programma

Will doctors be AIs with a human touch?

**Stefano Diciotti** - Machine Learning for Medical data

**Gastone Castellani** - Intelligence Genomics

**Giuseppe Notarstefano** - Collective intelligence: a framework to explore complex systems biology and federated AI medicine

**Nicola Baldini** - Intelligent orthopaedics: a joint effort exploring novel solutions for research and care