

Sano

Computing Technologies for Modern Medicine

The centre is implementing the project: “Centre for New Methods in Computational Diagnostics and Personalised Therapy”. Researchers at Sano’s Centre of Excellence use artificial intelligence, advanced algorithms, computer modelling and simulation, as well as analyse extensive databases to support doctors in the diagnostic and treatment process. The modern computer technologies developed at Sano help to pick the most beneficial treatment for a given patient and accelerate the development of new pharmaceuticals and medical procedures.



Sano – Centre for Computational Personalised Medicine – International Research Foundation (IRAP Plus)



Prof. Marco Viceconti and Marian Bubak, PhD, Eng.



Simulation, in silico medicine, personalised healthcare, decision support, high performance computing (HPC)



To establish a centre for computational medicine with the primary objective of introducing innovative computational-based diagnostic and therapeutic solutions into everyday healthcare practice to improve individualised patient treatment

Computational medicine – the purpose of Sano’s existence – is the combination of medicine and computing, allowing the more effective prevention and the more accurate diagnosis and treatment of diseases, with less side effects – **Marian Bubak, PhD, Eng.**



Quotes

Our project belongs to a branch of research called Virtual Physiological Human, whose aim is to build a computer model of a human being. Medicine is ceasing to be an art based on the experience of generations, and is increasingly moving into a field close to engineering, where it is important to measure patient parameters and predict how the body will behave after a specific treatment procedure has been applied – **Marian Bubak, PhD, Eng.**





Marian Bubak, PhD, Eng. – Chief Scientific Officer of Sano. Graduated in Technical Physics at the AGH University of Science and Technology, where he subsequently obtained a PhD in Computer Science. Alongside conducting research at Sano, he heads the Laboratory of Information Methods in Medicine of the Cyfronet AGH Academic Computer Centre. He is a member of the research and teaching personnel at the Institute of Computer Science, AGH, and Professor (Emeritus) of Distributed Systems Engineering at the Institute of Computer Science, University of Amsterdam. Co-editor of the journals: *FGCS*, *Bio-Algorithms and Med-Systems* as well as *The Computer Science Journal*. He has co-authored about 230 scientific publications and played crucial roles in 15 international research projects of the Framework Programmes of the European Commission. He was involved in the organisation of international conferences: ICCS, EuroPar, CCGrid, eScience.

Prof. Marco Viceconti – hailing from Italy, with a PhD from the University of Florence. He is Professor in Computational Biomechanics at the Department of Industrial Engineering, University of Bologna, Italy, and Visiting Professor at the Department of Mechanical Engineering, University of Sheffield, UK, where he founded the prestigious Insigneo: Institute for In Silico Medicine. He is an expert in the biomechanics of the neuromusculoskeletal system, particularly in the use of physical modelling for medical decision support. Prof. Viceconti is recognised as one of the greatest authorities in the international in silico medicine community. He is the President of the VPH Institute, an international non-profit organisation that coordinates this research community, and board member of the Avicenna Alliance, an organisation representing the interests of the biomedical industry in this area.



Interesting facts

Sano will use the fastest Polish supercomputers located at the Cyfronet AGH Academic Computer Centre in Kraków. The Prometheus currently in place has a computing power of over 50,000 high-end PCs, consists of 15 racks, each of which contains 144 servers and weighs over 30 tonnes. Between 2021 and 2022 a major extension of Cyfronet's computing power is planned, also to benefit Sano.



International partners:

University of Sheffield and Insigneo Institute, Forschungszentrum Jülich, Fraunhofer Institute for Systems and Innovation Research ISI, RWTH Aachen University, Sheffield Teaching Hospital

Polish partners:

Collegium Medicum of the Jagiellonian University and University Hospital in Kraków, Prof. Religa Foundation for Cardiac Surgery Development, AGH University of Science and Technology in Kraków and Cyfronet AGH Academic Computer Centre, LifeScience Kraków Cluster



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