



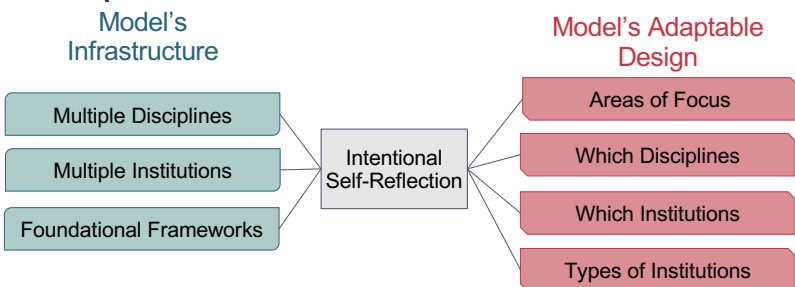
# A multi-institution, multi-discipline approach to transforming undergraduate STEM education



Hofstra (STEM)<sup>2</sup> Network Participants: Biology: Jessica Santangelo, Mike Dores, Steve Raciti;  
Math: Gillian Elston, Kira Adaricheva; Chemistry: Emily Mundorff, Sabrina Sobel

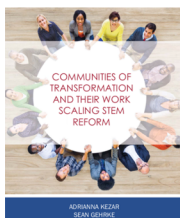
**Background** The Sustainable, Transformative Engagement across a Multi-Institution/Multidisciplinary STEM, (STEM)<sup>2</sup> “STEM-squared”, Network addresses challenges to STEM education reform by bridging disciplinary and institutional silos and helping faculty leverage the reward structure of the current system as they work to transform the system from the inside.

## An adaptable model



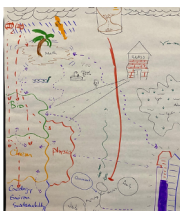
## Foundational Frameworks

### Community of Transformation<sup>1</sup>

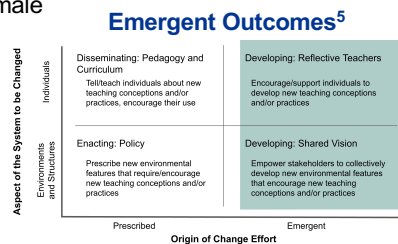


- “[explore] philosophically, in deep and fundamental ways, how science is taught.”
- Individuals + broader system
- Benefits particularly for faculty of color and female faculty

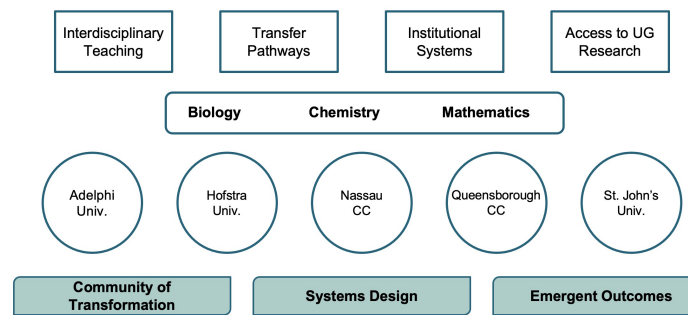
### Systems Design<sup>2-4</sup>



- Rich Pictures
- Influence Diagrams
- Change Theory
- Theory of Change
- Logic Modeling



## NYC/LI Network



- Leadership Team**
- Hofstra University  
Jessica Santangelo
  - Adelphi University  
Lawrence Hobbie  
Eugenia Villa-Cuesta
  - St. John's University  
Alison Hyslop
  - Nassau Community College  
Jacqueline Lee
  - Queensborough CC  
Michael Pullin

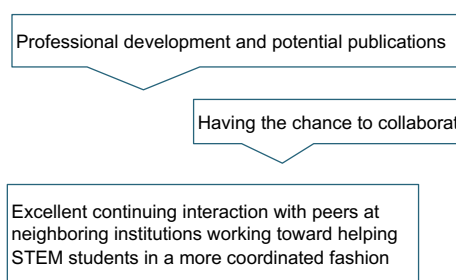
## Outcomes

- Since inception January 2020:
- Two papers published
  - Multiple on-going projects
  - Three multi-institution grants submitted
  - \$500K NSF-RCN-UBE Award (2021-2026)



- Extent to which faculty feel empowered to be change agents
- Cross-disciplinary collaborations
- Cross-institution collaborations
- Ties between 2- and 4-year schools

## What sustains continued participation



## Contributes to professional growth

- ...helped me evolve as a teacher and mentor of undergraduate STEM students.
- Spurs thinking of new ways to look at old, systemic problems.
- My skill set in modeling has definitely expanded, and I feel like I have collaborative contacts at multiple institutions in my local area.

## What's Next



\$500K NSF RCN-UBE  
2021-2026  
Expanding to 15 institutions



Join us!  
Onboarding new faculty  
January 2022



NATIONAL INSTITUTE  
on Scientific Teaching

Join us!  
Mobile Institute @ Adelphi  
June 2022

<sup>1</sup>Kezar and Gehrke. 2015. Communities of Transformation and their Work Scaling STEM Reform. <https://pullias.usc.edu/wp-content/uploads/2016/01/communities-of-trans.pdf>

<sup>2</sup>Bett 1992. How systems thinking applies to education. Educ. Leadersh. 38.

<sup>3</sup>Kania et al. The water of systems change. [https://www.fsg.org/publications/water\\_of\\_systems\\_change](https://www.fsg.org/publications/water_of_systems_change)

<sup>4</sup>Watson et al. 2008. Systems design for change in education and training. Handb. Res. Educ. Commun. Technol. 691–701.

<sup>5</sup>Henderson et al. 2010. Beyond Dissemination in College Science Teaching: An Introduction to Four Core Change Strategies. J. Coll. Sci. Teach. 39, 18–25 .

This material is based upon work supported by the National Science Foundation under Grant No. 1919614. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.