*Debriefing the **first mathematical modeling workshop** for faculty at the Technological University of Panama*

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Venue and background

ODEs constitute a significant portion of engineering curriculum.

Students question relevance to professional life.

Modeling regarded an essential skill for engineering students.

SENACYT

Secretaría Nacional de Ciencia, Tecnología e Innovación

Feb. 3-7, 2020

20 participants

8 SIMIODE modeling scenarios TRANSLATED into Spanish

1. *Muerte e inmigración de m&m's* (**1-001 m&m's Death and immigration**)
2. *Expansión de una mancha de petróleo* (**1-005 Oil slick**)
3. *Construcción de túnel de hormigas* (**1-007Ant tunnel building**)
4. *Torricelli - Columna de agua cayendo* (**1-015 Torricelli - Falling water column**)
5. *Burbuja de gas intraocular* (**1-030 Intraocular gas bubble**)
6. *Enfríalo* (**1-031 Coolit**)
7. *Introducción a las EDO de 2do orden* (**3-030 Intro to second order ODES**)
8. *LSD y resolución de problemas (***5-001 LSD and problem solving***)*

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ADAPTED modeling scenarios used in classes (online)

3 UTP professors implemented at least one modeling scenario during the 1st semester 2020.

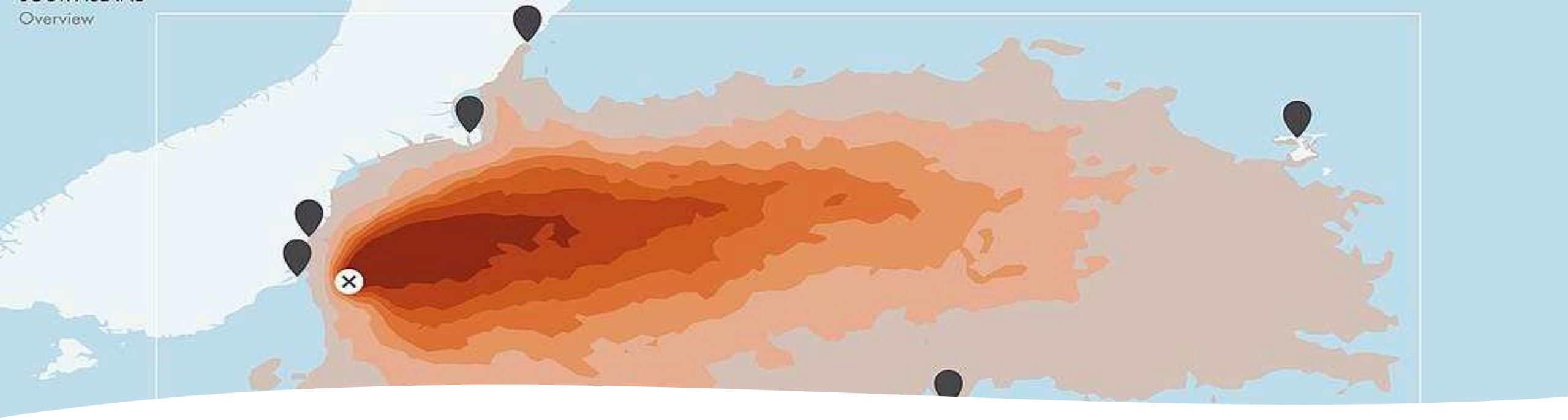
1. Death and immigration of m&m's

Adaptation

STUDENTS: Experiments and empirical modeling

IN CLASS: Theoretical aspects – modeling change analytically; computational aspects – SSE and Solver

STUDENTS: Adjusting analytical model



2. Oil slick

Deliverable 1:

- ✓ Minutes of group meeting to discuss how to tackle the problem
- ✓ Summary of online session with Dr. Winkel
- ✓ Excel sheet containing all data, graphs and calculations

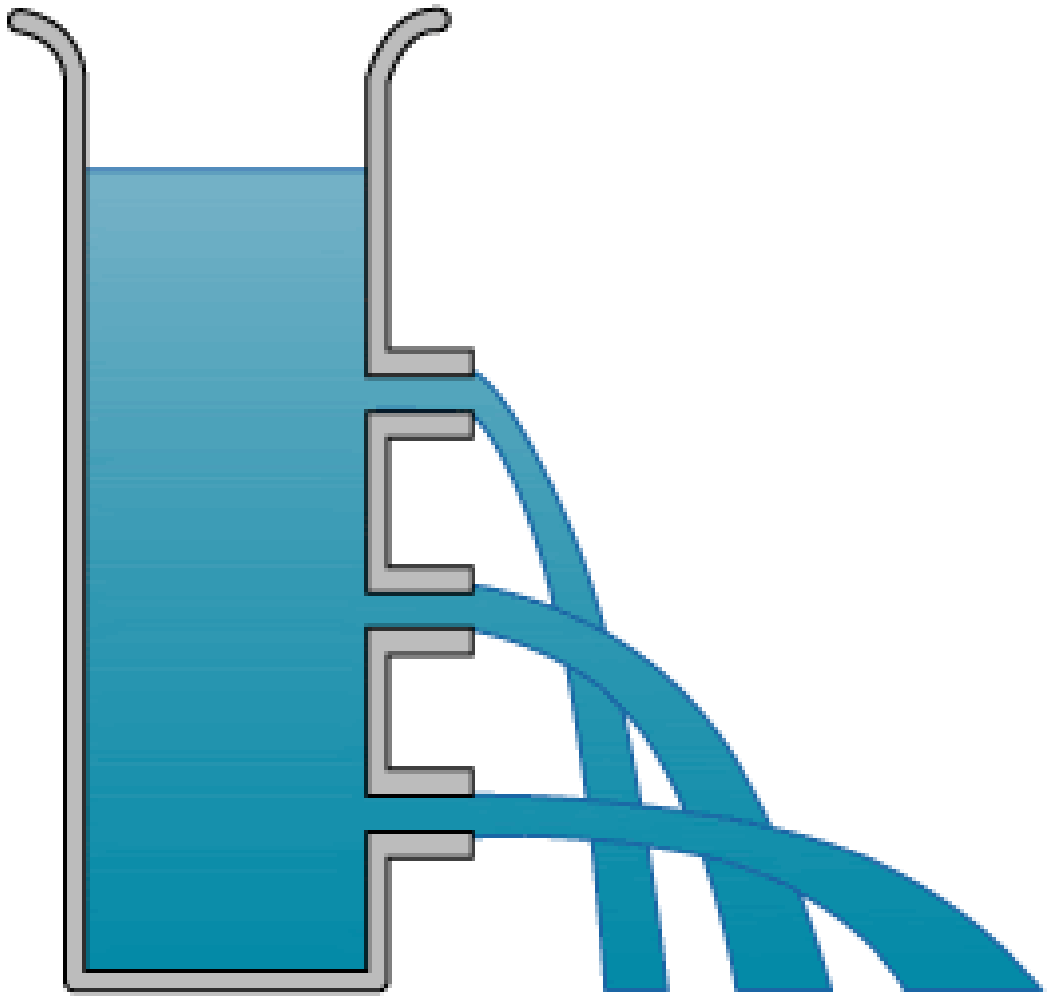
Deliverable 2:

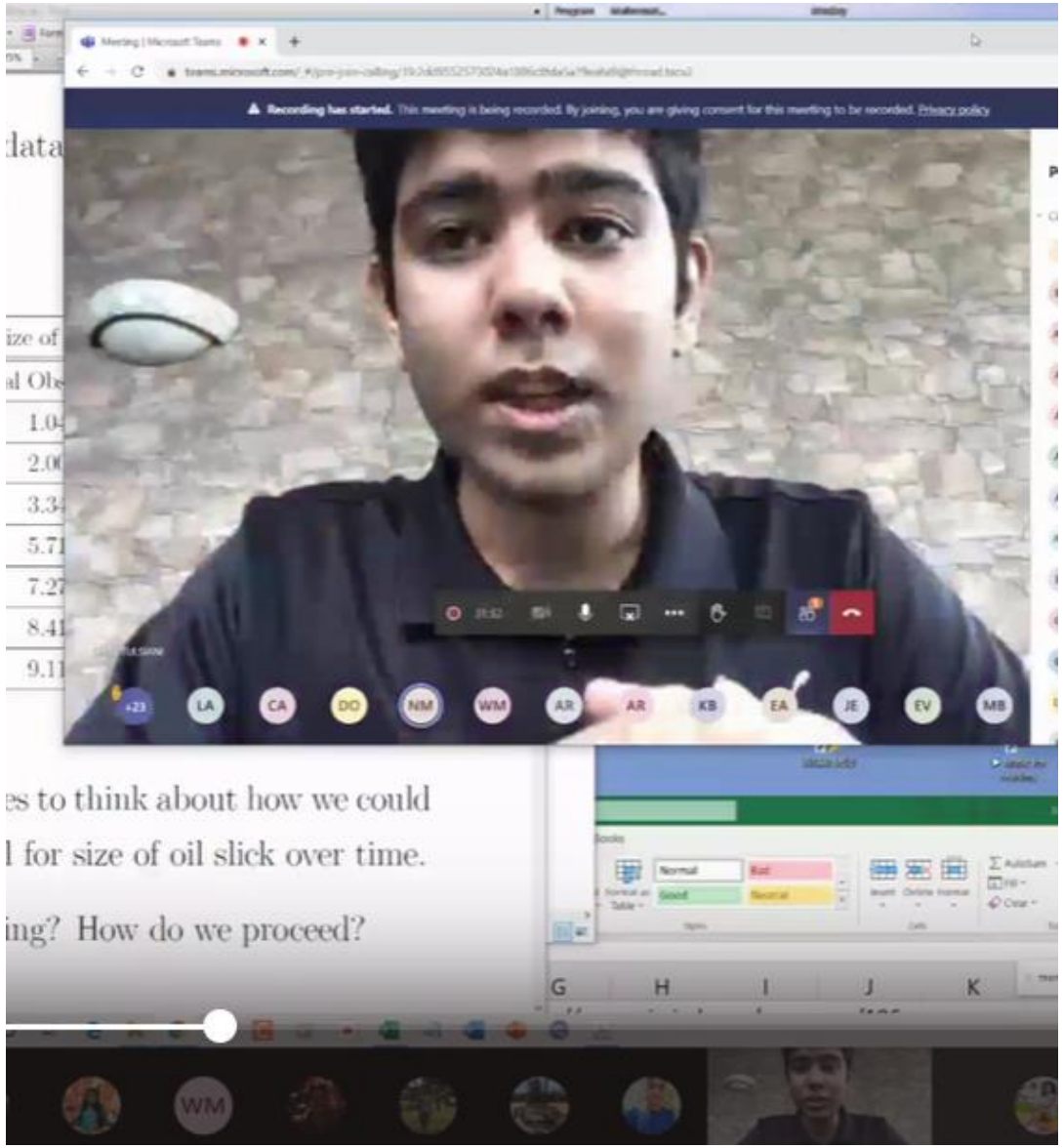
- ✓ A 2-page report for “Head of the Disaster Management Division”

3. Falling water column

DELIVERABLE:

- ✓ Annotated derivation of formula from first principles
- ✓ Collect 20 data points for assigned hole diameter from video
- ✓ Optimize model parameter using Excel Solver.
- ✓ Graph and compare observed versus model values.
- ✓ Explore relationship of b to hole size, sample size, and “location” of data points.

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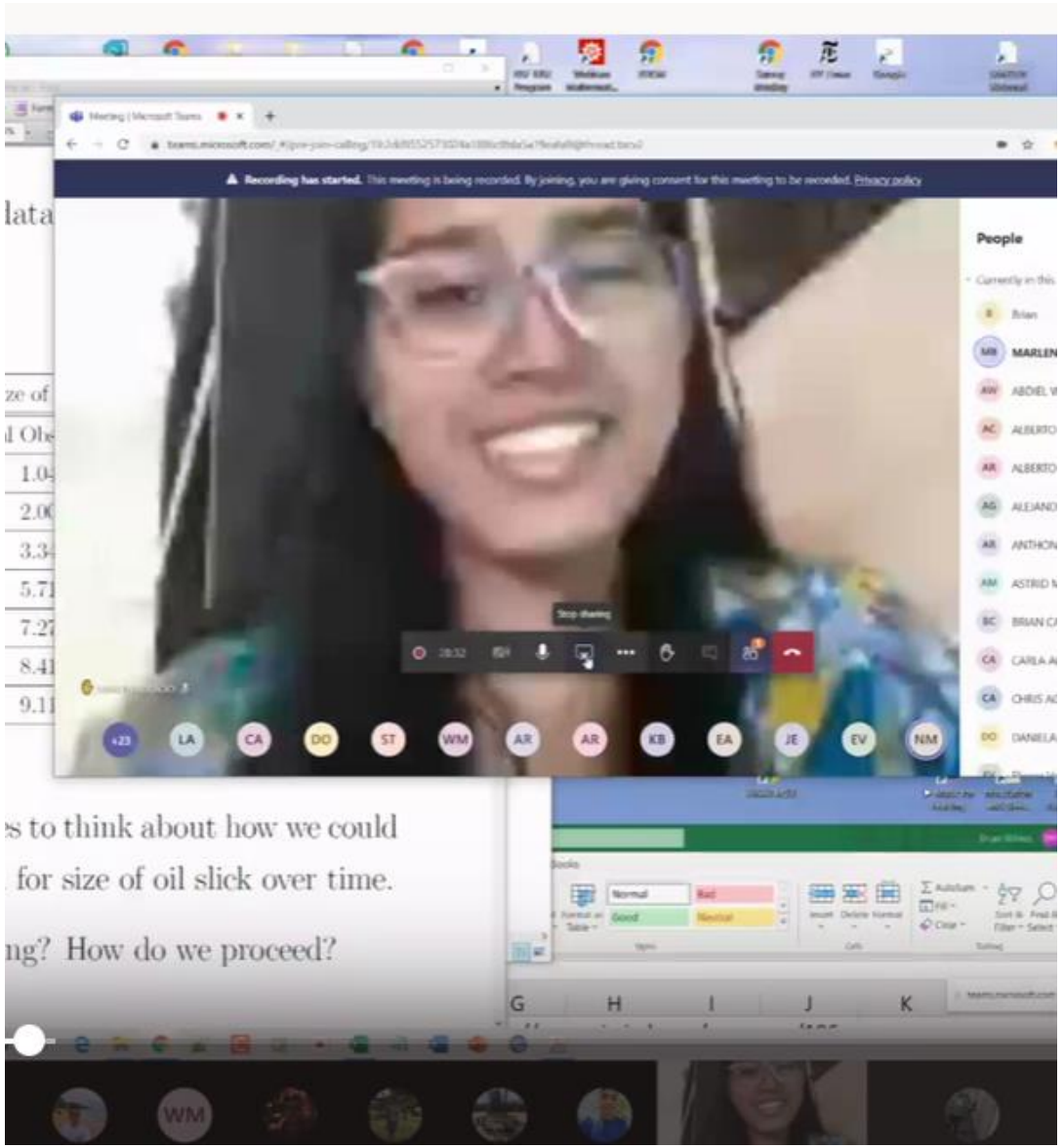
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The students' views:

"Modeling activities increase student interest in the ODE course."

"Modeling helps see how differential equations is applicable to everyday life"

"Allows students to better appreciate the scientific approach to studying a problem".

"Teachers should continue doing these kinds of educational activities."

Thank you for your attention