

# ResearchLink: Spotlight on Solar Technologies

## A Collaborative Research Connecting Researchers and Public Audiences (CRPA) Project (DRL #1241331 & DRL #1241353)

### Project Overview

*ResearchLink: Spotlight on Solar Technologies* engages public audiences with current Portland State University research related to solar energy, green roofs, and green buildings. Specifically, the project promotes awareness of two NSF-funded research projects led by PI Dr. Carl Wamser (see Current Research Focus below for further details). Under *ResearchLink*, PSU scientists are working collaboratively with OMSI staff to communicate current research through facilitated activities at the museum, outreach programs across the region, a project website, and Science Café events.

### Project Team

*ResearchLink* is a collaborative project led by:

- **Portland State University**  
Dr. Carl C. Wamser, Professor of Chemistry Emeritus, PI
- **Oregon Museum of Science and Industry**  
Lauren (Russell) Moreno, Director of Strategic Partnerships, PI  
Sue Wu, Senior Educator, co-PI



### Professional Development for Researchers and Educators

*ResearchLink* also provided professional development for both PSU researchers and OMSI educators. A cohort of PSU researchers, including PI Dr. Wamser, participated in OMSI's Science Communication Fellowship training program which included a four-part short course focused on how people learn science in informal learning environments and strategies for communicating current research to public audiences. Dr. Wamser and other PSU researchers also led several professional development opportunities for OMSI staff to increase their awareness and understanding of the research highlighted in this project. These events included a training session and tour of the PSU labs for OMSI's Museum Education team, a learning-over-lunch talk for all OMSI staff and volunteers, and a collaborative work session with PSU researchers focused on delivering accurate science content when facilitating the tabletop exhibits.



## Public Engagement Platforms

### Tabletop Exhibits

PSU researchers and OMSI educators collaborated to design and fabricate two hands-on tabletop exhibits, designed to support facilitated and stand-alone experiences, with text in both Spanish and English:

- The **Engineering Dyes into Solar Cells** exhibit allows visitors to test the absorption ability of organic compounds (dyes) by shining lasers through the dyes; visitors learn about organic materials being studied as a potential replacement for silicon in solar cells.
- The **Solar Panels on Green Roofs** exhibit displays the output of solar cells while visitors test conditions that may increase or decrease solar output; this exhibit helps to show some important variables to consider when integrating photovoltaics and green roofs.

The exhibits are deployed across multiple settings, including:

- *Meet a Scientist*—a monthly program at OMSI where PSU researchers facilitate these exhibits and other demonstrations. From October 2013 through July 2014, researchers facilitated these activities with an estimated 1,153 visitors.
- *\$2 Sunday*—a monthly event at OMSI where OMSI educators



facilitate the exhibits. On \$2 Sundays, OMSI attracts a more diverse audience. From January 2014 to July 2014, educators facilitated the exhibits with an estimated 6,061 visitors.

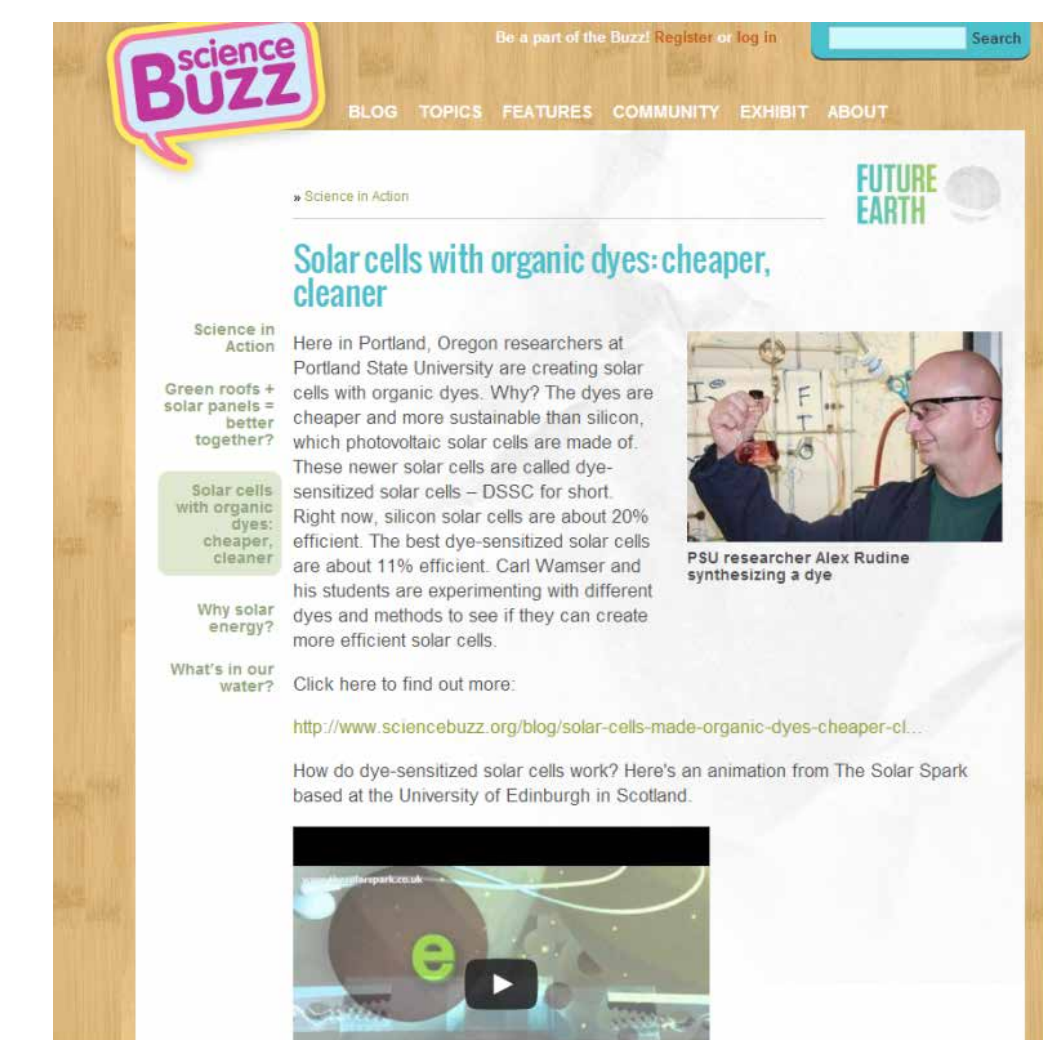
- In the community—OMSI educators bring copies of the exhibits to festivals and school science fairs across the region. PSU researchers also bring copies of the exhibits to local outreach events.

### Science Cafés

OMSI hosted two Science Cafés at local theatres, featuring lectures by PSU faculty Dr. Carl Wamser and Dr. Todd Rosenstiel to highlight ResearchLink and reach an adult audience. The events drew a total of 498 attendees.

### Science Buzz

*Science Buzz* is the Science Museum of Minnesota's NSF-funded online research-to-public platform. It is available online and through kiosks at science centers nationwide. OMSI worked with PSU scientists to create content related to their NSF-funded research for *Science Buzz*. This includes blog posts and customized web pages with short videos. From May 2013 to December 2013, there were over 4,000 views of the following project web pages: [www.sciencebuzz.org/topics/green-roofs-solar-panels-better-together](http://www.sciencebuzz.org/topics/green-roofs-solar-panels-better-together) and [www.sciencebuzz.org/topics/solar-cells-organic-dyes-cheaper-cleaner](http://www.sciencebuzz.org/topics/solar-cells-organic-dyes-cheaper-cleaner).



## Current Research Focus

*ResearchLink* focuses on engaging public audiences with content related to two NSF-funded research efforts led by PI Dr. Carl Wamser:

*Integrating Green Roofs and Photovoltaic Arrays for Energy Management and Optimization of Multiple Functionalities* (NSF CBET-0853933, 2009-2013, Portland State University)

A research site has been established at Portland State University consisting of multiple green roof pans with integrated photovoltaic panels. The study has been investigating the role of different types of plantings on the functions of the green roofs (thermal building insulation, rainwater retention, and carbon dioxide sequestration) as well as on the efficiency of the photovoltaic panels. We find that both systems carry out all their functions at least as well as they would independently.

*Nanofibrous Conductive Polymers from Aminophenylporphyrins: Mechanisms for Conductivity and Applications in Solar Cells* (NSF CHEM-0911186, 2009-2013, Portland State University)

This laboratory program has been investigating novel organic polymers that may be capable of solar energy conversion as either photovoltaics (electricity production) or photocatalysts (conversion of simple raw materials into fuels, such as water to hydrogen or carbon dioxide to methanol). Progress in this area is important for development of renewable energy resources and mitigating global climate change.



### Public Impact and Evaluation

*ResearchLink* was designed to reach a wide and diverse public audience, and specifically aims to increase participants'

- Engagement and interest in the research being presented, and
- Awareness and knowledge of the research being presented.

Preliminary summative evaluation findings indicate that *ResearchLink* was successful in achieving these public impacts. Specifically, the project successfully engaged public audiences and increased their interest in the research being presented.

- 99% of OMSI respondents reported that the experience added value to their museum visit.
- 97% of OMSI respondents indicated that the experience had been valuable or interesting to them.
- 87% of Science Café respondents were completely or nearly-completely satisfied with their experience.
- 99% of observed visitors demonstrated at least one initiation or transition learning behavior.

*ResearchLink* also increased public audiences' awareness and knowledge of the research being presented both onsite at OMSI and at the Science Café events:

- 100% of Science Café respondents learned something new through the presentation.
- 90% of OMSI visitors learned new content through ResearchLink activities.
- 100% of OMSI visitors rated their understanding of the research at 3 or higher (1-5 point scale) after their experience.
- 80% of OMSI visitors rated understanding of the research at 4 or higher (1-5 point scale) after their experience.
- 57% of observed OMSI visitors demonstrated at least one breakthrough learning behavior.

In addition, OMSI respondents who interacted directly with one of the scientists agreed that the experience was valuable to them and made them want to learn more about local scientists working in this research area.

- 90% of visitors who interacted with a scientist specifically mentioned that they valued being face-to-face with a scientist.
- 70% of these respondents indicated that they agreed or strongly agreed that the experience made them want to learn more about local scientists working in this research area.

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