

UNIVERSITY OF MIAMI

THE DR. JOHN T. MACDONALD FOUNDATION  
BIOMEDICAL NANOTECHNOLOGY INSTITUTE  
BioNIUM



# BioNIUM

## Lecture Series



**DR. VIVEK PRAKASH PRESENTS:**

## Fascinating flows and emergent mechanics in simple marine animals

**Wednesday, April 21, 2021 @ 3:30 PM**

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MEETING ID: 992 0648 4499  
PASSCODE: 044465

## ABOUT THE LECTURE

Animals are characterized by their movement, and their tissues are continuously subjected to dynamic force loading. Tissue mechanics determines the ecological niches that can be endured by a living organism. In the first part of my talk, I will present our surprising discovery of motility-induced tissue fractures and healing in a simple, early divergent marine animal - the *Trichoplax adhaerens*. I will demonstrate how fracture mechanics governs dramatic shape changes and asexual reproduction in this animal. Next, I will show fascinating bilateral cellular flows during early chick embryo development, and reveal their key role in establishing the embryonic symmetry axis. In the second part of my talk, I will focus on the role of fluid mechanics in marine invertebrates. In starfish larvae, we discovered that ciliary arrays give rise to a beautiful pattern of slowly evolving vortices which determine a physical tradeoff between feeding and swimming.

## ABOUT THE SPEAKER

Prof. Vivek Prakash is an Assistant Professor in the Department of Physics, and a secondary faculty in the Departments of Biology, and Marine Biology and Ecology at the University of Miami. His research at the interface of Physics, Engineering and Biology, is driven by a sense of curiosity, fascination and discovery. Previously, he carried out postdoctoral research in Biomechanics at Stanford University. He is the recipient of several awards such as the APS-DFD Milton van Dyke award, NSF Vizzies challenge award, and the Nikon Small World in Motion competition prize. His graduate research training is in experimental fluid dynamics, and he received his Ph.D. in Applied Physics at the University of Twente, The Netherlands. He obtained his master's and undergraduate degrees in Engineering Mechanics and Mechanical Engineering in India. For more information, please visit: [www.marinebiophysics.org](http://www.marinebiophysics.org)