

Quinta-Feira, 20 de Julho às 16h
Sala EC1:01 Escola de Ciências Campus de
Azurem

In-situ measurements of adaptive tribological coatings

**Prof. Christopher Muratore, University of Dayton,
Ohio, USA**



Resumo: In the early 1940s, military pilots and those who serviced their planes were surprised by serious problems with ignition systems and diverse electrical troubles in their state of the art aircraft designed for high altitude flight. Critical graphite parts in these systems were wearing out about 1000 times faster than expected. The solution to this problem was first documented in an article published in 1944, where the authors demonstrated that graphite, with its layered atomic structure and weak van der Waals bonds between atomic planes was not a lubricating solid on its own, but rather, demonstrated strong environmental sensitivity. The authors of that article indicated that finding a material that would work as a brush throughout this extreme range of altitudes was an important challenge for the future of aerospace.

Over 70 years later, the sensitivity of materials at contact interfaces subjected to extreme ambient conditions still limiting aerospace capability. This is primarily due to the challenge of correlating measurements of structure and composition using analytical equipment to the actual structure and composition of the surface during use in the actual ambient conditions of interest. I will talk about novel techniques to examine the mechanical response of contact interfaces in extreme environments in situ, and show how we have used these techniques to develop environmentally adaptive materials to overcome decades-old aerospace tribology challenges.