# Partial Differential Equations - Homework Day 2

**Professor:**
Dr. Joanna Bieri
joanna_bieri@redlands.edu

**Homework**

1. *Farlow* - Do all problems at the end of Lessons 2 and 3.
2. *Additional Problem 1* - Imagine we are setting up an experiment where we have a one dimensional laterally insulated rod of length $L$ that is initially heated to $T = 100$ degrees Fahrenheit. It is kept at the constant $T = 100$ degrees on one end and placed in an cold bath at the other end, where the liquid is kept at $T = 33$ degrees Fahrenheit. There is no internal heat source and no convection. Write down the PDE that describes this system. Draw plots of the temperature profile $T$ as a function of $x$ at different set times, starting with $t = 0$, then for a few moments after the experiment starts, and finally the long term solution.
3. *Additional Problem 2* - Write down a PDE that describes some sort of heat flow in your everyday life. It might be in multiple space dimensions or in spherical or cylindrical coordinates, this is okay just look up how to write the Laplacian ($\nabla^2 T$) in different coordinate systems. Make sure you include information about all of the boundaries and describe the system in words. Is there convection or an internal heat source? Also don't forget to define all your variables.

**Read and Take Notes**
**(prep for next class)**

1. *Farlow* - Lessons 5
2. **Submit your class prep notes on Canvas.**

**Other Notes:**

1. Make sure to be reading ahead of the class and taking notes! You should submit what you have before class. These don't have to be perfect.