

CSDS 500 and ECSE 500 Spring 2021 Colloquium

11:30AM to 12:30PM
Tuesday, April 20, 2021

Zoom Webinar ID: 998 2943 6376
Passcode: 357363

“Control Co-Design: The ARPA-E ATLANTIS and SHARKS Programs”

Abstract: Over the last few decades, control engineers have focused on developing innovative control theories and algorithms to regulate systems. These control efforts are usually at the last stage of a sequential strategy that allows engineering departments to work independently and consecutively towards the design of new products and systems. Control algorithms are usually developed at the end of that sequential process, once the mechanical, electrical and other sub-systems are completely defined. This presentation discusses a different approach, named *Control Co-Design* (CCD). Following a concurrent engineering strategy that considers multidisciplinary sub-system interactions from the beginning of the design process, CCD applies control concepts to design the entire system and reach optimal solutions that are not achievable otherwise. This approach is a *game-changer* for the *control engineer*, who will be not only the designer of advanced control algorithms, but also the natural leader of the design of new products and systems. During this presentation we will also review the new ATLANTIS and SHARKS Programs on floating offshore wind turbines and tidal energy converters respectively, proposed and developed by the speaker at ARPA-E (US DOE) following CCD methodologies.



Mario Garcia-Sanz
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Bio: Since January 2018, Prof. Mario Garcia-Sanz serves as Program Director at ARPA-E, with the U.S. Department of Energy in Washington DC. In 2009, he came to CWRU as the Inaugural Maltz Professor in Energy Innovation. Previously he has straddled academia and industry, having held appointments at the University of Manchester, Oxford University, NASA Jet Propulsion Laboratory, the European Space Agency, the Public University of Navarra, TECNUN and CEIT research center. He is an expert in control systems, and a veteran of the European wind energy industry. He worked as a Senior Advisor for many European wind energy companies, electrical utilities, and corporations, and holds many patents, published hundreds of research papers, and written several books. He has been the principal investigator of over 50 industry research projects. At ARPA-E he proposed and developed the ATLANTIS Program on floating offshore wind turbines, the SHARKS Program on tidal and riverine energy converters, and is leading the efforts on grid technology with the NODES Program and microgrid research.

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