MECHANICAL AND AEROSPACE ENGINEERING GRADUATE SEMINAR

Extracting Dominant Spatiotemporal Structures in Complex Flows

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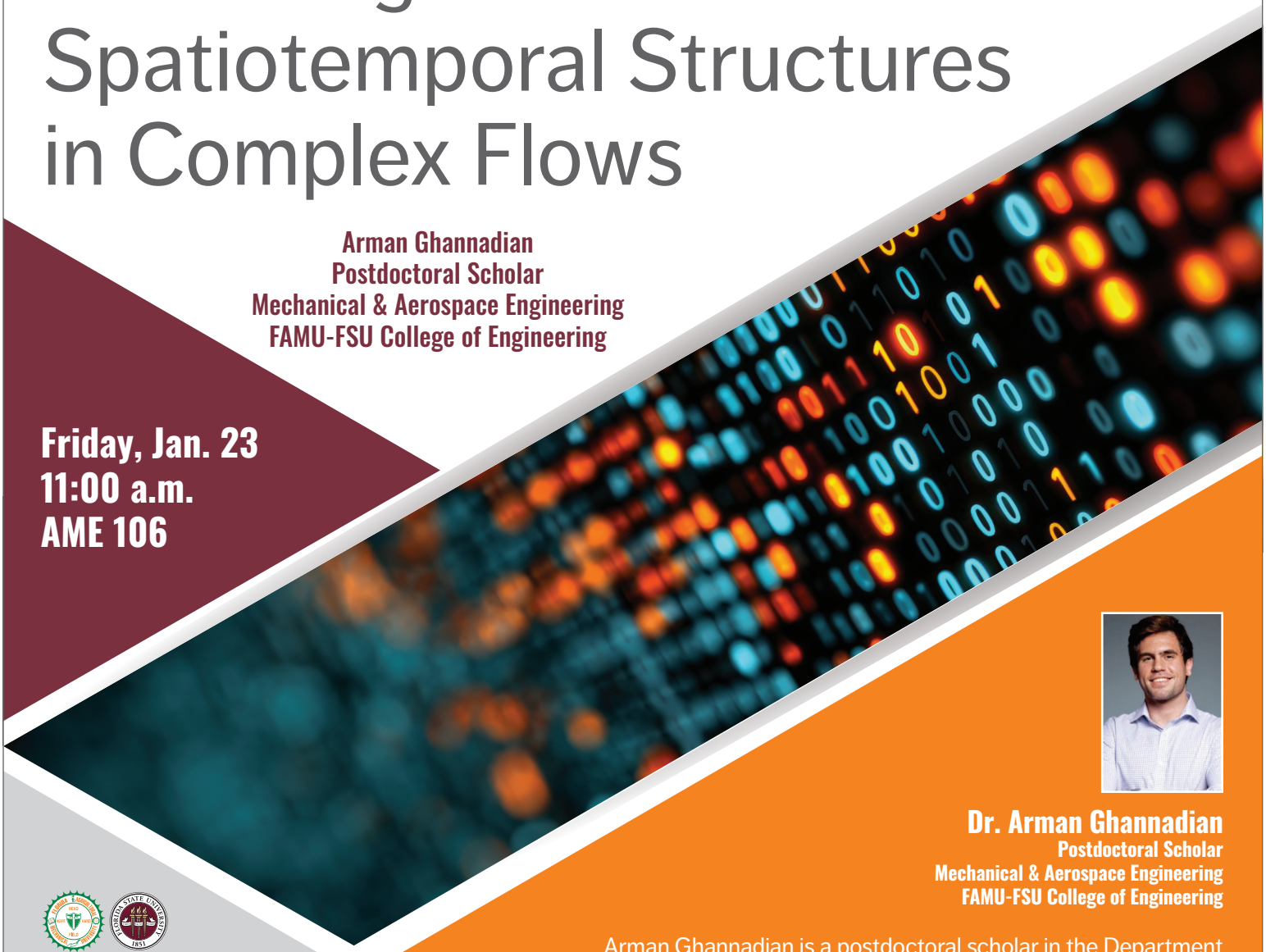
AME 106



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Arman Ghannadian is a postdoctoral scholar in the Department of Mechanical & Aerospace Engineering at the FAMU-FSU College of Engineering. Prior to this, he earned his PhD in Aerospace Engineering at the University of Florida. His research interests include understanding the behavior of unsteady and turbulent flows and their control.

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MAE Graduate Seminar Committee

Complex flow fields require detailed knowledge of the underlying dynamics for eventual control. Modal analysis techniques allow for studying the dominant unsteady spatiotemporal patterns in these flows, providing insight into the system's dynamics and helping assess the effectiveness of imposed control. The focus of this work is on data-driven methods based on dynamic mode decomposition (DMD) for flow assessment. The limitations of the DMD are discussed, along with several extensions to overcome them. Applications to several problems, including experimental schlieren and numerical simulations of boundary-layer transition control at Mach 0.5, will be presented.