

DEPARTMENT OF MECHANICAL ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“DYNAMICS OF LARGE ARRAY MICRO/NANO RESONATORS”

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University of Akron

Abstract: This work describes an analytical framework suitable for the analysis of large-scale arrays of coupled resonators, including those which feature amplitude and phase dynamics, inherent element-level parameter variation, nonlinearity, and/or noise. This analysis allows for the consideration of coupled systems in which the number of individual resonators is large, extending as far as the continuum limit corresponding to an infinite number of resonators. Moreover, this framework permits analytical predictions for the amplitude and phase dynamics of such systems. The utility of this analytical methodology is explored through the analysis of a system of N non-identical resonators with global coupling, including both reactive and dissipative components, physically motivated by an electromagnetically transduced micro-resonator array. The behavior of an array of resonators can be described using two self-consistency variables and a force, which not only includes the external excitation but also due to the reactive and dissipative coupling parameters, this is called a global coupling function. Two different bifurcations resulting from the variation of coupling parameters have been identified, which explains the underlying phenomenon that leads to multiple-equilibrium distributions.

Bio: Dr. Chaitanya Borra is a senior lecturer in the Mechanical Engineering Department at University of Akron (UA), involved with teaching and developing undergraduate courses. He received his Ph.D. in Mechanical Engineering from UA, in May 2020. He has 4+ years of industrial experience, working in automotive (Mahindra) and aerospace industries (General Electric) in India, where he worked as a CAE engineer involved in product development and finite element analysis. His research interests include Large array MEMS resonators, non-linear vibrations and Continuum mechanics.

Date: Feb 26, Friday

Time: 3-4 pm (CST); 4-5pm (EST)

Place: <https://uky.zoom.us/j/83008957257?pwd=MmVWeW9MODBJaW1HZXpPaEkzSko2Zz09>

Attendance open to all interested persons



Paducah Engineering Seminar Series

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