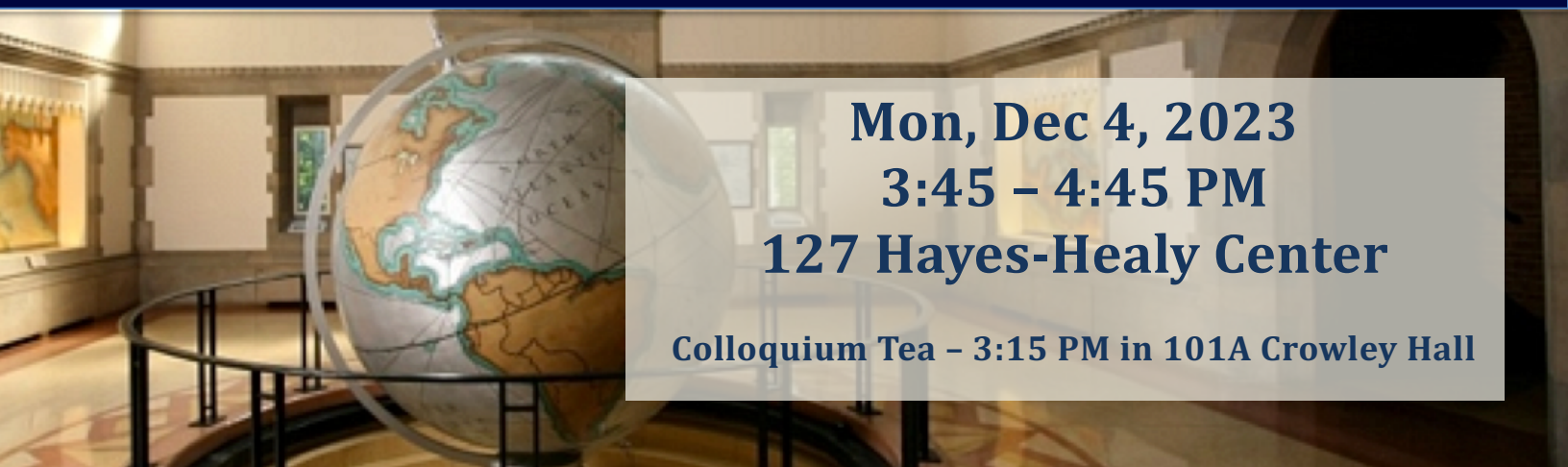
# Department of Applied and Computational Mathematics and Statistics Colloquium

## Megan Morrison

Courant Institute

### *Foraging and decision-making in C. elegans: a biophysical and data-driven model of neural network dynamics*

*C. elegans* produce many behaviors, such as foraging, by switching between forward and reversal states with turns ending reversals. While experimentalists have identified subsets of neurons that drive forward and reversal states, these premotor neurons are highly integrated into a larger network whose collective dynamics ultimately determine which behaviors are sustained and terminated. Analyzing collective network dynamics presents a major challenge in *C. elegans* and other biological networks where a subsystem of interest is embedded in a complex larger system. In this talk, I will introduce a dynamical systems model of the *C. elegans* neural network that is amenable to analysis and treats subnetworks relevant to behavior as perturbed holistic components. Our model elucidates how nonlinear intrinsic dynamics in conjunction with connectivity structure may produce stochastic switching activity underlying foraging behavior and highlights different roles for gap junctions and synaptic connections.



**Mon, Dec 4, 2023**
**3:45 – 4:45 PM**
**127 Hayes-Healy Center**

**Colloquium Tea – 3:15 PM in 101A Crowley Hall**