SPEAKERS

C. Combi **-** University of Verona
P. Giudici **-** University of Pavia
E. Raffinetti **-** University of Milan
F. Chesani **-** University of Bologna
L. Sacchi **-** University of Pavia
S. Ramat **-** University of Pavia
V. Bevilacqua – Politecnico di Bari
N. Viani - King's College London
B. Zupan **-** University of Ljubljana
R. Alexander **-** IBM
A. Tucker **-** Brunel University London, UK
E. Parimbelli **-** University of Pavia
V.G. Santucci **–** ISTC CNR Rome
M. Vettoretti - University of Padova
M. Ottaviano - Universidad Politécnica de Madrid
G. Sandini **-** Istituto Italiano di Tecnologia
Y. Kuniyoshi **-** University of Tokyo
C. Bartolozzi **-** Istituto Italiano di Tecnologia
E. Falotico **–** Scuola Superiore Sant'Anna
E. D'Angelo **-** University of Pavia
A. Pedrocchi **–** Politecnico di Milano
A. Riva **-** Bioinformatics Core at University of Florida Interdisciplinary Center for Biotechnology Research, US
R. Cucchiara **-** University of Modena and Reggio Emilia
D. Nardi **-** La Sapienza University of Rome
A. Bertolini **-** Scuola Superiore Sant'Anna
A. Santosuosso **-** University of Pavia

SCIENTIFIC ORGANIZERS

Riccardo Bellazzi **-** University of Pavia
Cecilia Laschi **–** Scuola Superiore Sant'Anna
Lucia Sacchi **-** University of Pavia
Silvana Quaglini **-** University of Pavia

DATATHON ORGANIZER

Riccardo Barbieri – Politecnico di Milano

LOCAL ORGANIZER

Gruppo Nazionale di Bioingegneria

[1] PhD students, Post-doctoral fellows, Perfezionamento and Scuole di Specializzazione

GENERAL INFORMATION

	Early Bird Registration (By August 15th 2020)	Registration
Standard (GNB Members*)	110€	140€
Standard (non GNB Members)	210€	240€
Graduate Students[1] (GNB Members**)	60€	80€
Graduate Students[1] (non GNB Members)	120€	140€
Undergraduate Students[2]	50€	70€
Undergraduate Students[2] light (no book)	25€	30€

* GNB membership regular: 50€
** GNB membership student: 30€
To register as a GNB member, the GNB membership code is required in the registration form. To become a member, visit https://soci.grupponazionalebioingegneria.it/utenti/front/accedi.
All the registration fees except *Undergraduate students light* include the School Proceedings book, published by Patron. All Registration fees include VAT.
Participation to the DATATHON is included in the registration fee. Students interested in participating to the DATATHON must specify it in the registration form. There is a limited number of places available (60), and priority will be given to PhD students.

Segreteria Organizzativa*: PRAGMA Congressi, Pavia*

[2] BSc and MSc students, must have status certification

GRUPPO NAZIONALE DI BIOINGEGNERIA

UNIVERSITÀ DEGLI STUDI DI PADOVA
Cicli di conferenze in Bressanone
Dipartimento di Ingegneria dell'Informazione

DOTTORATI DI RICERCA IN BIOINGEGNERIA
Università di Ancona, Bologna, Firenze, Genova, Napoli, Padova, Pavia, Pisa, Roma "La Sapienza", Roma Tre, Roma Campus Bio-Medico, Trieste,
Politecnici di Milano e Torino
Istituto Italiano di Tecnologia
Scuola Superiore Sant'Anna - Pisa
Istituto Universitario di Scienze Motorie – Roma

XXXIX Annual School

"AI-enabled health care: from decision support to autonomous robots"

September 7 – 10, 2020

AIMS AND OBJECTIVES

Artificial Intelligence (AI) has recently gained a pivotal role among current technologies. The reason for this success rests in the tech environment: the plentiful availability of huge data sets - hence the buzzword Big Data, the evolution of powerful computational architectures and development of flexible and scalable algorithms.

The state-of-the-art AI systems can process language, analyze images, manage multiple heterogeneous signals. Furthermore, AI can derive decision support tools so refined that they sometimes equal or surpass human capabilities, especially when dealing with specific tasks, such as the interpretation of diagnostic images.

This kind of hype and interest around AI, however, may cause over-expectations, misuse and poor assessment of its implementation, which may lead to serious consequences in safety critical contexts, like medicine. A careful, profound and open-minded assessment of AI is strongly needed.

The Italian bioengineering community has studied the application of AI in medicine in depth since the early eighties. Bioengineers successfully exploit AI methods and algorithms to support the full range of its potential applications, ranging from clinical decisions to the implementation of effective bio-robotic solutions. The GNB Bioengineering School aims at providing the fundamentals, state-of-the-art and perspective of AI in medicine, bridging clinical decision support and robotics by showing their full range of application and the problems they share when AI instruments are applied to support health care and life sciences.

Capturing the main aspects and trends of this developing topic and its interdisciplinary elements is of utmost importance for stakeholders of both industry and research.

The School program is designed to take all the above mentioned aspects into careful consideration; tracing a path from the basics, through the building blocks of decision support and AI systems, to real world applications, robotics and ultimately embodied intelligence.

PROGRAM

Sunday September 6th
(Datathon participants only – see DATATHON program)

Monday September 7th

09.00 School opening (R. Bellazzi, C. Laschi, S. Quaglini)

INTRODUCTION AND BASICS

09:15 AI an Healthcare: past, present and future (C. Combi)
10:00 AI in the institutional context (P Giudici, E Raffinetti)
10:45 BREAK
11:00 Knowledge representation and reasoning (F. Chesani)
11:45 BREAK
14:00 A basic glossary of Machine Learning (L. Sacchi)
14:45 From Neural Networks to Deep Learning (S. Ramat)
15:30 BREAK

BUILDING AI MEDICAL SYSTEMS (1)

15.45 Deep Learning for Medical Imaging in the Era of Precision Medicine (V. Bevilacqua)
16:30 DATATHON Presentation (R. Barbieri)

Tuesday September 8th

BUILDING AI MEDICAL SYSTEMS (2)

09:00 Natural language processing methods for clinical text (N. Viani)
09:45 -omics (B. Zupan)
10:30 BREAK
10:45 Building cognitive systems (R. Alexander)
11:30 Opening the Black Box: Explanation and Trust in Medical-Based AI-Systems (A. Tucker)
12:15 BREAK

SUPPORTING DECISIONS

14:00 Decision-making, values and utilities (E Parimbelli)
14:45 Reinforcement learning (V.G. Santucci)
15:30 BREAK

APPLICATIONS

15:45 AI in Diabetes management (M. Vettoretti)
16:30 Towards AI powered chatbots for mental health (M Ottaviano)

Wednesday September 9th

09:00 Connecting the dots – School organizers

FROM ALGORITHMS TO AUTONOMOUS SYSTEMS

09:15 Robotics and the bioengineering of cognitive development: iCub and the quest for cognition (G. Sandini)
10:00 On the origin of human autonomy and sociality: Embodied emergence development and constructivism (Y. Kuniyoshi)
10:45 BREAK
11:00 Neuromorphic sensing and perception (C. Bartolozzi)
11:45 Neurorobotics: Brain-inspired models for robot control (E. Falotico)
12:30 BREAK
14:30 **Award Ceremony** -AMICI DELL'UNIVERSITÀ DI PADOVA, BRESSANONE, FREUNDE DER UNIVERSITÄT PADUA, BRIXEN
17:00 **LECTIO MAGISTRALIS**: Intelligenza artificiale in Medicina – la lezione di Mario Stefanelli a dieci anni dalla sua scomparsa (A. Riva)

Thursday September 10th

09:00 Data-driven Spiking Neural Networks for Neurorobotics (A. Pedrocchi / E. D'Angelo)
09:45 Computer vision in autonomous systems(R Cucchiara)
10:30 Human-Robot Interaction (D. Nardi)
11:15 BREAK
11:30 A functional approach to the regulation of AI (A. Bertolini)
11:45 AI and decision-making: dilemmas of regulation and methodological implications (A. Santosuosso)
12:30 BREAK

DATATHON CHALLENGE

14:30 Report on the activities performed during the week
15:00 DATATHON challenge presentations
16:00 **DATATHON AWARDS**
16:30 Closing (R. Bellazzi, C. Laschi, S. Quaglini)
17:00 **GNB General Assembly**

DATATHON PROGRAM

Sunday September 6th
(for DATATHON participants only)

15.00 – 17:30 DATATHON challenge presentation (R. Barbieri, M. Mollura):

- introducing the working groups
- presentation of the database
- introduction to the developers' platform
- description of the research questions

Monday September 7th
17:00 - 17:30: Q&A participants and organizers
17:30 - 19:00: working session

Tuesday September 8th
17:30 - 18:30: Mid-term presentations with the organizers (5 min for each working group)
18-30: 19:30: Working session

Wednesday September 9th
17:00 - 18:00: Working session (final stage)
18:00 - 19:30: final presentation to the award committee

Thursday September 10th
14:30 - 15:00: report on the activities performed during the week
15:00 - 16:00: final presentations to the School (5 min for each working group)
16:00 DATATHON Awards

MEET THE EXPERTS

Monday September 7th
17:00 - 18:30: Meet the experts day 1

Tuesday September 8th
17:30 - 19:00: Meet the experts day 2

Wednesday September 9th
17:30 - 19:00: Meet the experts day 3

Thursday September 10th
12:30 - 13:30: Meet the experts day 4