



Department of  
Mathematical Sciences

# Colloquium

## Professor Ami Radunskaya

### Professor of Mathematics

## Pomona College

Friday,  
September 23, 2022  
@ 2:00pm

EMS Building, E495



**Professor Ami  
Radunskaya**

UW-Milwaukee  
Department of  
Mathematical Sciences

EMS Building, Room E403  
3200 North Cramer Street  
Milwaukee, Wisconsin  
53211  
414-229-4836

## Mathematical challenges in triggered drug delivery: getting the right dose to the right place at the right time.

The brain tissue is protected by the blood-brain barrier: a wall of tightly-packed cells that keep unwanted molecules from crossing from the blood vessels into the tissue. This presents challenges to delivering therapeutic drugs to locations in the brain to treat certain diseases. One approach to meeting this challenge is to encapsulate the drugs in sono-sensitive nano-carriers. These vesicles can then be made to release their cargo locally using focused ultra-sound beams at intensities that are not damaging to the surrounding tissue. Mathematical problems come up when trying to answer questions such as: what is the best positioning for an array of ultrasound transducers in order to produce the required signal at the right spot in the brain? What ultrasound parameters and dosages produce the desired drug profile at the target region?

In this talk I will discuss the specific mathematical challenges, as well as some approaches to their solution. No background in physiology or ultrasound technology will be assumed.

This is joint work with Peter Hinow (UWM), John Reynolds (U Otago), Paul Harris (Callahan Innovations), Stanley Su and Ruth Gale (Pomona College).

**Refreshments will be served in EMS E495 following this event.**



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