BIOENGINEERING
Faculty Candidate Seminar

Date: **Thursday, February 11, 2021**
Time: **12:00 pm - 1:00pm**
Location: **Virtual**

Join Zoom Meeting:
Meeting ID: 988 0549 4005 Passcode: 454698

Evelyn Tang, Ph.D.

Biography:

Evelyn Tang is a group leader in the Living Matter Physics department at the Max Planck Institute for Dynamics and Self-Organization. As a theoretical physicist engaged in the study of living matter, her goal is to understand why biological function remains so robust despite stochasticity and fluctuations on the microscopic scale. This research draws on her training in many-body physics, statistical mechanics, and novel phases of matter. Current interests include the study of global cycles and synchronization, optimal learning, and information in fluid flows.

Evelyn was previously an Africk Postdoctoral Fellow at the University of Pennsylvania, focusing on cognition and brain development in the group of Dani Bassett. In 2015, she received her PhD in Physics from the Massachusetts Institute of Technology, where she worked with Xiao-Gang Wen on topological phases in quantum electronic systems. She holds an MPhil from the University of Cambridge (where she was a Gates scholar) and a BS from Yale University.

Title:

Predicting robust function in living systems using topology and geometry

Abstract:

I study how robust functions such as learning and global cycles emerge in complex biological systems. A fundamental cognitive process is to map value and identity onto the objects we learn about; however, the shape of this map is not well understood. I analyze the geometric organization of neural responses as reflected in functional MRI, to show that quick learners have a higher dimensional representation and hence more easily distinguishable whole-brain responses to objects of different value. Furthermore, quick learners display a greater efficiency of cognitive coding. If time permits, I will also discuss ongoing work on stochastic networks at the molecular scale that support chiral edge currents in reaction space. As these emergent edge currents are associated to macroscopic timescales and length scales, simply tuning a small number of parameters enables varied dynamical phenomena including a global clock, stochastic growth and shrinkage, and synchronization.