



THURSDAY, OCTOBER 8 2:00-2:50 PM

ME Research Seminar



Hot and Cold Plasmas: A Journey From Analytical Instrumentation to Therapeutics

DR. PRASOON DIWAKAR
SOUTH DAKOTA MINES

Dr. Diwakar joined South Dakota Mines in Fall 2018 where he is teaching thermal science courses and conducting research in the field of laser diagnostics, spectroscopy, LIBS, cold plasma for biomedical applications, STEM Education and other related research areas. He completed undergrad studies in ME at the Indian Institute of Technology, Kanpur. Dr. Diwakar then earned a M.S. and Ph.D. in Mechanical Engineering at the University of Florida with Dr. David Hahn. He worked on projects including combustion and Laser Induced Breakdown Spectroscopy (LIBS) and other analytical techniques. His PhD focused on understanding plasma-particle interactions with regards to understanding fundamentals of LIBS for qualitative analysis of aerosols. Dr. Diwakar then joined the National Institute for Occupational Safety and Health as a National Research Council postdoc working on aerosol instrumentation development. He then worked as a research associate at the Center for Materials under Extreme Environment (CMUXE) at Purdue where his research focused on understanding fundamentals of ultrafast laser ablation processes and their implications on various analytical techniques including LA-ICPMS and LIBS.

Talk abstract

Laser produced plasma (thermal plasmas) play a central role in various analytical methods and techniques for chemical analysis and microanalysis including Laser-induced Breakdown Spectroscopy (LIBS), Laser Ablation-inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS), Pulsed Laser Deposition (PLD), Extreme Ultraviolet Lithography (EUV) and laser spectroscopy. For laser-produced plasma based techniques to emerge as efficient and accurate quantitative analytical techniques, understanding of fundamental processes involved in laser-material interaction, plasma formation, plume expansion and plasma-material interaction is very important along with novel data analytics including statistical analysis and machine learning. This talk will emphasize on recent research in each of these aspects of laser produced plasma (thermal plasmas) in the context of applications ranging from ambient air monitoring to mining applications to nuclear material applications. In addition to thermal plasmas, cold atmospheric plasmas is another category of plasmas which has applications in the field of plasma medicine. Several unique and novel applications of cold plasmas in conjunction are presented with biomedical applications including cancer and diabetes therapeutics. Novel interdisciplinary instrumentations and concepts will be presented showcasing combination of lasers, thermal plasma, cold plasmas for a range of applications.

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in-person: CM 266 (capacity 16)
Live Zoom! LINK: tiny.cc/MinesF20