

Designing Our World

A Community Envisioning Girls as Engineers

(DRL #1322306)

Project Overview

We recognize that in order to drive innovation and collaborate globally, the US needs a strong, creative engineering workforce. Training more engineers with diverse backgrounds and life experiences will help advance this goal. By attracting underrepresented groups, the U.S. can help fill this gap and promote diversity in order to maximize innovation.

Designing Our World (DOW) empowers and promotes girls' pursuit of engineering careers by cultivating networks of community stakeholders and engaging girls with experiences that illuminate the social, personally relevant and altruistic nature of engineering.

Key Approaches

- Highlight the ways in which engineering careers and engineering design thinking can be altruistic, personally relevant, and social
- Show girls and their peers the various ways in which the engineering process relates to their lives and to potential careers
- In partnership with the community, create an educational model which supports cross-context learning and engagement through the course of multiple experiences
- Empower adult stakeholders to support girls and people of color in pursuing engineering careers
- Foster a sense of self-efficacy in and positive attitude toward engineering design thinking and engineering careers to support girls' engineering identity formation

Project Team

Designing Our World is a collaborative project, with team members from the following institutions:

- **Oregon Museum of Science and Industry** | Portland, OR
Lauren Moreno, PI
Scott Pattison, Co-PI
Veronika Nunez, Co-PI
- **Oregon State University** | Corvallis, Oregon
Lynn Dierking, Co-PI
- **Garibay Group** | Chicago, Illinois
Cecilia Garibay, Evaluator

Community Partnerships

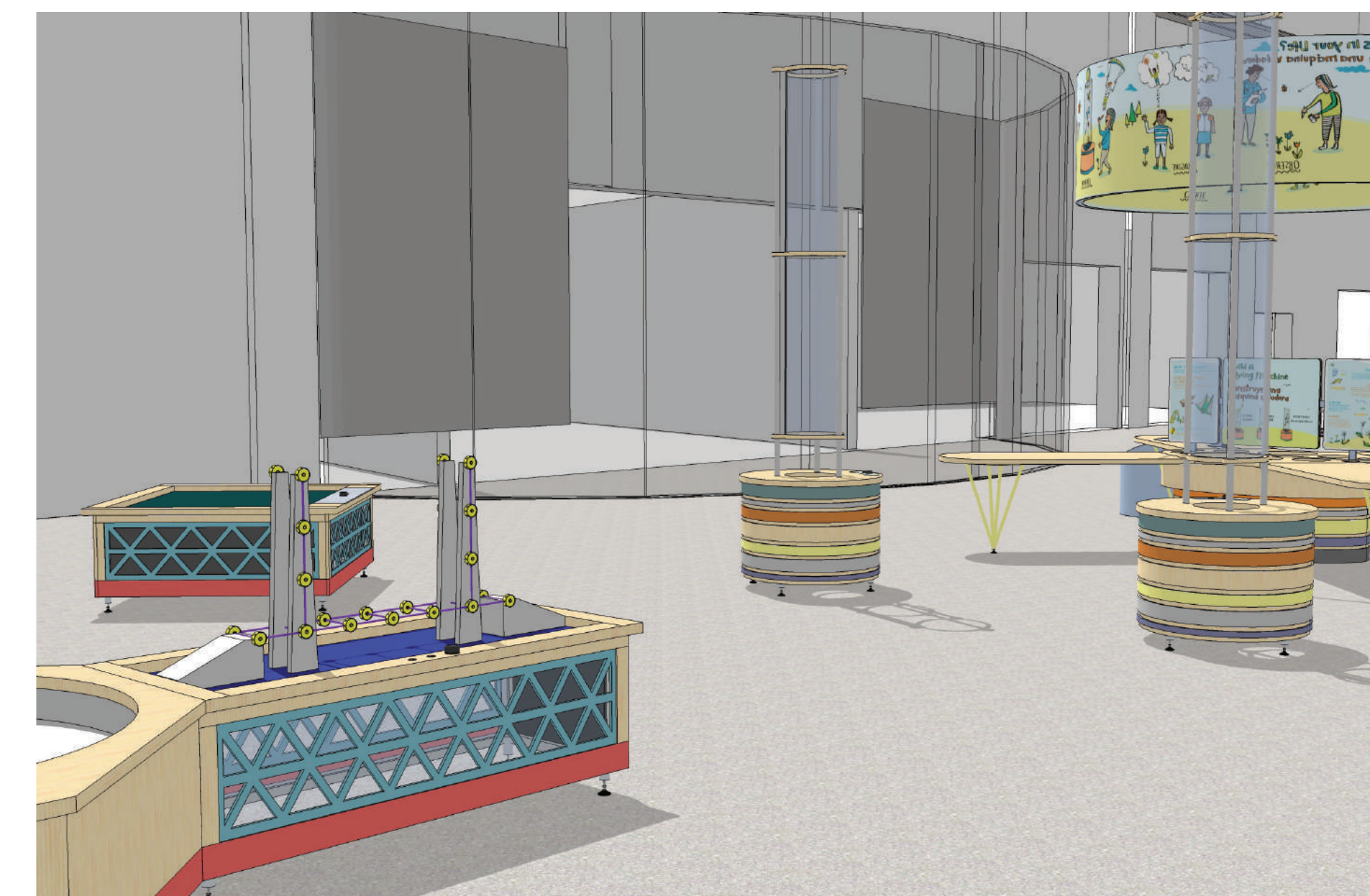
OMSI has developed partnerships with diverse local girl-serving organizations, local professional engineers, and informal science education providers to design and test the DOW educational model.



Family & Adult Community Engagement

In order to promote effective engineering messaging throughout the community, the DOW project includes a professional development component aimed at adults with an influence on girls' STEM identity (e.g., parents and caregivers, girl-serving organization staff, and engineering professionals).

- Professional development for parents and caregivers includes workshops, reflective dialog, and family engineering/career events.
- Professional development for girl-serving partner staff includes workshops, reflective dialog and an all-day workshop at the museum in the summer.
- Professional development for participating engineers includes communication training, activity development, and practice engagement opportunities.
- DOW brings adult stakeholders (parents and caregivers, girl-serving partner staff, engineers, OMSI staff) together with girls and their families at Family Engineering Nights.



Exhibit

A re-envisioned *Engineer It!* exhibition will serve as a hub at OMSI to engage diverse audiences in engineering practices and careers.

- Redesign focuses on the “big idea” that engineering is altruistic, personally relevant, and social.
- Bilingual copy, illustrations, and images connect open-ended design challenges with stories of engineer role models.

Creative Solutions Programming

DOW Creative Solutions Programming is implemented in partnership with girl-serving organizations. Each cohort serves 10-30 girls (aged 9-14) and includes at least seven community-based afterschool programs, a field trip with museum-based engineering activities, and two Family Engineering Nights at the museum. Youth programs are implemented concurrently with adult engagement activities.

- OMSI has partnered with three community based girl-serving organizations to run DOW cohorts: Boys and Girls Club, Girls Inc. and Adelante Mujeres.
- Engineering activities highlight real engineering careers and showcase the altruistic nature of engineering through challenges such as designing a wheel-chair accessible ramp, or engineering surgical tools specialized for specific tasks.
- Programming also includes discussions and reflective activities focused on gender equity, stereotypes in STEM, the nature of engineering practices, the nature of engineering careers, and personal experiences.
- Engineers also take part in afterschool programs and family engineering nights, acting as role models and providing girls in-person examples of engineering careers.



Identity Research

The DOW identity research includes two qualitative studies are focused on investigating how girls construct and negotiate engineering-related identities across contexts and over time. Findings from the first study have been used to develop a framework for describing girls engineering-related identity negotiation during the programs, including youth *performance and definition* work, adult and peer *recognition and positioning* work, critical *identity moments*, and emergent *situated identities and situation definitions*. The second study is currently underway.

Primary Audience

- **Underserved Public Audience:** girls ages 9-14
- **Professional Audience:** a broad group of girls' identity stakeholders including ISE educators, leaders of girl-serving groups, professional engineers, parents, caregivers, and other mentors.
- **General Public Audience:** families with children



Challenges and Opportunities

- Complexity and richness of community partnerships
- Scalability of educational model
- Coordinating and aligning messaging and strategies across learning contexts
- Time constraints within an afterschool program environment



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