Department of Applied and Computational Mathematics and Statistics Colloquium

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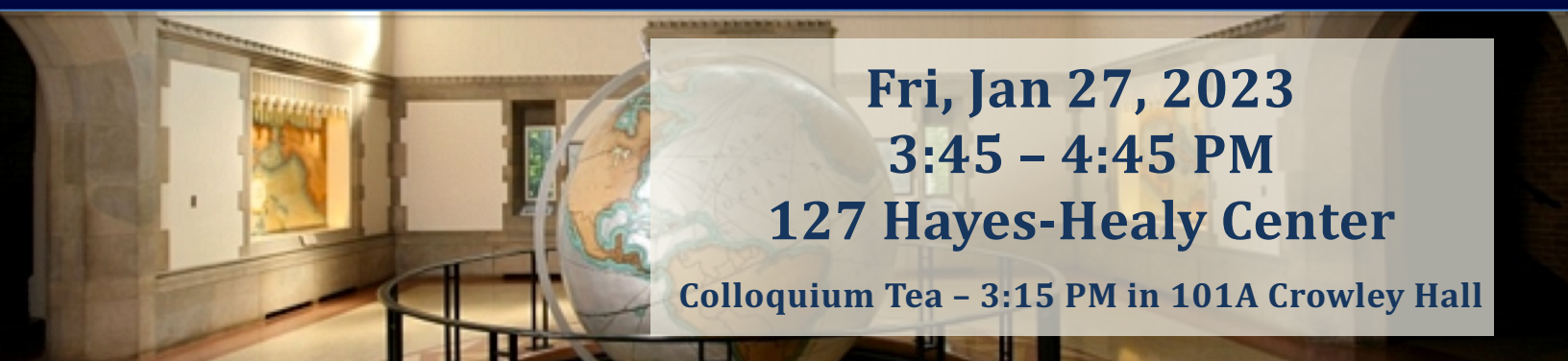
Leveraging computational modeling to understand biomedical diseases

Computational and mathematical modeling have become critical tools to understand biomedical disease progression and predict effective treatments. In this talk, I will introduce two recently developed modeling approaches for biomedical diseases, one is pathophysiology-driven modeling, and the other is data-driven modeling. The former is used when the pathophysiology of such a disease is well known. As an example, a mathematical model of atherosclerosis, based on this modeling approach, provides a personalized cardiovascular risk by solving a free boundary problem. Some interesting mathematical problems are also introduced by this new model to help us understand cardiovascular risk. The second modeling approach is used to learn the mathematical model based on clinical data when the pathophysiology of a particular disease is not well understood. I will use Alzheimer's disease as an example to illustrate the idea of this modeling approach and apply it to personalized treatment studies of aducanumab, a recently FDA-approved Alzheimer's medication.



Fri, Jan 27, 2023
3:45 – 4:45 PM
127 Hayes-Healy Center

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