Department of Electrical and Computer Engineering
Materials Engineering Program
Center for Integrated Bio and Nano Systems
10:30 a.m., November 13, 2020
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X-Ray Photoelectron Spectroscopy

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Abstract: In this webinar, we will comprehensively discuss this powerful technique for surface analysis. Our journey will start from quantum mechanics and will end discussing XPS applications in fields such as Egiptology. We will at first highlight the physical mechanisms on which the technique is based and how such mechanisms are exploited in XPS. The parts of the XPS apparatuses and their scopes are discussed next, with a due focus on their limitations. In addition to the standard technique we will discuss improvements such as the depth profiling and the tilted angle XPS apparatuses. A number of slides will be devoted to data analysis as the background subtraction as well as the peak fitting are critical issues to extract appropriate quantitative information from XPS spectra. A few examples of XPS use in various fields will complete the talk.

Short Bio: He graduated in Nuclear Engineering and was awarded a PhD in Physics. He is currently associate professor in Solid State Physics at the Department of Applied Science and Technology of Politecnico in Turin (Italy) and adjunct professor at OntarioTechU in Oshawa (Canada). He is Chair of the Education Committee of IUVSTA and member of the editorial board of a number of international journals as well as coeditor of a few books on carbon materials and their applications. He has published more than 190 papers on international journals.

He is head of the research team "Carbon group" of Politecnico (www.polito.it/carbongroup/) that focuses its activity on environmental friendly carbon materials and photocatalytic oxides. Carbon Group is actively working on materials such as biochar, developing new techniques for its analysis as well as testing it in innovative applications. His expertise includes experimental techniques (ESR, XPS, UV-Vis spectroscopy, IR spectroscopy, …) and their data analysis, the

most recent achievement being the introduction of the new mixed Gaussian-Lorentzian lineshape in the analysis of Raman spectra of disordered carbon based materials. His work however includes also application such as sensors, biosensors and composite materials (both polymer-based and cement-based). He also works in collaboration with other research groups worldwide (University of Houston, University of Miami) to investigate nanostructured carbon materials.Bismuth-based oxide are the photocatalytic systems he focused his activity, achieving innovative results in the treatment of polluted water and in sensing of biomolecules and drugs.

Please contact Dr. Francisco Robles Hernandez <fcrobles@Central.UH.EDU> or Jiming Bao (jbao@uh.edu) if you want to meet with the speaker.