

UNIVERSITY OF CRETE  
DEPARTMENTS OF MATHEMATICS AND APPLIED MATHEMATICS

APPLIED MATHEMATICS SEMINAR

6:00pm, Thursday, 8 April 2021  
<https://zoom.us/j/94582403251>

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*Complex systems: From metamaterials to biological neurons*

The interplay between nonlinearity and structure is at the center of research on complex systems. In ensembles of coupled oscillators, the synergy between topological features and the underlying dynamics may lead to interesting self-organized phenomena. I will present two types of systems that are capable of exhibiting such complex dynamics: a superconducting metamaterial, i.e. an artificially structured medium which shows extraordinary electromagnetic properties, and a modular network of biological neurons, inspired by the *C.elegans* connectome. I will talk about the emergent collective behavior observed in these systems with emphasis on chimera states, a counter-intuitive symmetry breaking phenomenon of partial synchronization. Finally, I will briefly talk about recent collaborative work on the forecasting capability of Long Short-Term Memory (LSTM) and reservoir computing (RC) recurrent neural networks, of the presented spatio-temporal dynamics.