
Pianoforte travel grant activity report

Training course “BioModR-Breast” - Italy

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I am pleased to share my activity during the training course “BioModR-Breast” organized by and held at the University of Pavia, Italy. This course focused on building models in biomedical physics and radiation protection, specifically to improve breast cancer diagnosis and optimize treatment approaches. Extensive discussions were held on the need to deepen our understanding of breast cancer's underlying pathophysiology and the urge to further develop techniques to detect tumors at very early stages. Participants in the course were from a wide range of scientific backgrounds, including physicists, biologists, medical engineers, and lab technicians. This diverse audience made the discussions even more engaging and insightful.

The course started with lectures on the basics of breast cancer, such as types, subtypes, risk factors, etc., Although this session might not have included new knowledge, it helped me refresh my knowledge of basic biology. Later, the concept of the Organ on a Chip was introduced. Here, it was interesting to know about these miniature systems that could have the ability to replicate a whole organ. However, the requirements and challenges presented by Dr. Fachet made it clear that it is far more complicated than how fancy it sounds. We were also introduced to Boron Neutron Capture Therapy (BNCT) and had the opportunity to visit the only and last operating nuclear reactor for medical purposes in Italy. This visit was extremely engaging, linking the theory in the morning session to practice in the afternoon. Similarly, we had the chance to visit the laboratory for in vitro cell systems, and we were able to work with our hands with cells; always interesting! Other aspects of breast cancer diagnosis and treatment optimization were covered as well. The practical session on Geant4 simulations was quite heavy yet eye-opening. Simulating and visualizing how particles propagate in and interact with matter is a powerful tool to do a lot before even starting any real experiment.

At the end of the course, I gave a 10-minute presentation on lessons learned and links to my current research area. This was interactive as other participants had to present as well, so I got to know what projects they are working on. I believe it was a great chance from both scientific and social aspects. I got to connect with researchers from different institutes and even establish some collaborations. I would like to thank PIANOFORTE for this rewarding opportunity that widened my horizon in the field of breast cancer models.