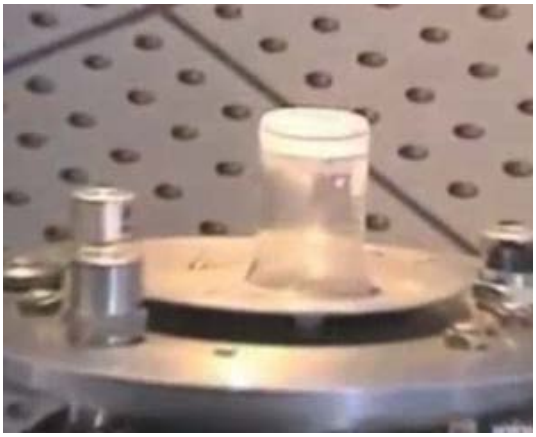
11 January 2019
To: ChE 312 Class
From: Professors Koretsky and Goulas
Subject: Homework #2

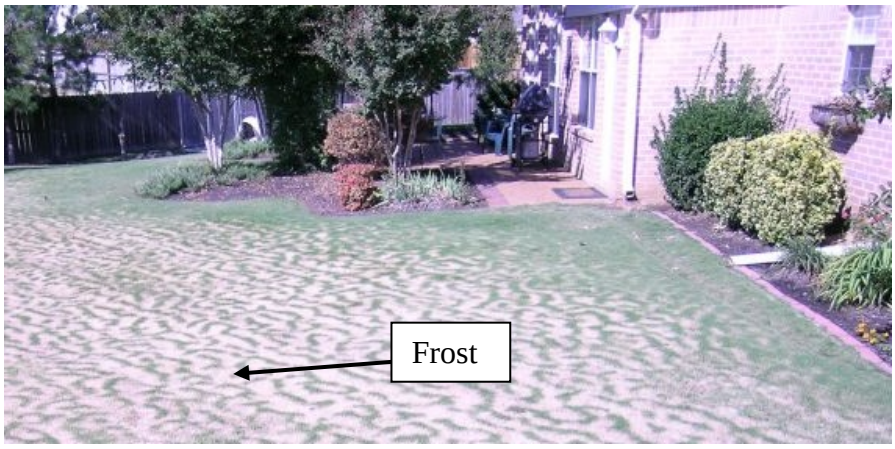
Below is the second homework assignment of the quarter. Please conform to the format described in the class syllabus. This assignment is due on 17 January 2019 at the start of the studio section for which you are registered. If you have any questions, feel free to see us or one of the other instructors during office hours or by appointment.

1. In the video from class on Wednesday, we watched 200 ml of liquid water at 20 ^{o}C as it was placed in vacuum. Immediately after vacuum was achieved, the water started to boil (figure left, below). By the end of the process, some of that water turned to ice as shown below right.



However, in the video on Friday, no ice formed. Predict the percentage of liquid water that must boil before you notice any ice.

2. When you woke up this morning and stepped outside, you noticed frost (ice) on the ground as shown below. Your housemate looked at the weather app on her phone and noticed the low temperature last night was 35 F (1.7 C). Explain why the frost occurred.



3. You are working on a project in your back yard and have left a large metal block uncovered. As compared to the lawn shown below, how likely do you think it is that frost would also form there?
   A. More likely
   B. Less likely
   C. The same likelihood

   Explain your answer

4. Estimate Δh_{vap} for a species that has the following boiling data:

T [K]	P_i^{sat} [kPa]
260	3.3
300	32.5