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COLBURN LAB
ROOM 102**

MODEL-BASED FEEDBACK CONTROL OF ATMOSPHERIC PRESSURE PLASMA JETS FOR PLASMA MEDICINE

ABSTRACT

Atmospheric pressure plasma jets (APPJs) have widespread use in materials processing and biomedical applications. Safe and effective operation of hand-held APPJs is however highly sensitive to the intrinsic variability of plasma characteristics as well as to exogenous disturbances such as variations in the separation distance between the device tip and target surface. Key challenges in feedback control of APPJs arise from the need to: (i) handle the nonlinear, multivariable nature of plasma dynamics, (ii) retain the system operation in a constrained region for safe and reliable operation, and (iii) realize multiple (possibly conflicting) plasma dose delivery objectives. In this talk, we will demonstrate the importance of using model-based control strategies for safe, reproducible, and therapeutically effective application of APPJs for dose delivery in plasma medicine.

BIOGRAPHY

Ali Mesbah is Assistant Professor of Chemical and Biomolecular Engineering at the University of California at Berkeley. Before joining UC Berkeley, he was a senior postdoctoral associate at MIT. He holds a Ph.D. degree in systems and control from Delft University of Technology. He is a senior member of the IEEE Control Systems Society and AIChE. He is on the IEEE Control Systems Society conference editorial board as well as the editorial board of IEEE Transactions on Radiation and Plasma Medical Sciences. He is the recipient of the AIChE's 35 Under 35 Award in 2017, the IEEE Control Systems Outstanding Paper Award in 2017, and the AIChE CAST W. David Smith, Jr. Graduation Publication Award in 2015. His research interests are in the areas of optimization-based systems analysis, fault diagnosis, and predictive control of uncertain systems.

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