

The FAU-SIAM student chapter invites you to a talk by

## Chris Jones, Ph.D.

RENCI, University of North Carolina at Chapel Hill



### Rate-Induced Tipping and Climate

Thursday, February 11th, 2021 at 11:00am EST

Open to all

Live on [Zoom](#) (Meeting ID: 829 1824 9336, passcode: Spring2021)

#### Abstract

Rate-induced tipping occurs when a parameter in the system is changed rapidly enough to destabilize a state that would be attracting with frozen, or slowly changing, parameter values. Results on when this can and cannot occur are well known for scalar equations, but many questions are open for systems of equations due to the higher dimensional phase space. I will give some basic criteria that work for classes of systems that have interest in applications. In particular, a rather neat result holds for monotone systems. I will discuss what this implies for some physical systems arising from climate studies, including a layered radiative atmosphere system and a hurricane model introduced recently by Emmanuel. In the latter example, there are some suggestive implications as to what it would take to trigger or kill a hurricane.

#### About the speaker

Christopher K.R.T. Jones is currently a domain scientist in the Renaissance Computing Institute at the University of North Carolina at Chapel Hill. He received his Ph.D. in Mathematics from the University of Wisconsin-Madison in 1979, and, prior to being Bill Guthridge Distinguished Professor of Mathematics at UNC, he was a Professor of Applied Mathematics at Brown for thirteen years. The main thrust of his research is the use of dynamical systems as a tool for solving problems that originate in applications; in particular, the use of dynamical systems methods in the study of nonlinear wave motion in neuroscience and optics, ocean dynamics and, more recently, climate. His recent work has included contributions to the area of Data Assimilation, with a particular focus on assimilating data in ocean and sea-ice models. He is currently Director of the Mathematics and Climate Research Network. He is a Fellow of the Society of Industrial and Applied Mathematics and won the inaugural prize of the SIAM Activity Group on the Mathematics for Planet Earth in 2020.

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