

## EEE Research Seminar

Date: October 5, 2021 at 10:30 AM

Location: POTR 234 (Fu Room)

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## A New Environmentally Safe Technology for Decommissioning of Oil Wells: A Contribution to the Phase out of an Oil Based Economy

### Abstract

Global change from carbon-based to carbon-free economy has driven the development of several innovative technologies. At the same time, abandonment of old generation plants and pollutant processes in energy production demand much effort from companies due to the undesirable environmental damage left behind, which must be mitigated for avoiding additional harm to local communities and their future generations. In the case of oil and natural gas extraction, oils reservoirs are found on and offshore, and after the field has become mature, or say, after there is no more economical advantage in continuing exploration, the wells must be permanently plugged, retaining their natural state prior to the drilling process. In general, cement is used to close the wellbore but such technologies bear an extremely high cost and are yet to be proven reliable and effective on the long term. This project will evaluate a new potential game -change technology where burning a compound known as “thermite” is used to melt the casing, cement and rock forming an impermeable plug within the wellbore.

### Bio

Prof. de Lemos obtained his Bachelor and MSc degrees in Mechanical Engineering from the Pontifical Catholic University of Rio de Janeiro (PUC-RJ) in 1977 and 1979, respectively. In early 1983, he obtained his PhD degree from Purdue University, USA. He spent a year as Assistant Professor at PUC-RJ in 1984, followed by two years as Resident Associate at Argonne National Laboratory, Illinois. In 1986, he joined the Aeronautical Institute of Technology -ITA in São José dos Campos, Brazil. He is Full Professor at ITA, founder and head of the Computational Transport Phenomena Laboratory -LCFT and the newly established Competence Center for Energy – CCE. He also serves as Head of the Department of Energy since 2010. From 1991 to 1992, he was Visiting Scholar at Ruhr-Universität-Bochum, Germany. In early 1992, he became Member of the American Society of Mechanical Engineers -ASME and in 2009 he was promoted to the *Fellow* grade. He is also *Fellow* of the Royal Aeronautical Society (UK) and *Associate Fellow* of the AIAA. He has advised 12 PhD and 31 MSc students. Prof. de Lemos has set a new mathematical framework for novel treatment of turbulent flow, heat, and mass transfer through permeable media. On the overall, he has published more than 450 articles in conference proceedings and journals in addition to nine book chapters and five books. He has coordinated several joint research projects with DLR and Uni-Erlangen, Germany, and has delivered seminar lectures in Brazil, USA, Portugal, Tunis, Lebanon, Italy, France, Germany, South Korea, Romania, UAE, Japan and China. He is Consultant to Brazilian Education Ministry (CAPES), Brazilian National Research Council (CNPq) and São Paulo State Research Foundation (FAPESP). Prof. de Lemos’ research interests involve computational thermo-fluid dynamics, transport phenomena, porous media, thermal engineering, aerodynamics, gas turbines, advanced fossil and renewable energy systems (wind, solar, biomass), high performance computing, turbulent reactive flow, computational mathematics, combustion dynamics, modeling and simulation of thermochemical systems, fuel cells, gasification processes and CO<sub>2</sub> capture and storage technologies.