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## Sano Computational Medicine Seminars

Monday, 21 December 2020, 14:00-15:30 (CEST)

Join us via Zoom: <https://seminar.sano.science/>

**Paweł Moskal**

Jagiellonian University, Cracow Poland

## Towards dynamic total-body metabolic and positronium imaging

**Ewa Stępień**

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## Studies of positronium and microvesicles biomarkers

### Abstract

During the positron emission tomography about 40% of positrons annihilations occur through the creation of positronium (an atom composed of an electron from tissue and a positron emitted by a radioisotope). Positronium decays in the patient body are sensitive to the nanostructure and metabolism of the tissues. This phenomenon is not used in the present PET diagnostics, yet it is in principle possible to use environment modified properties of positronium as diagnostic biomarkers for cancer therapy. We developed a method of positronium lifetime imaging in which the lifetime and position of positronium atoms is determined on an event-by-event basis. Presentation will be divided into two parts. In the first one, the method of positronium imaging and the pilot positronium images obtained with the J-PET detector (a first PET based on plastic scintillators) will be reported. The second part will concern preliminary results of the preclinical studies of positronium properties in cancerous and healthy tissues operated from the patients as well as in the freeze-dried and alive healthy skin cells and cancer skin cells in the 2D and 3D cultures.

**Prof. Paweł Moskal** is an inventor of positron emission tomography based on plastic scintillators and method of in-vivo pathology based on positronium imaging. He is Professor of physics and the head of the Cluster of Nuclear Physics Departments as well as the head of the Department of Particle Physics and Applications at the Jagiellonian University, and serves as a Member of the Committee on Medical Physics, Radiobiology and X-Ray Imaging, Polish Academy of Sciences.

**Prof. Ewa Stępień** is the head of the Medical Physics Department at the Jagiellonian University and serves as a president of the Experimental Cardiology section of Polish Society of Cardiology (PTK) and a member of the Committee of Physiological and Pharmaceutical Sciences of Polish Academy of Sciences. She received the 2nd award from the Polish Ministry of Health and Social Security named "Evidence Based Medicine in practice".