

## University of Michigan **Provost's Teaching** Innovation Prize

### **2016 WINNER**



FEI WEN Dow Corning Assistant Professor of Chemical Engineering College of Engineering feiwenum@umich.edu

Dr. Wen would like to acknowledge Ronald Larson, Eugene Kim, Daniel Quevedo, Lola Eniola-Adefeso, Mark Burns, Cindy Finelli, Tershia Pinder-Grover, Mark Moldwin, and Benjamin Griessmann.

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# Identify-Solve-Broadcast Students' Own Mass and Heat Transport Phenomena

#### Innovation Description

Supporting students in the production of work that will be valued by real audiences, not just a grader, is a hallmark of innovative teaching. In 2012, Chemical Engineering 342 won a TIP award by challenging students to demonstrate heat and mass transfer principles for visiting high schoolers. In 2014, ChE34 students took demos of heat and mass transfer to the next level by creating YouTube videos, a multimedia assignment.

Students respond enthusiastically to meaningful opportunities for autonomy and creativity. Careful scaffolding of the video project process by the instructor can ensure that rigor is not lost in the fun. **Identify:** Groups first develop and defend a project proposal with an eye to scientific accuracy and feasibility. Notably, if a group chooses a very comple example of heat and mass transfer, the students ma address just one or two key experimental parameter this approach respects their intrinsic motivation while keeping projects manageable. Solve: Students design original experiments or simulations. When intuition conflicts with rational prediction, they build experimental systems, define relative parameters, ar set up mathematical models. Broadcast: Groups meet regularly with the course instructor and GSIs a they figure out how to organize their demonstration into a clear and engaging video.

http://tinyurl.com/FeiWenTIP

#### **Examples of Teaching Innovation**

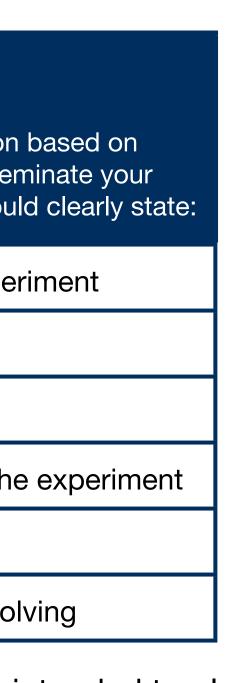
#### Video Grading Rubric

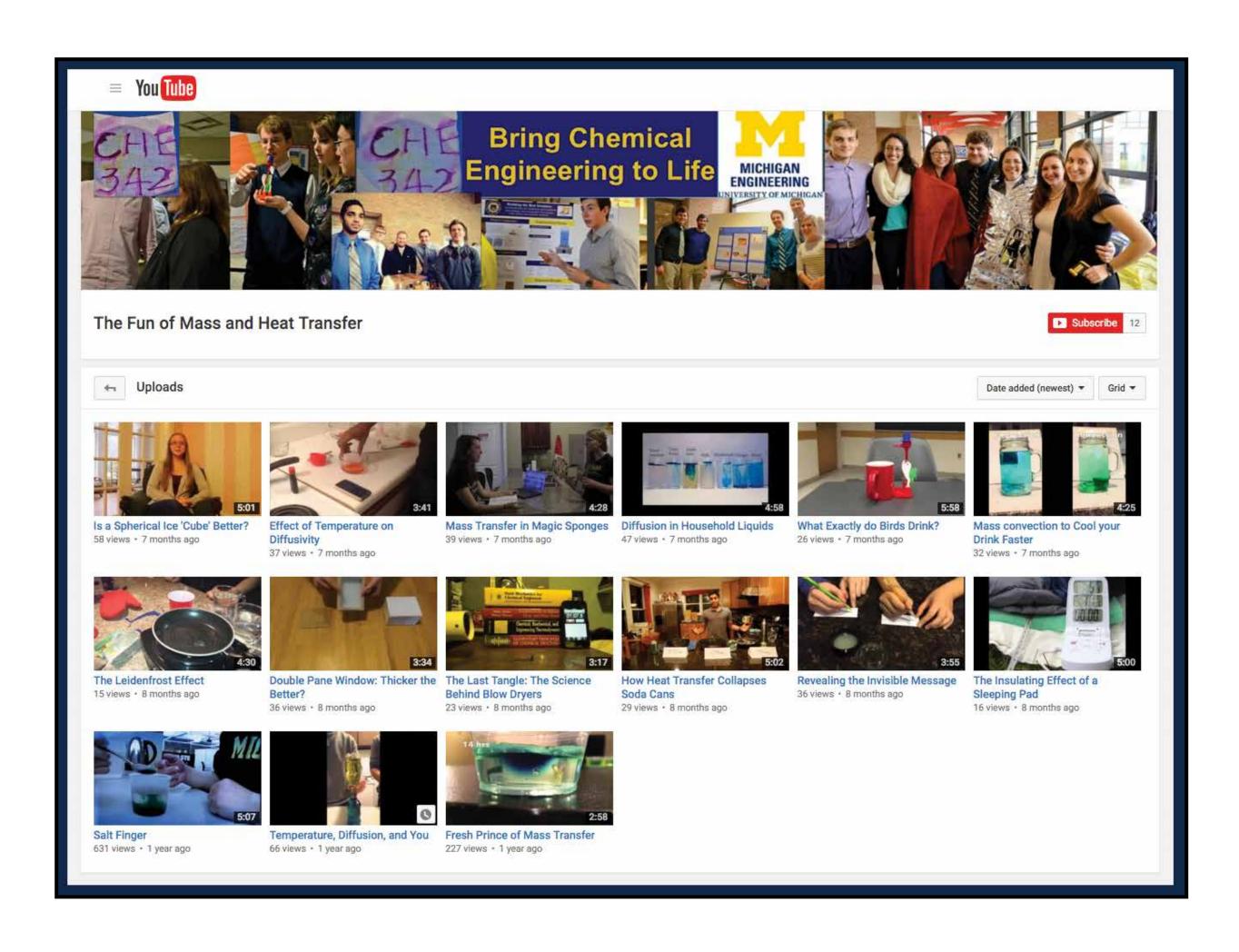
Each group must submit a 3-5 min video recording of a demonstration based on a heat or mass transfer principle. The purpose of this video is to disseminate your project to a broader audient via the Internet. Therefore, the video should clearly state:

- A daily life phenomenon that inspires and motivates the experiment
- The purpose and rationale of the experiment
- The design and execution of the experiment
- The explanation of mass/heat transfer principle underlying the experiment
- A brief summary of what is demonstrated
- How Chemical Engineers contribute to real world problem solving

Using a grading rubric helps ensure the quality of videos intended to play a role in global outreach. The YouTube channel has drawn 1,140 views from 68 countries as of February 2016.

	Student Comments
is al	"Working on the YouTube project increased r how the concepts of heat and mass transfer daily life."
342 the	"It differs from traditional assignments and pe conceptual knowledge to actual applications
a	"Knowing that our videos would be uploaded motivates us to create a video that is interest comprehensible for the public."
n. :t	"I enjoyed the opportunity to collaborate with choose a real-world application that intrigued creative with our project delivery and experin and to think analytically to solve non-textboo
olex ay ers; nile	"The scope of the project was very broad, wi a great variety of topics that delved into many phenomena and allowed us to reflect on the of what we have learned in class."
d and as	"The project tested my ability to develop exp designs, apply my understanding of heat tran to model the results, and most importantly to describe my thought process to others."
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which resulted in ny daily observed e wide application

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