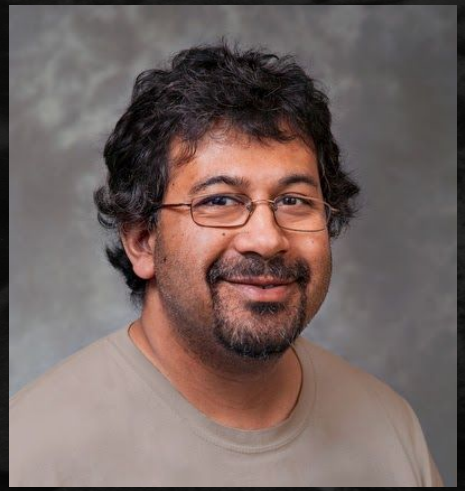
BALL STATE UNIVERSITY

The Mathematical Laws of Morphology and Biomechanics

PURDUE FORT WAYNE

Tuesday 16th November 2021 noon EDT

Virtual Presentation: https://purdue.webex.com/meet/aselvite



Prof. Sayan Mukherjee

Duke University

Departments of Statistical Science, Mathematics, and Computer Science

Modeling shapes and fields: a sheaf theoretic perspective

We will consider modeling shapes and fields via topological and lifted-topological transforms. Specifically, we show how the Euler Characteristic Transform and the Lifted Euler Characteristic Transform can be used in practice for statistical analysis of shape and field data. The Lifted Euler Characteristic is an alternative to the. Euler calculus developed by Ghrist and Baryshnikov for real valued functions. We also state a moduli space of shapes for which we can provide a complexity metric for the shapes. We also provide a sheaf theoretic construction of shape space that does not require diffeomorphisms or correspondence. A direct result of this sheaf theoretic construction is that in three dimensions for meshes, 0-dimensional homology is enough to characterize the shape.

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