Science Communication 101/201: A Museum-University Partnership for Early-Stage Graduate Students

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Improv Exercise
Mission: To inspire the inventive genius in everyone.

Vision: To inspire and motivate children to achieve their full potential in science, technology, medicine and engineering.
Science Education and Public Engagement

- Youth-focused model of collaborative impact
  - Positive youth development
  - Teacher professional learning
  - Maker-based experiences
  - Field trip learning labs

- Student and public programs with STEM practitioners
  - 200+ practitioners annually

- Guest-facing staff training and development
MSI Science Communication 101/201

- Partnership with University of Chicago Institute for Molecular Engineering
- Two-year training program for second- and third-year graduate students
- Eight Saturday workshops + individual workshops and coaching – more than 40 contact hours
- Launched in fall 2015; first cohort will complete program in July 2017
Key Program Elements

• Discussion and use of evidence-based strategies in science communication and science learning.

• Participatory activities and debrief discussions.

• Regular pre-and post-workshop work - readings, journal reflections, attendance of public events and presentation preparation.

• Preparation and delivery of a live presentation for Museum audiences.
Year 1 Program Goals

- Verbally communicate science to a wide variety of audiences
- Expand their presentation skills
- Tailor the content of their presentations spontaneously and in reaction to their audience

**Workshop 1:** Introduce importance of science communication

**Workshop 2:** Introduce improvisational theater as a science communication strategy

**Workshop 3:** Understand the use of emotion and storytelling in communicating science; address the “So What Factor”

**Workshop 4:** Learn how to tailor content in advance and on the spot
Year 1 Program – Example Activities

• Baseball
  In the bottom of the ninth Jeter worked a one out walk and stole second. But the Red Sox ace reliever got Ellsbury and Teixeira to strike out swinging to end the game.

• Bringing in the Public

• Tailoring Your Message
Year 1 Feedback from Students

What was most useful about the Year 1 Program?

*I learned how to catch audience's attention gradually by asking them simple questions, which will give them confidence and increase their interest.*

*The exercises involving the elevator research pitches, and having to say them in front of the class as well as listen to feedback.*

What do you hope to gain in Year 2?

*I am used to presenting to a scientific audience with already considerable knowledge…so it will be helpful to get more feedback on presentations designed for broad audiences.*

*Become better at distilling my research down to its core … [and] be able to make a program that children will find enriching and inspiring.*
Year 2 Program

Students build on Year One learnings to translate their own research into a learning experience for a youth audience.
Year 2 Program Goals

**Workshop 1:** Learn about informal science learning, explore science communication styles and meet experts

**Workshop 2:** Discover a personal voice, style and story

**Workshop 3:** Presentation framework and activity development followed by peer feedback

**Workshop 4:** Challenging scenarios, using slides and visuals and open working time
Year 2 Workshop Activities

• Exploring communication styles
• Science communicator panel discussion
• Content connections and exhibit exploration
• Building a presentation framework
• Workshops for small groups and individual students
Concept Mapping Exercise

- What STUFF or MATERIALS in the lab or field help make it tangible?
- Why Is it COOL? What FASCINATES you about it?
- What ANALOGIES or COMMON REFERENCES describe this topic?
- Why does it MATTER? How is it RELEVANT to people's lives?
- What are good HOOKS or ACCESS POINTS to initiate engagement?
- How can you FRAME this issue? What is the right CONTEXT to describe?
- How is SEQUENCE of ideas important for understanding?
- What will inspire people to ask you QUESTIONS? What questions will you ask them?
- What PRIOR KNOWLEDGE might people have? How can you assess?

Source: Portal to the Public
Concept Mapping - Peer Feedback
The aggregation of proteins into amyloid fibrils is implicated in numerous chronic diseases affecting millions of people worldwide. These illnesses include Alzheimer’s disease, Parkinson’s disease, and type II diabetes. It is now understood that early-stage aggregates are toxic, prompting a shift from studying mature fibrils to investigating mechanisms of nascent fibril formation and related intermediates. However, there are still challenges in identifying aggregation pathways and detecting early-stage aggregates. My research addresses these challenges on two fronts: (1) investigating the mechanism behind early-stage amyloid aggregates using molecular simulations, specifically with molecular dynamics and the string method sampling technique, and (2) detecting early-stage amyloid aggregates with liquid crystals.
Individual Support: Practice Sessions
Final Year 2 Activities

Jr. Science Café Series: The Institute for Molecular Engineering, University of Chicago

A Survivalist’s Guide to Building a Battery
Yu Kambre, PhD Candidate and Battery Engineer

Journey Through the Immune System
Elyse Watkins and Lea Maillat, PhD Candidates

Saving the Good Guys: Bacteria That Helps Make Food
Johnny Alfaro, PhD Candidate

http://www.msichicago.org/education/field-trips/jr-science-cafes/
Year 2 Feedback

- Increased confidence in talking about their research
- Increased comfort and familiarity with their own personal stories
- Increased interest in science communication opportunities
- Positive reconnections with cohort peers
Program Next Steps

- Host student Jr. Science Café sessions
- Integrate students into Museum’s growing community of STEM practitioner partners
- Updating resources, activities and training materials
- Launch a comprehensive evaluation with MSI research and evaluation team (Fall 2017)
- Develop scalable model for University of Chicago and other partners
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Thank You!
Sparking Interest in STEM Careers

https://youtu.be/u79BugiujuNU
Year 1 Program

In the first year, students will participate in a series of workshops designed to enhance their ability to **orally communicate science effectively to a wide variety of audiences**, expand their **presentation skills**, and to learn to **tailor the content** of their presentations **spontaneously and in reaction to their audience**. **Improvisational theater techniques and other communication strategies** will prepare students as they work toward conducting a facilitated learning experience in their second year.

**Workshop 1: Orientation**
- Introduce importance of science communication

**Workshop 2: Improv for Scientists I**
- Introduce improvisation as a science communication strategy

**Workshop 3: Improv for Scientists II**
- Understand how use of emotion and storytelling can help communicate science
- Address “So What Factor”

**Workshop 4: Effective Public Speaking & Tailoring Your Message**
- Learn how to tailor content in advance and on the spot
Lessons Learned:

- It is possible to distill research without "dumbing it down" and so that it can be understood by both people that are unfamiliar and somewhat familiar with the topic
- It is important to yourself know the broader goals of your research before you can communicate it effectively to others
- Engaging the audience is particularly important, not just lecturing to them
- Engage your audience with examples and analogies
- Attitude/body language is important
- One must not be afraid of things not going as planned

Post Survey helped to inform Year 2 development, refine Year 1 for second cohort