

# **COPPE (CSMC-OMSI Partnership for Public Engagement) Final Report**

Prepared for



by

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## Executive Summary

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### Background

The CSMC-OMSI Partnership for Public Engagement (COPPE) project was developed to establish a strong and long-lasting partnership between the Center for Sustainable Materials Chemistry (CSMC) and the Oregon Museum of Science and Industry (OMSI). Through participation in this project, COPPE researchers and OMSI educators sought a deeper understanding of each other's profession while simultaneously developing a suite of Informal Science Education (ISE) outreach programs that engage the public in new and enduring ways. These new ISE platforms were developed to enhance public awareness in the areas of CSMC science, chemistry, and sustainability—research that will enable a new generation of sustainably manufactured electronic and energy devices.

The intended impacts on the participating researchers and educators included:

- **Skills:** This project will increase the project team's capacity to facilitate collaborations that create informal learning experiences that highlight CSMC research.
- **Attitudes:** This project will increase project team members' confidence in their ability to work effectively in collaboration with each other.

### Project Phases

The COPPE project was structured into two phases, culminating in the development of pilot projects.

#### Phase I

During Phase I of the collaboration, the CSMC and OMSI participants attended professional development workshops at both institutions' respective locations.

#### Phase II

During Phase II, a smaller, core group of CSMC ISE Fellows worked with OMSI staff to develop ISE outreach activities that highlight CSMC science, chemistry, and sustainability.

#### Pilot Projects

The culmination of Phase II involved the development and creation of pilot projects that addressed aspects of CSMC research in the context of ISE. These activities were then facilitated at OMSI and refined to become elements of OMSI's traveling education programs.

### Evaluation

The evaluation approach of COPPE was a developmental case study involving a series of formative studies followed by opportunities for stakeholders to reflect on the findings to shape and benefit the developing partnership in an ongoing manner. Now in the last quarter of the project, this final report tells the story of the evolving partnership by describing impacts on participants and changes over time. This report also includes discussion and recommendations for the partnership's future. These findings are intended to provide insight into partnership development and maintenance for COPPE participants as well as other institutions interested in creating or developing new partnerships.

### Findings

#### *Front End Study*

Findings from a front-end study show that members of COPPE entered into the partnership highly motivated and anticipating concrete benefits despite unfamiliarity between the institutions. This unfamiliarity motivated participants to want to engage with each other with a commitment to collaborate; to work towards a shared goal/interest; and with openness to quality communication. The lack of familiarity between institutions was offset by participants' confidence drawn from prior successful experiences with institutional collaborations, but most COPPE members entered into the project with an awareness of the challenges that the project would bring.

### *Formative Study 1*

An initial formative study was conducted after COPPE participants had begun building the partnership by hosting their respective partner organization for a structured workshop that introduced participants to one another and provided an introduction to each organization's skills and area of expertise. After these two workshop events, both CSMC and OMSI respondents relayed significantly increased familiarity with each other's institutions and work. This increase in familiarity related to aspects of organizational culture, structure, program offerings, and organizational goals. These interactions also contributed to positive affective perceptions of one another, with CSMC in particular using affective language in their descriptions of OMSI. OMSI participants were also excited to learn about CSMC science, but some expressed a heightened awareness of the challenges of understanding and communicating complex CSMC research to a public audience. With this mixture of excitement and awareness of the significant task ahead, the project leadership met to determine logistics around developing a set of pilot projects and forming a fellowship program for CSMC participants. This fellowship program paired two groups of CSMC fellows with OMSI educators to develop pilot projects that communicated CSMC research to public audiences in an ISE context.

### *Formative Study 2*

A second formative study was conducted near the end of pilot project development as well as the end of the grant calendar. After having over a year in which to develop a partnership, COPPE participants expressed that their relationship with their partner organization was a positive one, and that their understanding of the work of their partners had increased over time. Both CSMC and OMSI participants exhibited high regard for their partner organization and the scientific and/or educational work that they do. In general, most participants were not as focused on the nature of or processes related to developing the organizational partnership as they were on the specifics of collaborative work: details from the initial workshops and meetings, the process of developing the demos, or specific one-on-one-interactions with members of their partner organization.

When asked to relay benefits that emerged from the partnership, both CSMC and OMSI participants easily named several specific personal and organizational benefits. Repeatedly, CSMC participants noted primary benefits related to increased science communication skills and new experiences with relating their research to the public. OMSI participants described their excitement and enjoyment working one-on-one with CSMC participants, as well as enthusiasm that additions were made to the collection of OMSI's traveling education offerings through development of the pilot projects. While the overall sentiment from project participants was positive and enthusiastic, some anticipated project challenges voiced by participants during the front-end study were still voiced at the end of the project, including geographical distance, competing time commitments, limited program capacity/grant duration, and uncertainty about program structure.

## **Discussion and Recommendations**

The findings from this evaluation show that the partnership experience was beneficial for members of both organizations. Participants took advantage of the opportunity to practice skills related to collaborative work with a partner organization, and attitudes towards this collaboration were positive and appreciative. The final evaluation of the project notes one aspect of the partnership that could be improved. This involves uneven understanding among COPPE partners about the mutual institutional benefits of participation in COPPE. Throughout the partnership, some CSMC members voiced uncertainty about what OMSI gained to benefit from the project, even though OMSI expressed its need for bringing current scientific research to museum visitors through partnerships with researchers such as those at CSMC. This uneven awareness of mutual benefit may be alleviated by improved communication between partners about mutual benefits, such as setting aside time to explicitly discuss ways in which each organization's expertise can meet the needs of the partner organization.

Overall, participants in the COPPE project gained increased knowledge of the work of each other's institutions, practiced collaboration with an institution different from their own, and expanded their professional networks. CSMC participants improved skills in effective science communication and gained knowledge about the informal science education (ISE) field. OMSI participants increased their knowledge about cutting-edge CSMC research and gained new exhibits/activities that will bring local scientific research to diverse public audiences. This evaluation of the COPPE project illustrates how partnerships between science research centers and informal science education

institutions can be developed in a relatively short amount of time, as well as ways in which future partnerships can build on the challenges and successes of the COPPE project.

## Project Background

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In January 2009, the U.S. National Research Council (NRC) released a report about informal science education (ISE), *Learning Science in Informal Environments: Places, People, and Pursuits*. In releasing the report, the NRC noted that "tens of millions of Americans, young and old, choose to learn about science in informal ways - by visiting museums and aquariums, attending after-school programs, pursuing personal hobbies, and watching TV documentaries, for example. There is abundant evidence that these programs and settings, and even everyday experiences such as a walk in the park, contribute to people's knowledge and interest in science." Philip Bell, associate professor of learning sciences at the University of Washington and co-chair of the NRC ISE committee, added that "Learning is broader than schooling, and informal science environments and experiences play a crucial role. These experiences can kick-start and sustain long-term interests that involve sophisticated learning."

In light of the powerful role that ISE can have in promoting science interest and learning, institutions of higher learning and science research centers have pursued opportunities to disseminate their scientific research to public audiences through informal contexts. The CSMC-OMSI Partnership for Public Engagement (COPPE) project was developed to establish a strong and long-lasting partnership between one such scientific research center, the Center for Sustainable Materials Chemistry (CSMC), and an institution well-versed in ISE, the Oregon Museum of Science and Industry (OMSI). (See Appendix A for descriptions of each institution.) Through participation in this project, COPPE researchers and OMSI educators sought a deeper understanding of each other's profession while simultaneously developing a suite of ISE outreach programs that engage the public in new and enduring ways. These new ISE platforms were developed to enhance public awareness in the areas of CSMC science, chemistry, and sustainability—research that will enable a new generation of sustainably manufactured electronic and energy devices. Across the lifespan of the project, CSMC staff included funded graduate students, postdocs, and management, while OMSI staff hailed from the areas of programs, exhibits, research and development, events, and management. For purposes of this report, CSMC staff members are referred to as "researchers" and OMSI staff members are referred to as "educators," despite individual staff members holding various specific titles related to their respective departments and work groups.

The intended impacts on the participating researchers and educators included:

- Skills: This project will increase the project team's capacity to facilitate collaborations that create informal learning experiences that highlight CSMC research.
- Attitudes: This project will increase project team members' confidence in their ability to work effectively in collaboration with each other.

CSMC at Oregon State University received a National Science Foundation (NSF) grant in 2012 to support the COPPE project in response to the NSF Dear Colleague Letter *NSF 12-056: Promoting Partnerships between Centers for Chemical Innovation and Informal Science Education Organizations FY2012 Supplemental Funding Opportunity*. CSMC reached out to OMSI as collaborator in this grant, which enabled CSMC and OMSI to create a new partnership through the planning and development of COPPE activities. Planning for the project began in late 2012 and activities began in early 2013. With the help of no-cost extensions to the grant, activities continued through mid-year, 2015.

The COPPE project took place in two distinct phases, culminating in the development and facilitation of ISE pilot projects related to CSMC research themes. The first phase involved professional development for both CSMC and OMSI participants through workshops at each organization's respective location. The second phase focused efforts on a smaller, core group of COPPE participants chosen to be ISE Fellows that worked intensively with OMSI educators to develop pilot programs that would engage the community in ISE. This phase culminated in the development of pilot projects, which included a tabletop exhibit with facilitated activities and a card game that were tested and revised through facilitation on the OMSI museum floor.

Similarly, the COPPE project evaluation took place in multiple stages to match the processes of partnership formation. A front-end study was conducted during the *partnership formation* stage, followed by a formative study during the second stage of *partnership development*, and an additional formative study during the third stage of *partnership maintenance*. This report draws from all of these previous studies to offer a formative case study

evaluation of the project as a whole. Specific details about each evaluation stage can be found in the Project Evaluation section below.

## Project Phases

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As noted above, the COPPE project was structured into two phases, culminating in the development of pilot projects.

### Phase I

During the Phase I of the collaboration, the CSMC and OMSI participants attended professional development workshops at both institutions' respective locations.

### Phase II

During Phase II, a smaller, core group of CSMC ISE Fellows worked with OMSI educators to develop ISE outreach activities that highlight CSMC science, chemistry, and sustainability.

### Pilot Projects

The culmination of Phase II involved the development and creation of pilot projects that addressed aspects of CSMC research in the context of ISE. These activities were then facilitated at OMSI and refined to become elements of OMSI's travelling education programs.

## Project Activities

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### Professional Development Workshop at CSMC

OMSI participants first met with CSMC participants during a site visit on January 31, 2013 at the CSMC facility in Eugene, Oregon. (See Appendix B for the full agenda.) During this visit, OMSI educators met with CSMC students and researchers and gained exposure to their work. Representatives from specific CSMC working groups were present to cover research related to solution thin films, nanopatterning and clusters. CSMC researchers from each group presented ten-minute "flash talks" explaining the rationale and real-world applications of their work with follow-up questions from OMSI participants. OMSI participants were then paired up with members of each of the four research groups and given the opportunity to talk more in-depth about those particular research areas and topics. The four groups also provided tours of their respective work areas in the CSMC facility.

During the last half of the workshop, each of the four groups, now comprised of CSMC researchers and OMSI educators, worked together to develop demos or skits that integrated public education techniques with CSMC research. The groups selected a public audience for a mock presentation, and were given time to develop a demonstration of CSMC research with this audience in mind. During the last hour of the workshop, the four groups presented their collaborative work to the larger team and discussed some ways that the two institutions might collaborate in the future.

This professional development workshop provided an initial opportunity for CSMC researchers to practice explaining their research to a general audience, while OMSI participants were able to learn more about the organizational culture of CSMC, socialize with individual researchers, and gain some preliminary knowledge about the scientific research occurring at the center. In addition, one of the group activities at this workshop resulted in the creation of an entertaining, educational limerick story that was later adapted as an illustrated installation at both the University of Oregon and Oregon State University CSMC facilities, with copies distributed at OMSI as well.

### Professional Development Workshop at OMSI

Just over one month after this initial workshop, on March 8, 2013, CSMC researchers and educators traveled to Portland to attend a professional development workshop in an ISE organizational setting at OMSI. (See Appendix C for the full agenda.) This day-long workshop included directed training in science communication skills as well as

an opportunity for CSMC participants to tour the OMSI facility, meet and speak with OMSI educators in various roles in the museum, and gain a better understanding of OMSI's organizational culture and educator personalities.

Some of the workshop content was based on modules from the NSF funded Portal to the Public (PoP) project (DRL-0639021), which developed a suite of resources led by Pacific Science Center (PSC), located in Seattle, Washington. The PoP project was designed to bring ISE institutions and science researchers together in face-to-face public interactions that promote public awareness and appreciation of current research and its applications. Portal to the Public is an internationally recognized program whose professional development modules have been proven to increase participating scientists' communication skills (Sickler 2011). COPPE co-PI Lauren Russell drew on her experience as lead developer of these modules while Senior Personnel and Project Manager for Portal to the Public (2007–2010) to present selected modules to CSMC participants during their OMSI visit. These proven professional development modules provided instruction and facilitation of activities related to effective science communication techniques to CSMC researchers during their OMSI visit.

### **Pilot Projects**

Following the two professional development workshop visits between CSMC and OMSI, a small working group of staff from each institution convened at OMSI for a partnership summit meeting in June 2013. The goals of the summit were to debrief professional development experiences, solidify direction and plans for the pilot public engagement projects, and begin implementation of these pilot projects. During this meeting, COPPE leadership decided to pursue development of pilot projects in the form of ISE demos, kits, or tabletop facilitated activities that could be tested and facilitated at OMSI and in other ISE contexts. An application process was created to select a handful of CSMC researchers to become members of a core team that would develop and test pilot projects for COPPE. This team took the form of a fellowship program at CSMC called the Informal Science Education (ISE) Fellowship.

Following this summit, the COPPE leadership distributed an application for CSMC researchers to become ISE Fellows as part of the COPPE project. The selection process was completed and fellows began meeting with OMSI educators in July 2013. Each ISE fellow worked as part of a team to develop a pilot project in collaboration with OMSI educators. The fellows were divided into two teams: one team located at the CSMC facility at University of Oregon in Eugene, and one team at a CSMC facility at Oregon State University in Corvallis. Fellows and OMSI educators met in person once at CSMC in Eugene, Oregon and once at OMSI in Portland to brainstorm and narrow ideas for their pilot projects. Ideas for demos were based on the messages and processes related to research and activities happening at the CSMC. These two teams then worked internally to further develop and create their demo, with OMSI educators on call to provide guidance and assistance as needed. Two follow-up meetings between OMSI educators and CSMC teams were held via online videoconference during the development of the demos. Frequent email communication was used between fellows and educators to keep in touch and provide ongoing support.

By spring 2014, one team had fully developed a tabletop exhibit with facilitated activities and was ready to test a prototype at OMSI. During a meeting at OMSI, the fellows and educators went through the program record process and had the opportunity to try out the demo with museum visitors on the OMSI floor. Floor testing occurred through a series of prototyping events on the museum floor. The exhibit was then refined and finalized as the researchers joined OMSI's Science Communication Fellowship program, which allowed the researchers opportunities to facilitate their exhibit demonstrations at OMSI's monthly *Meet a Scientist* program. Demonstrations were further refined and continued to be facilitated at OMSI throughout summer 2014. The second pilot project took the form of an educational card game and was completed summer 2014. Testing of the game on the OMSI floor took place beginning in August 2014. If well-received, the game will also become part of OMSI's educational offerings.

## **Project Evaluation**

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### **Evaluation Stages**

The evaluation approach of COPPE was a developmental case study involving a series of formative studies followed by opportunities for stakeholders to reflect on the findings to shape and benefit the developing partnership in an ongoing manner. The timing of the evaluation studies were matched with the stage of partnership development as recommended by the Centers for Disease Control and Prevention (CDC) in *Fundamentals of Evaluating Partnerships: Evaluation Guide* (CDC 2008). This final culminating report includes data collected through each of the three studies.

#### *Front-End Study*

During the *partnership formation* stage (GY1, Q1), evaluation staff conducted a front-end study to better understand the target audience involved in the project, identify needs the partnership would address and potential challenges it would encounter. The study, which involved an online survey, also provided a baseline to understand changes over time. (See Appendix D for the instrument.)

#### *Front-End Evaluation Questions:*

- What do participants perceive as the purpose of this partnership?
- How would participants define a successful partnership?
- What are participants' motivations for being involved?
- What are anticipated benefits and challenges of the partnership?
- What are participant's prior experiences working in a similar partnership?
- What are participants' perceptions of their partner's organization and area of expertise?
- What specific public audiences do the partners want to reach with their work?

#### *Formative Study #1*

During the *partnership building* stage (GY1, Q2 and 3), evaluation staff conducted an initial formative study that examined levels of partner participation, satisfaction, and engagement and reported changes in relationships, skills, and confidence after the professional development workshops. The study also identified areas for improvement. Data collection took place at both workshops and participants were asked to fill out a questionnaire at the end of the day. (See Appendix E for the instrument.)

#### *Formative Study #1 Evaluation Questions:*

- What aspects of the workshops did participants find enjoyable? What could have been improved?
- Do participants feel that the CSMC-OMSI partnership is, or can be, successful?
- What are the anticipated benefits and challenges of collaborating? Have these changed?
- What are participants' current levels of confidence in their ability to work effectively in collaboration with one another? Have these changed?
- What are participants' familiarity and perceptions of their partner and their field of expertise?
- What collaborative project ideas do participants have now that they have gotten exposure to one another, both in the short and long term?

#### *Formative Study #2*

During the *partnership maintenance* stage (GY2, Q1 and 2), evaluation staff conducted another formative study that focused on changes in partner relationships, skills, and confidence; measured partnership commitment and sustainability; and identified areas for improvement. This study took place in July 2014, towards the end of collaborative development of the pilot public engagement program. Interviews and an online survey were conducted as part of this second formative study. (See Appendices F and G for the instruments.)

#### *Formative Study #2 Evaluation Questions:*

- Partner Relationship:
  - What is the nature of the partnership?
  - How has the partnership changed since the beginning of the project?
  - What were the primary benefits of and barriers to this partnership?
- Skills and Confidence:
  - How have the skills and confidence of partner participants changed regarding their

ability to create and sustain meaningful and effective partnerships?

- Partnership Commitment:
  - How will the skills and experience gained from this partnership inform future partnerships or project?
- Partnership Sustainability:
  - How likely is the partnership to continue after the grant is complete?

### *Final Report*

Now in the last quarter of the project, the present final report tells the story of the developing partnership by describing impacts on participants and changes over time. This report also includes discussion and recommendations for the partnership's future. This final report evaluates the project as a whole to better understand the nature and function of the partnership throughout the life of the grant. This study's findings are intended to provide insight into partnership development and maintenance for COPPE participants as well as other institutions interested in creating or developing new partnerships.

### **Data Collection**

#### *Front-End Study*

Participants in the front-end study included individuals from both organizations (CSMC and OMSI) who planned to attend the first professional development workshop event. Data was collected through an online survey in mid-January 2013 and participants were recruited via email to respond. A total of 13 CSMC staff and nine OMSI staff participated in the survey.

#### *Formative Study #1*

After participating in the two professional development workshops at CSMC and OMSI, these individuals were invited to take part in a post-workshop formative study. OMSI participants were asked to complete an online survey after their visit to CSMC, and CSMC participants were asked to complete a paper version of the survey at OMSI at the end of that day's workshop. A total of 11 CSMC staff and 7 OMSI staff participated in the surveys.

#### *Formative Study #2*

Near the end of the COPPE project, a second formative study was conducted among CSMC fellows, staff, and liaisons; OMSI educational staff and liaisons; and individuals in relevant leadership positions in COPPE, CSMC, and OMSI. Due to the narrowing of CSMC participants to involve only the ISE Fellows, the subject pool for this study was slightly smaller than for the previous two studies. Participants were asked to complete an online survey and/or participate in a short phone or in-person interview with an OMSI evaluator. A total of 9 surveys were collected (6 from CSMC and 3 from OMSI), and 8 participants completed a short interview (5 from CSMC and 3 from OMSI).

### **Data Analysis**

For all studies, data were downloaded from the online survey host Survey Gizmo in .csv format and uploaded into Excel and/or SPSS. Mean and frequency analysis was conducted on quantitative data, but the majority of qualitative data were inductively analyzed and interpreted for common issues and themes. Verbatim quotes were selected from open-ended questions to provide illustrative examples in evaluation reports.

### **Limitations**

The COPPE participants at the beginning of the project were not always the same individuals involved at the end of the project, so descriptions of changes over time are influenced in part by the fact that different people were being surveyed/interviewed at different points in the project. With a small group of participants, there is always the risk of over-influence by one or two vocal members of the group or those who happened to be available during data collection. And although all participants' data was kept as confidential as possible, confidentiality could not be guaranteed in such a small group. This fact, along with the fact that the evaluators are OMSI staff members, may have influenced the responses of some participants who may have worried about negative comments impacting their employment or participation in the COPPE partnership. In addition, different evaluation staff members were

involved at the beginning, middle, and end of the project evaluation, so the coherence of the project overview may be limited by this change in perspective and relay of information between various individuals.

## Summary of Findings

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### *Partnership Formation*

Before COPPE participants had hosted any group workshops or otherwise interacted as a group, participants from both CSMC and OMSI were surveyed as part of a front-end study to learn more about their views of their partner organization, what the perceived benefits and purpose of the COPPE project were, what worries they had about anticipated challenges, as well as what they thought would define a successful relationship between the two partner organizations. Based on these findings, many participants were excited about the prospects for the COPPE project, but still a bit unclear about the specifics of the partnership as well as the work of their organizational partner.

While CSMC respondents were relatively familiar with OMSI and had at least some personal experiences with the museum, fewer OMSI participants were aware of CSMC or the work of the Center. Similarly, CSMC respondents exhibited some knowledge about public engagement in science, in which OMSI staff were well-versed, but described such engagement in somewhat vague or even apprehensive terms such as “difficult” or “afraid.” Likewise, OMSI respondents generally reported little to no understanding of the specific work of CSMC outside of its relationship to sustainability and related chemistry research, with responses to the request to describe CSMC including “huh?” and “nothing [comes to mind].” Although some CSMC participants had prior experience related to public engagement in science or ISE, OMSI respondents had little to no experience conducting scientific research or demonstrated in-depth knowledge of the types of chemistry familiar to those at CSMC. As one OMSI respondent noted:

“I have more experience teaching science than doing it. I haven’t done any original research.”

This relative unfamiliarity between the two organizations clarified the need for the partnership and underscored the gap in knowledge that would need to be addressed to make the partnership successful. This lack of familiarity did not discourage participants, though. Many respondents from both organizations reported having prior experiences creating successful partnerships with other organizations, with nearly one third reporting having a “great deal” of prior experience. Such participants drew confidence from their past experiences, with quotes such as:

“Collaboration is one of the things we do in the Center.”

“I have almost ten years’ experience playing this game.”

Respondents showed eagerness and excitement in relaying positive motivations for their participation as well as clear anticipated benefits for them personally and as part of a larger organization.

When asked what the anticipated institutional and personal benefits of participation would be, commonly-mentioned benefits related to public outreach and the sharing of innovative scientific research with public audiences, as well as increased skills in relaying complex research through effective science communication. These benefits were often understood as a form of professional development, with the focus on the benefit to the COPPE participants, while others focused on the overall benefit to the public who would gain increased knowledge about CSMC-related scientific research. OMSI respondents tended to focus more on professional development, but also on building institutional partnerships as itself a worthwhile, beneficial experience and goal. The focus on the partnership itself is reflected in comments from OMSI participants such as:

“Networking, new resource, making connections between science centers and researchers.”

“Develop a better understanding of how we can structure a sustainable partnership for long-term collaboration.”

CSMC respondents tended to focus more on the benefits of improved communication and sharing knowledge with the public. Responses included:

“Better communication with a general audience in a way that promotes dialogue.”

“Afford me new perspectives of how to present my research in different ways.”

These foci were also reflected in respondents’ reported motivations for participation: CSMC participants were highly motivated by the prospect of improving their science communication skills, while OMSI participants were motivated by opportunities for networking and increasing professional knowledge related to CSMC’s scientific research.

When asked to rank statements that would define a successful partnership, respondents’ answers reflected lessons from their past experiences with partnership-building as well as some apprehensions about gaps in knowledge and understanding between the two institutional partners. The most important elements selected for a successful partnership were high-quality, open communication, followed by having a shared goal or interest, and a commitment or willingness to collaborate on both sides. Communication, then, was valued not only as one of the goals of the partnership (increased science communication skills) but also as a means to achieve it. As communication had emerged as an important anticipated benefit by CSMC respondents, it also was selected by CSMC as the most important factor for success.

The second most-mentioned criteria for a successful partnership, a shared goal or interest, highlighted the participants’ awareness that they lacked understanding of each other’s organizational goals and motivations for participating in COPPE. Indeed, one of the anticipated challenges noted by CSMC related to finding a balance in roles and “finding projects that benefit both groups.” Both OMSI and CSMC agreed that a common challenge would be finding ways to communicate across work cultures and knowledge gaps, but CSMC understood OMSI as having expertise in effective communication and thus as offering a clear benefit to CSMC. When explaining the purpose of the partnership, some CSMC participants seemed less sure what benefit they were offering to OMSI. Although OMSI was able to clearly state what they expected to gain from the partnership, some of OMSI’s responses reflected a similar understanding of the relationship where:

“OMSI will inform the public about CSMC and CSMC will learn how to engage the public.”

This framing places OMSI in the role of teacher and CSMC as student. In a few responses from both institutions, OMSI was described in the role of a “helper” to CSMC, with more focus on the benefits to CSMC than the benefits to OMSI.

The most common anticipated challenge mentioned by COPPE participants at this stage related to working across geographical distances. CSMC participants already hail from more than one location—the University of Oregon in Eugene and Oregon State University in Corvallis—so adding an additional participant up in Portland meant that this partnership would need to find ways to develop cohesion despite a lack of proximity. Participants also anticipated challenges related to the project structure.

“It may be hard to identify tangible tasks and goals.”

“Finding a balance in who plays what role.”

“[Limitations of] time frame and budget.”

These findings show that members of COPPE entered into the partnership highly motivated and anticipating concrete benefits, despite some unfamiliarity between the institutions. This unfamiliarity motivated participants to

want to engage with each other with a commitment to collaborate; to work towards a shared goal/interest; and openness to quality communication. The lack of familiarity between institutions was offset by participants' confidence in prior experiences with institutional collaborations, but most COPPE members entered into the project with an awareness of the challenges that the project would bring.

### *Partnership Building*

The COPPE kickoff began with a series of two institutional visits. COPPE project participants from OMSI travelled to CSMC for an initial workshop, followed by a visit by CSMC to OMSI for a second workshop. After each visit, participants were asked to complete a second survey that followed up on questions from the earlier survey from the front-end study. This survey asked about any changes in participants' familiarity with each other's organization and its work, their level of confidence in their ability to be an effective collaborator, anticipated project benefits/challenges, as well as project ideas for the organizations as they moved forward in the project.

Through these two workshop events, both CSMC and OMSI respondents relayed significantly increased familiarity with each other's institutions and work. This increase in familiarity related to aspects of organizational culture, structure, program offerings, and goals. In addition, COPPE participants perceived the organizational culture at their partner institution as being similar to their own, which further bridged the perceived gap in knowledge between organizations. Even if participants didn't know everything about their partner organization, they knew a bit more about how that organization functioned, in addition to now having had interpersonal experiences with one another. These interactions also contributed to positive affective perceptions of one another, with CSMC in particular using affective attributes in their descriptions of OMSI, such as "creative," "passion," and "exciting." In addition, CSMC respondents demonstrated many positive associations with public engagement in science after the workshop at OMSI, more so than they did prior to the workshops. Such words included "enthusiastic," "interactive," "adventure," and "rad." CSMC participants left the OMSI workshop excited about the skills they had gained in science communication and the experiences they had learning more about OMSI as an organization. CSMC comments included:

"I had so much fun."

"Lots of participants and excitement from both sides."

After the CSMC workshop, OMSI respondents showed an increase in specific knowledge about the work of CSMC and its research, as well as an increased understanding of the centrality of sustainable innovation to the work of the Center. Responses included:

"[I have a] better understanding of the breadth of programs offered [at CSMC and its] staff/volunteer structure."

"I'm much more aware of what CSMC does and how it's important in my life."

Some OMSI respondents voiced appreciation for how much they had learned from the CSMC workshop, as well the difficulty some of them had with understanding the complexity of the research that was presented to them. Comments included:

"A lot of the CSMC research projects are really complex and may require a fair amount of prior knowledge to comprehend. I think that we will be challenged to slice off the right pieces of their work for demos and programs that don't 'dumb it down' (I hate that!) but rather make the content relevant and accessible."

"Most of the OMSI people at the PD day are pretty knowledgeable when it comes to chemistry. We're no dummies. And still, the content was just barely within the realm of our (or at least my) understanding. I think that to take this information and try to convey it to the public—whose members are likely to have a shallower base understanding of chemistry than the average OMSI employee—will be a challenge. A good challenge though."

Their exposure to CSMC research during the workshop left many OMSI participants keenly aware of the difficult task that lay ahead for the COPPE project—first of teaching OMSI staff about CSMC research, and then of working with CSMC to find a way to effectively communicate that research in an easily understandable form to the general public.

Despite the awareness of the hard work that lay ahead for the COPPE project, participants left the workshops feeling confident in their ability to work with one another to create a successful partnership. The criteria that participants had outlined in the previous survey—quality, open communication; shared goal or interest; and commitment and willingness to collaborate on both sides—were reflected in respondents’ sentiments about the partnerships’ likelihood for success, with many articulating satisfaction with their partner institutions’ respective communication style, overlapping goals/interests, and commitment to the project.

COPPE participants were asked to relay ideas for potential collaborative projects or activities. OMSI participants had several ideas for programs that involved hands-on activities, demos, and portable exhibits. CSMC offered ideas that focused on collaborative exhibits. Members from both organizations described ideas for collaboration that would extend long-term, such as OMSI becoming a “portal” for CSMC’s research to the public, or for the creation of structures through which CSMC members could volunteer or intern at OMSI on a regular basis.

#### *Partnership Maintenance*

In the time between the initial workshops and the final project evaluation, the number of CSMC participants were whittled down to those chosen by CSMC to be ISE Fellows. These fellows consisted of CSMC graduate students and post-doctoral fellows. Thus, a number of participants from CSMC in the workshop at OMSI and in the subsequent survey did not continue to be part of the COPPE collaboration. In addition, the nature of meetings changed from large groups to small groups. Where individuals at the initial workshops included COPPE project leadership and institution staff members present as representatives of their organization, once the pilot projects were under development, interactions between COPPE participants occurred primarily within and between the two CSMC pilot project teams (one at the University of Oregon, one at Oregon State University) and a couple of educators at OMSI. Prior to the pilot development process, the project kick-off workshops occurred in person as each institution hosted the other. During pilot development, CSMC and OMSI participants also met in person, with additional follow-up communication occurring through videoconference or email.

After developing their partnership over the course of 16 months, COPPE project participants were invited to take an online survey and/or complete a short phone or in-person interview to learn more about their understanding of the partnership, partnership changes over time, changes in skills and/or confidence related to partnership-building, and suggestions for future improvements.

Overall, COPPE participants expressed that their relationship with their partner organization was a positive one, and that their understanding of the work of their partners had increased over time. Both CSMC and OMSI participants exhibited high regard for their partner organization and the scientific and/or educational work that they do. Comments included:

“Everyone I’ve worked with...has been great—very friendly and easy to communicate with.”

“I think our skill sets have...really complemented each other.”

“The people at CSMC have always been so welcoming and really excited to share.”

“It was really interesting...the interaction we got with OMSI beforehand... [made] creating something like this enjoyable.”

When asked to relay any benefits that emerged from the partnership, both CSMC and OMSI participants easily named several specific personal and organizational benefits. Repeatedly, CSMC participants noted primary benefits related to increased science communication skills and practice relating their research to the public. Both ISE fellows and CSMC leadership noted these benefits in detail. In particular, the project enabled ISE fellows to grow as

graduate students/post-docs and developing researchers by providing benefits to their confidence, increases in self-efficacy related to ISE facilitation, and their ability to interact with OMSI “professionals” or the ISE “industry.” Comments included:

“The whole thing was pretty special...I hadn’t had that kind of opportunity before in grad school and didn’t really have the opportunity to pursue those things as an undergrad so this whole thing was kind of unique for me.”

“I think it’s even helped...with how you communicate about science with other scientists...it’s better...to be a little bit more narrow...in the words that you use.”

“It’s been very valuable to run [the demos] over and over again because every time I feel like I learn something new and think about a new way to do it.”

Various CSMC respondents noted personal and professional growth areas including improved listening skills, increased willingness to be assertive and ask questions, and increased confidence in their ability to seek out partnerships in future. For example, some CSMC respondents noted:

“I would say [I’m] more likely...I feel a little more empowered [to try and [build another partnership in the future].”

“Every time I work in big groups like this...I learn a little bit more about ‘OK, I just got to get out of my shell and I’ve got to just ask the questions that need answered’ because chances are they’ve got a really unique perspective ...so I got a really healthy respect for taking perspective from people from all sorts of different backgrounds in trying to figure out what would work best for our demo.”

“I think scientists sometimes get a little bit caught up in, ‘Oh, only I understand what it is that I’m doing’ and I think that’s counterproductive. I think the best thing you can do is be really open to hearing what people have to say...especially people who are not an expert.”

The benefits of participation were clearly described by OMSI respondents as well. Many vividly described their excitement and enjoyment with working one-on-one with the ISE fellows at CSMC. The OMSI educators expressed genuine pleasure and pride in collaborating in the development of the demos with ISE fellows, as well as excitement that additions were made to the collection of OMSI’s education offerings. In addition, the benefits of learning more about CSMC’s scientific research were highly valued by OMSI participants.

“I think it’s really awesome to actually have current science on the [museum] floor and to have people be able to see somebody and say, like, ‘Oh, this person is just like a normal dude! ...they don’t wear lab coats and are old and have crazy white hair or something!’ I think that has a huge benefit.”

“[The CSMC ISE fellows] actually led the development of those demos and filled our template and did some pretty extensive work.... and now we have two permanent demos that will be on the floor! That’s pretty cool.”

“It’s been really interesting just to learn about their work, to tour their facilities and see things I haven’t seen before.”

OMSI participants mentioned that they had personally increased their knowledge of CSMC science, and that OMSI had greatly benefited by the production of science demos as COPPE pilot projects.

Some challenges that participants had anticipated at the beginning of the partnership continued to be voiced near the end of the project. These barriers included geographical distance, competing time commitments, limited program capacity/grant duration, and uncertainty about program structure.

“[At the beginning of the project] it was really open ended in terms of what we would do; we had a basic structure around the relationship development and professional development...and because it wasn't super specific it took us a while to define that and move it forward and have...the focus to pick what we wanted to do moving forward and make it tangible.”

“The only problem that I ran into was...about the timeline.... [Deadlines] just so happened to be [while people were] working on thesis and graduating and all these other big life changes.”

“We have more students interested in this type of program than we can support. We're not limited by the number of students who would like to participate.”

“The biggest barrier I found...was just the distance between Eugene and Portland, it makes it a lot more difficult.... You pretty much take a whole weekend, or getting home pretty late so it's just kind of hard to pop up and pop down and things like that.”

However, these barriers did not stop COPPE participants from describing increased confidence in their ability to create and maintain similar partnerships in the future. CSMC respondents specifically noted ways in which increased understanding of ISE and skills in science communication will be useful in creating new relationships with other organizations in the future. Increased understanding of the types of structures that help create and maintain an institutional partnership was also mentioned as a confidence-boosting outcome of the COPPE project.

“Through this partnership, I have learned how to better communicate with a wide variety of people, including educators.”

“I find myself thinking about how I would simplify something I am doing to be able to explain it to someone outside the CSMC.”

“Because we have gained access to an organization that has such a great understanding of how to be effective and disseminating knowledge to the general public, we have started to gain some of those skills and are implementing them in our own outreach as well.”

Nearly all respondents expressed belief in and/or desire to see some sort of continued relationship between CSMC and OMSI after the COPPE project ends. The exact nature of the relationship was unclear to many, but participants speculated that such a partnership would be less formal, more sporadic, and less group-based, more likely taking the form of individual collaborations. Some of the ideas included:

“I still want to work on making my own demo for Meet a Scientist day...and I think that's going to be the shape of the partnership moving forward. I mean, people who want to stay connected and involved will [do so], but I would be surprised if there were any more of the group activities.”

“One of the things we've been pushing for is... getting a library of these demos that we can really bring out into the public and... if it's something where we can have it be really versatile and going into outreach all over the state in different areas, I think that would be really cool.”

“I would like to see... having some number of CSMC students participate in the fellowship every year and that provides sort of an ongoing connection. Maybe something else, an event that we invite them to or that they invite us to... some ongoing but low-cost things.”

“It would be awesome if all CSMC people also became Science Communication Fellows people...like it was just standard.”

However, a few respondents noted that continuing the partnership would be difficult once the funding is no longer available, and that barriers to continued work together included the lack of a leader/facilitator and an uncertain structure within which the partnership could keep growing.

### *COPPE Project Benefits*

Findings suggest that the COPPE project provided the following benefits:

#### CSMC Benefits

CSMC had a positive experience working with OMSI participants and CSMC colleagues in COPPE.

CSMC gained one-on-one professional relationships with some other CSMC colleagues and OMSI participants.

CSMC expanded its professional network by creating a new relationship with an ISE organization.

CSMC gained confidence in participants' abilities to create and participate in partnerships with ISE organizations in the future.

CSMC gained increased understanding of OMSI's organizational structure, culture, and goals.

CSMC gained and practiced skills in effective science communication to public audiences.

CSMC gained and practiced skills in creating interactive ISE projects/activities.

CSMC gained experience interacting with a variety of age groups and populations among the general public in an ISE context.

#### OMSI Benefits

OMSI had a positive experience working with CSMC participants in COPPE.

OMSI gained one-on-one professional relationships with some CSMC participants.

OMSI expanded its professional network by creating a new relationship with a research organization.

OMSI gained increased understanding of CSMC's organizational structure, culture, and goals.

OMSI gained and practiced skills in facilitating interactions between scientists and members of the public.

OMSI gained and practiced skills in working with a specific kind of scientist (materials science/chemistry) and research organization (research center housed within an institution of higher education).

OMSI gained knowledge about the scientific research occurring at CSMC.

OMSI gained additions to its onsite museum offerings by testing exhibit demos that covered CSMC's current, cutting-edge scientific research.

## **Discussion and Recommendations**

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The COPPE project set out to establish a strong and long-lasting partnership between CSMC and OMSI. Through participation in the project, it was intended that COPPE members gain a deeper understanding of each other's professions and related expertise. This understanding would be utilized to develop ISE outreach programs that engage the public and enhance awareness of CSMC research related to chemistry and sustainability.

The intended impacts on participants were:

- Skills: This project will increase the project team's capacity to facilitate collaborations that create informal learning experiences that highlight CSMC research.
- Attitudes: This project will increase project team members' confidence in their ability to work effectively in collaboration with each other.

Clearly, both CSMC and OMSI partners greatly benefitted from participation in the COPPE projects. Participant experiences were positive, knowledge was gained, and skills were practiced and improved. New connections between members of CSMC and OMSI have opened opportunities to call on one another for advice and collaborations in the future. The COPPE project offers an example of how a scientific research center and an ISE organization can team up to create collaborative projects that benefit both parties. The COPPE project also offers a model to other organizations who desire to create an effective partnership with another institution.

The evaluation of the COPPE project addressed the extent to which the partnership was successful and whether it achieved its intended impacts. Through this evaluation, one key challenge emerged, which when analyzed more closely, may enable other organizations to build on COPPE's successes and lessons learned.

### **Mutual benefits**

One of the criteria for successful partnerships selected by COPPE participants in the front-end survey pertained to having a shared goal or interest between the two organizations. The importance of this shared goal/interest for the team underscored the need for each partner to get to know each other's institution and field of expertise. CSMC held expertise in sustainable materials chemistry; OMSI held expertise in informal science education and communication to public audiences. Both partners also hoped to benefit from each other's expertise. CSMC hoped to benefit by gaining professional development skills related to effective science communication strategies that would better equip them to share their research with the public. OMSI hoped to benefit by learning about the innovative scientific research happening at CSMC to create new exhibits about current scientific research for use on the OMSI floor and by OMSI outreach educators. In order for these benefits to be gained, each partner needed to spend some time listening to and learning from their partner organization.

However, some respondents expressed worry from the beginning of the project about the potential for mutual benefit for both participating organizations. As noted in the above findings, the relationship between OMSI and CSMC was characterized by some as a "helping" or "teaching" relationship, in which the knowledge and skills held by OMSI were perceived as greater or more important than those held by CSMC—at least as they pertained to this specific project. Even as the project progressed and participants from both organizations expressed that they did indeed learn more about each other's institutions and fields of expertise, this perception of uneven benefit remained through to the end of the project among a few CSMC participants. Some CSMC participants mentioned that they did not perceive OMSI as fully understanding CSMC research, and at least one OMSI participant agreed that CSMC research was difficult for them to understand. While OMSI respondents to survey and interview requests all expressed clear benefits from their participation in the project—both personal and professional benefits—OMSI's benefits were not clear to some members of the project from CSMC.

The impression that OMSI did not stand to gain as much from the partnership as CSMC, while untrue, may have influenced some of the relationships and collaboration that went on between the two groups. Given this perception among some COPPE participants, some recommendations for future projects include:

- Clearly and consistently articulate the needs of and anticipated benefits to both organizations in the partnership, and update or add to these needs and benefits as the relationship progresses.
- Ensure that both organizations are given enough time to present their work and ensure full understanding by the partner organization. Follow up with additional forums for sharing questions and expertise.

### **Conclusion**

Organizations embarking on new institutional partnerships may benefit from this evaluation of COPPE's project. The above discussion outlines one way in which the COPPE partnership could have been improved, but the project overall was an enjoyable and enriching experience for its participants. Members of both organizations eagerly expressed interest in their partner's work and enjoyment working with their staff and students. Both organizations voiced appreciation for the welcoming environment created by their partner, as well as each partner's openness to conversation and willingness to learn. CSMC participants gained skills in science communication and experience sharing their research in accessible ways to diverse audiences in an informal science education context. OMSI participants learned about new research in sustainable materials chemistry and filled an ongoing need to create exhibits and demos that incorporate current, innovative scientific research and applications. Both teams increased their understanding of each other's institutions and fields, and one-on-one relationships were built that may be the basis for future collaborations or activities. In addition, some members of the general public will now be exposed to current scientific research that they may not have otherwise experienced, and this exposure may spark an interest in science and sustainability that has positive impacts on that individual, their community, and beyond. This evaluation of the COPPE project illustrates how partnerships between science research centers and informal science education institutions can be developed in a relatively short amount of time, as well as ways in which future partnerships can build on the challenges and successes of the COPPE project.

## Sources Cited

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Centers for Disease Control and Prevention (2008). *Evaluation Guide: Fundamentals of Evaluating Partnerships*. U.S. Department of Health and Human Services: Atlanta, GA.

National Research Council (2009). *Learning Science in Informal Environments: People, Places, and Pursuits*. The National Academies Press: Washington, DC.

Sickler, J., Foutz, S., Ong, A., Storksdieck, M., & Kisiel, J. (2011). *Portal to the Public guiding framework: Determining the value of a model for scientist-visitor interactions*. Technical report. Institute for Learning Innovation: Edgewater, MD.

## Appendices

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Appendix A: Institution Descriptions

Appendix B: CSMC Workshop Agenda

Appendix C: OMSI Workshop Agenda

Appendix D: Front-End Survey Instrument

Appendix E: Formative Study #1 Survey Instrument

Appendix F: Formative Study #2 Survey Instrument

Appendix G: Formative Study #2 Interview Questions

## Appendix A: Institution descriptions

**About OMSI:** Founded in 1944, the Oregon Museum of Science and Industry is an educational and social hub for people of all ages. Located in Portland, Oregon, OMSI is a 501 (c)(3) nonprofit organization with a \$17,079,790 annual budget (for FY11), and currently employs 274 people with a non-paid volunteer staff of 650 who contribute over 103,885 hours a year. OMSI makes science exciting and relevant with over 219,000 square feet of exhibits, educational programs, and experiences presented in an entertaining and participatory fashion that invite people to explore and invent, to problem solve and think creatively. This past year, more than 858,000 people visited the museum alone, including more than 78,000 children.

OMSI, a museum and informal learning environment, provides personalized, educational experiences for learners of all ages and for family groups together. Emerging data suggests that the best way to increase the public understanding of science is to reach people during out-of-school time, given that only 5 percent of an average American's lifetime is spent in the classroom and only a small fraction of that time is dedicated to science instruction (Falk 2010). A recent National Research Council report, *Learning Science in Informal Environments: People, Places, and Pursuits*, concluded that there is abundant evidence that individuals of all ages learn science in informal, out-of-school learning environments like museums (Bell 2009). The report explains the specific value of museums and science centers for life-long science learning, noting how visitors to these environments pursue and develop science interests, engage in science inquiry and reflect on their experiences through sense-making conversations (Bell 2009).

OMSI's strengths lie in the institutions' organizational commitment to responding to the needs of our communities; providing a variety of stimulating on- and off-site experiences surrounding informal science education; and creating a population of engaged, life-long learners. Traveling and community programs take OMSI into schools and rural locations in five western states. OMSI's programs invite students, families, and adults to engage with science and technology through a wealth of hands-on experiences.

OMSI has special expertise in designing and facilitating informal chemistry learning experiences. The Chemistry Lab at OMSI is the first of its kind to offer a wet-lab experience to the general public, open full time during operating hours. In this unique space within the museum, visitors view exciting demonstrations and take part in hands-on wet chemistry—conducting real experiments that investigate states of matter, density, and chemical reactions. The Chemistry Lab facilitates unique and personal experimentation and research opportunities using equipment and materials not commonly available to students or the public. With funding from the Camille and Henry Dreyfus Foundation and the National Science Foundation, OMSI has developed over two hundred hands-on wet lab activities appropriate for students and families. This curriculum has been published in several comprehensive guides that aim to help informal educators and classroom teachers bring hands-on chemistry learning experiences to students and families outside of OMSI. OMSI will leverage our experience and expertise in this area to create learning experiences that engage the public with current research from the Center for Sustainable Materials Chemistry. These learning experiences, developed in collaboration with the Center through our pilot project, will highlight the specific research questions, methods and findings emerging from this group.

**About CSMC:** The CSMC is a Phase-II Center for Chemical Innovation sponsored by the **National Science Foundation**. Collaborative research in materials chemistry is carried out across six academic institutions – Oregon State University (*Center headquarters*), University of Oregon, Washington University at St Louis, Rutgers University, University of California Davis, and University of California Berkeley. To support its mission, the Center offers several student and professional development opportunities in the areas of education and science outreach. Industry is engaged through sponsored research programs and student internships. The Center offers unique programs to train the next generation of innovators, while also promoting the translation of basic research for societal benefit.

### Mission

Our mission is to conduct curiosity-driven and use-inspired research to enhance the sustainable chemistry toolbox with new methods and new techniques that will advance the scientific enterprise and transform the next generation of products, while preparing students to become the next generation of green chemists.

## Overview

The CSMC is building and studying a sustainable materials chemistry platform for addressing pressing needs in scaling. Semiconductor manufacturers are focused on scaling to ever smaller device structures, while printed and display electronics are focused on scaling performance across very large areas. At the same time, new materials and methods are needed to accelerate the deployment of efficient, very large-area solar energy devices to address global climate change. The CSMC is **exploring** new solution-based methods for producing very high-quality thin films and patterns as building blocks for these next-generation devices. With its water-based chemistries, the Center has demonstrated leading-edge results in nanocluster synthesis, nanopatterning, integrated device performance, and solar water splitting.

## Students and Postdocs Experience

The CSMC strives to broaden perspectives and opportunities through collaborative mentorships and team research on grand scientific challenges. Network building is strongly supported through our broad partnerships, web-enabled meetings, and travel funds. Entry-level students can join the Center through an immersion course that is taught by advanced Center graduate students and postdoctoral scholars. The course is structured around a Center research project that leads to a journal publication. Graduates of the course can participate as instructors in follow-on offerings to enhance professional development toward an academic career. The Center maintains an Informal Science Education program with the Oregon Museum Science and Industry, a unique collaboration for building public communication skills. Numerous internships are available through our many partnerships with industry and the **Oregon Nanoscience and Microtechnologies Institute**. The Center in collaboration with the **National Collegiate Inventors and Innovators Alliance** offers an extensive series of workshops and webinars aimed at educating and preparing students for careers in **innovation**. The Center is an active member of a thriving innovation ecosystem that is focused on enabling and accelerating the translation of basic chemistry research to commercial products.

## Appendix B: CSMC Workshop Agenda



### CSMC - OMSI Partnership for Public Engagement (COPPE) Professional Development Seminar

Date: 1-31-13

Location: UO Lewis Integrated Science Building (LISB) Room 417 (at the north end of the building on the fourth floor)

Agenda:

- 10:00AM - Coffee snacks and informal introductions
- 10:20AM -  CSMC, Opening Remarks
- 10:40AM - CSMC Presentations: six, 10 minute Start with Why flash talks by CSMC researchers
- 6 minute talk, 2 minute questions, 2 minutes to switch speaker
  - Speakers will use a Start With Why format, See Simon Sinek's TED talk [here](#) for an overview of Start With Why
    - **Why:** 2 minutes on why do we do what we do. What are the major issues we are trying to solve and what motivates us to come to work every day: solving the energy crisis, halting global warming, to get my PhD, etc.
    - **How:** 2 minutes on how the materials and techniques that we are developing will address the issues laid out in the Why section
    - **What:** 2 minutes on what you do in the lab to produce the materials or refine the techniques laid out in the How section
- 11:40AM -  OMSI, Presents Science Thursday Activity
- For Science Thursday, OMSI staff will interview CSMC researchers in a [Science Friday](#) or [Radiolab](#) style format. Teams will have until 3:00PM to prepare 8 minutes worth of questions and answers that communicate CSMC science to the public. Teams can use any media to support the presentation: slides, demos, video, audio, etc.
- 11:50AM - Lunch, Break into Science Thursday teams
- 12:30PM - Teams do separate tours
- 1:00PM - LISB 417, 217, and B002 are open for teams to prep for Science Thursday
- 2:45PM - Snacks in LISB 417
- 3:00PM - Science Thursday
- 4:00PM - Adjourn

## Appendix C: OMSI Workshop Agenda

CSMC – OMSI Partnership for Public Engagement (COPPE)  
Professional Development Workshop at OMSI, March 8, 2013

10:00a-10:30a	Welcome, Introductions  Workshop goals: Relationship building: 2 <sup>nd</sup> Date Get to know OMSI: culture, organization, etc. Introduce to best practices in science communication  Brief OMSI History 1962 Serve over 1M a year Programs, exhibits, events Statewide education Discipline of Informal Science Education Increasing focus on current science
10:30a-11:30a	Portal PD: The Pleasure of Finding Out
11:30a-12:30p	Chem Lab: Experience Programs
12:30p-1:15p	Lunch
1:15p-2:15p	Behind the Scenes OMSI Tour
2:15p-3:00p	Panel Discussion/Speed Dating with OMSI Staff
3:00p-4:00p	Portal PD: Building a Common Vision
4:00p-4:30p	Portal PD: Concept Mapping
4:30p-5:00p	Wrap up & Survey

**Appendix D: Front-End Survey Instrument**

1. Please rate and briefly describe your current level of familiarity with <<full name of other org, followed by abbreviation in parentheses>>.

1= Not at all familiar	2= Moderately unfamiliar	3= Slightly unfamiliar	4= Slightly familiar	5= Moderately familiar	6= Extremely familiar
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Please explain your rating: \_\_\_\_\_

2. What three words come to mind when you think of chemistry research?

\_\_\_\_\_

3. What three words come to mind when you think of the CSMC specifically?

\_\_\_\_\_

4. What three words come to mind when you think of public engagement in science?

\_\_\_\_\_

5. What three words come to mind when you think of OMSI specifically?

\_\_\_\_\_

6. If you were going to describe the purpose of the CSMC-OMSI partnership to a friend, what would you say?

7. In your opinion, which of the following factors are the TOP THREE most important for creating a successful partnership between two organizations? Please rank your top three, such that a ranking of "1" indicates the most important factor for creating a successful partnership, a ranking of "2" indicates the second most important factor, and a ranking of "3" indicates the third most important factor.

- a. High-quality, open communication
- b. Mutual trust and respect
- c. A shared goal or interest
- d. Skilled leadership
- e. Sharing and exchanging of information and resources
- f. Commitment and willingness to collaborate on both sides
- g. Shared decision-making
- h. Other (please specify) \_\_\_\_\_
- i. I don't know

8. What do you think some benefits will be for <<your org, abbreviated>> in collaborating with <<other org, abbreviated>>?
9. What do you think some benefits will be for you personally in collaborating with people from <<other org, abbreviated>>? This could be in regards to things like knowledge, skills, or awareness that you hope to gain.
10. What do you think some challenges will be for <<your org, abbreviated>> in collaborating with <<other org, abbreviated>>?

Please rate and briefly describe your current level of previous experience with the following items:

11. Collaborating with others that have expertise from different areas of science and/or science education

1= No experience	2= Very little	3= A little	4= Some	5= Quite a bit	6= A great deal of experience
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Please explain your rating: \_\_\_\_\_

12. Engaging a public audience in science concepts

1= No experience	2= Very little	3= A little	4= Some	5= Quite a bit	6= A great deal of experience
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Please explain your rating: \_\_\_\_\_

13. Conducting science research to advance the field

1= No experience	2= Very little	3= A little	4= Some	5= Quite a bit	6= A great deal of experience
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Please explain your rating: \_\_\_\_\_

Please rate and briefly describe your level of agreement with the following statement:

14. I am confident in my current ability to effectively collaborate with <<research scientists/museum educators >> to engage the public in science.

1= Strongly disagree	2= Moderately disagree	3= Slightly disagree	4= Slightly agree	5= Moderately agree	6= Strongly agree
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Please explain your rating: \_\_\_\_\_

15. In your opinion, what specific public audience (by age, race/ethnicity, location, or other characteristics) do you think is most important to reach with <<informal science education experiences /sustainable materials chemistry research >>?

16. What specific public audience do you think <<other org, abbreviated>> is most wanting to reach with <<their informal science education experiences/their sustainable materials chemistry research>>?

17. Please share any additional questions, comments, or thoughts about the CSMC-OMSI partnership.

**Appendix E: Formative Study #1 Survey Instrument**

Note: The two organizations received a slightly different survey in order to directly reference the name of their partner or area of expertise. The text in chevron brackets (<...>) describes where the differences are.

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**Thank you for attending the CSMC-OMSI Partnership Professional Development Seminar!**

**After today's visit to <full name of partner org listed and also abbreviated>...**

1. What three words come to mind when you think of <public engagement in science (for CSMC)/chemistry research (for OMSI)>?

\_\_\_\_\_

2. What three words come to mind when you think of <your partner org> specifically?

\_\_\_\_\_

3. Please rate and briefly describe your current level of familiarity with <your partner org>:

1	2	3	4	5	6
Not at all familiar	Moderately unfamiliar	Slightly unfamiliar	Slightly familiar	Moderately familiar	Extremely familiar

Please explain your response:

4. From your perspective, how would you describe the institutional culture at <your partner org>?

For the scales below, please mark the box on each continuum that you think **best describes <your partner org> and the type of work that goes on there** (for instance, if you think OMSI's culture is equal parts independent and collaborative, you would mark the box directly in the middle of those two). Don't worry, there are no "correct" answers!

Independent									Collaborative
Desk and computer									Interactive and hands-on
Mentoring from supervisor									Peer support

Focus on results								Focus on learning
Fast-paced								Laidback

What specific things did you see or experience at <your partner org> today that influenced the way you rated the items above?

**After today's visit to <full name of partner org listed and also abbreviated>...**

5. What do you think some benefits will be for <your org> in collaborating with <partner org>?
6. What do you think some challenges will be for <your org> in collaborating with <partner org>?

**Looking back at the <your partner org> site visit...**

7. What aspect did you enjoy the most?
8. What do you think could have been improved about the visit?

**Please rate and briefly describe your level of agreement with the following statements:**

9. I believe the CSMC-OMSI partnership has, or has the potential to have, high-quality, open communication.

1	2	3	4	5	6	I don't know
Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	

Please explain your response:

10. I believe the CSMC-OMSI partnership has, or has the potential to have, a shared goal or interest.

1	2	3	4	5	6	I don't know
Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	

Please explain your response:

11. I believe the CSMC-OMSI partnership has, or has the potential to have, commitment and willingness to collaborate on both sides.

1	2	3	4	5	6	I don't know
Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	

Please explain your response:

**Please rate and briefly describe how your confidence in your ability to collaborate changed (or didn't change) as a result of the <your partner org> site visit:**

12. After the <your partner org> site visit, my confidence in my ability to collaborate with <museum educators (for CSMC)/science researchers (for OMSI)> to engage the public in science:

1	2	3	4	5
Decreased greatly	Decreased slightly	Stayed the same	Increased slightly	Increased greatly

Please explain your response:

**As part of the CSMC-OMSI partnership project, we have some seed money to develop a collaborative pilot project aimed at public engagement this spring. It would be great at this point to start gathering some initial ideas for what this pilot project might be.**

13. Thinking about where there is the greatest synergy between the two organizations, what types of projects (or very specific project ideas) do you think would be excellent in this context?

14. What kinds of projects or collaborative efforts do you envision in the longer term of this partnership?

15. Please share any additional questions, comments, or thoughts about the CSMC-OMSI partnership.

**Appendix F. Formative Study #2 Survey Instrument**

Not at all familiar	Moderately unfamiliar	Slightly unfamiliar	Slightly familiar	Moderately familiar	Extremely familiar
<input type="checkbox"/>					

COPPE final survey

**Survey Body**

Please answer the following questions to the best of your ability. You may skip any questions that are not relevant to your experience or that you wish not to answer.

**1. Please rate and briefly describe your current level of familiarity with OMSI/CSMC.**

**2. Please explain your response:**

**3. I believe that the CSMC-OMSI partnership has high-quality, open communication.**

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="checkbox"/>						

**4. Please explain your response:**

**5. I believe that the CSMC-OMSI partnership has a shared goal or interest.**

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="checkbox"/>						

**6. Please explain your response:**

**7. I believe that the CSMC-OMSI partnership has commitment and willingness to collaborate on both sides.**

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="radio"/>						

8. Please explain your response:

▲  
▼  
◀
▶

9. I believe that the CSMC-OMSI partnership is likely to continue after the COPPE grant ends.

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="radio"/>						

10. Specifically, what form(s) might the CSMC-OMSI partnership take in the future, both short-term and long-term?

▲  
▼  
◀
▶

11. As a result of this partnership, I am more confident in my organization's ability to create partnerships between research institutions (such as CSMC) and informal science education organizations (such as OMSI).

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="radio"/>						

12. As a result of this partnership, I am more confident in my personal skills and abilities in creating partnerships between research institutions (such as CSMC) and informal science education organizations (such as OMSI).

Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	I don't know
<input type="radio"/>						

13. Please explain your responses to Questions 11 and 12:

▲  
▼  
◀
▶

14. What, if anything, has changed about your or your organization's work as a result of this partnership?

▲  
▼  
◀
▶

**15. What were the primary benefits of this partnership?**

**16. What were the primary barriers to this partnership?**

**17. What could have been done differently during the past 18 months to make this partnership more successful?**

**18. What can be done in the future to make this partnership more successful?**

**19. What, if anything, have you learned about creating successful partnerships between research institutions (such as CSMC) and informal science education organizations (such as OMSI) as a result of this experience?**

**20. Do you have any additional thoughts, suggestions, or feedback on your experience with the CSMC-OMSI partnership?**

Submit

Back

**Thank You!**

Thank you for taking our survey. Your response is very important to us. If you have any questions, feel free to contact Anne Sinkey at [asinkey@omsi.edu](mailto:asinkey@omsi.edu). The findings from this survey will be available in September and will be distributed to the CSMC-OMSI partnership team at that time.

## Appendix G: Formative Study #2 Interview Questions

### Interview Questions:

1. To start out, can you tell me a little bit about **your role** in this project and how you got involved?
2. I'm interested in hearing your take on how the folks at CSMC and at OMSI related to each other as partners in this project. How would you **describe the relationship** between participants in the two organizations?

Do you think that these relationships **have changed** since the beginning of the project?

3. Given the interesting similarities and differences between that staff at CSMC and OMSI, I'm curious to hear what you think were the primary **benefits** of this partnership for your and your colleagues. Can you think of any ways that you may have benefitted from this experience?

4. And were there any specific **barriers** that had to be overcome?

5. So thinking back on the partnership and its activities so far, can you think of anything about this partnership that is **unique or** especially **interesting** to you?

6. Since we're nearing the end of this grant cycle, do you think that this **partnership will continue**?

Do you have any preferences about what you'd like to see happen with the project, either short-term or long-term?

7. I'm curious to hear whether this experience has **taught you** anything important about building relationships with people in other institutions, maybe a **skill or lesson** that you will remember if you do something like this again. Are there any lessons you've learned from this?

Do you think this experience makes you any more or less **likely to build similar relationships** in the future?

8. Any other comments? Questions for me?