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Seminar

Elemental measurements in nail clippings using X-ray techniques

Prof. David Fleming

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Short Bio David Fleming is a Professor in the Physics Department at Mount Allison University in the province of New Brunswick, Canada. He is currently the Secretary of the International Society for Trace Element Research in Humans. He has recently served as External Examiner with the Institute of Nuclear Science and Technology at the University of Nairobi.

Abstract The analysis of human nail clippings to determine the concentration of certain elements of interest is common. Results can be used to assess exposure to various elements and their absorption into the body. When nail clippings are used as a biomarker in this way, they are typically analyzed by a method such as inductively coupled plasma-mass spectrometry or instrumental neutron activation analysis. Our group has explored the use of X-ray techniques to assess elements within human nail clippings. This talk will examine two such approaches involving nail clippings, ranging from the use of very large equipment (synchrotron applications) to very small equipment (a portable X-ray fluorescence system). Synchrotron measurements at the Canadian Light Source were used with X-ray fluorescence to explore the distribution of arsenic in nail clippings from a small number of study participants. Synchrotron-based X-ray absorption spectroscopy was then used to explore the arsenic speciation within the nails of different individuals. Using a compact and portable X-ray fluorescence technique, we have also explored the potential for rapid and low-cost elemental analysis from a single nail clipping. I will report on results from single nail clippings from 60 individuals living in Atlantic Canada. Samples were obtained through the Atlantic PATH initiative, part of the Canadian Partnership for Tomorrow's Health. Results of the analysis of characteristic X-rays from zinc and arsenic will be provided, and compared to concentrations determined from a "gold standard" technique.

Thursday
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Aula A2 Edificio
Polifunzionale

Organizer: Prof.ssa Laura Borgese, Dipartimento di Ingegneria Meccanica e Industriale