

INSTITUTE ON THE
ENVIRONMENT

UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

MINI GRANT PROJECT SUMMARY

Please complete the project summary and return the completed form to Alyssa Johnson, Administrative Assistant at the Institute on the Environment, at joh10074@umn.edu. Paper copies will not be accepted. Please also attach any photos, publications, brochures, event agendas or other materials that were a result of the mini grant summary.

Date of Report Submission:	
Project PI & Dept/School	Ryan Briscoe Runquist
Project Title:	Market Science – IonE Renewal Proposal
Grant Amount \$:	\$2000

Project Context & Purpose

Please include the original project purpose statement and revise for any changes that occurred in the project after the start date with a short explanation of the changes.

STEM based research is primarily conducted away from the public eye, and research results are usually disseminated only within a limited circle of STEM academics and professionals. While communication among researchers is vital to the scientific process, it does little to inform the general public about how scientific research is performed, who scientists are, or how research impacts their own lives. This leaves many in our communities unfamiliar with and skeptical of science. Our initiative, Market Science, enables dialogue between academics and the community at large through activities and discussions at Minneapolis' Midtown Farmers Market (MFM). These direct and informal conversations between University researchers and the general public take place within an ethnically, socially, and economically diverse community that comprises the 55,000 annual visitors to the market. In its first year, Market Science reached hundreds of market attendees, fostering beneficial dialogue between researchers and their communities. With continued funding, we feel that the regular presence of researchers at public events can help demystify science and scientists, leading to better understanding of and appreciation for STEM research in our communities.

2015 Action Plan

Increase visibility – This year we are planning to have a community table at the MFM every Saturday. Last year, we were only available every other week. This will provide more opportunities to cover more scientific topics and allow market-goers to participate in a greater variety of hands-on activities. This will also allow for a greater number of scientists to participate in this outreach opportunity.

We have also created a website (marketsciencemn.wordpress.com) and a twitter account (@_MarketSci) to increase our digital presence. The website will feature blogs that discuss the weeks activities. We will also feature guest blogs from scientists about topics or research of particular interest.

Increase core group of scientists – This year, we are extending the opportunity to multiple graduate groups across the life sciences to allow for more students to become involved and to increase the breadth and depth of scientific topics that we can cover. We anticipate that the interdisciplinary interaction of scientists from different areas of research will result in collaborated responses to the public, and a diverse representation of scientists. We have sent out a form to five graduate

groups (Plant Biology; Ecology, Evolution and Behavior; Conservation Biology; Applied Plant Science; Forestry) to solicit volunteers for each week.

We will also increase the number of undergraduate volunteers. Undergraduates can use this as an outreach opportunity for civic engagement and share their scientific knowledge.

Assessment – We will be partnering with Dr. Robin Wright, head of the department of Biology Teaching and Learning, and senior associate dean for undergraduates in CBS and Dr. Tyler Koep, post-doctoral associate leading the InSciEd In project to develop formal assessment tools for the program. This will allow us to better understand the impacts of Market Science and subsequently improve the program. Using these assessment tools will also enable us to formally publish our findings about the effectiveness of Market Science and potentially encourage Market Science programs in other areas. In addition we will track the number of visitors that stop at our table.

Outreach mentorship – We are in contact with leaders in scientific outreach at the University of Minnesota – Twin Cities to improve our communication and outreach skills. We have setup meeting with Drs. Kathryn Quick, Carissa Schively-Slotterback, and have contacted Dr. Mark Seeley. We have also contacted Dr. Gillian Roehrig to discuss ways in which we can improve our inclusivity. We are very mindful of the potential for unconscious bias and want to address this directly in our planning process for summer 2015. We will also use information from our meetings to prepare materials on effective outreach techniques and scientific communication to give to our volunteers. This will help to promote an effective experience for our scientist volunteers and market-goers.

Schedule – We have developed a schedule for the month of May and have begun preparation of activities for the chosen topics. Each week will be led by an early-career researcher that helps plan activities, organize volunteers, and write a post for the website on the activities of the day. We have also come up with a list of other potential topics for the season and are entertaining possibilities from participating scientists.

May Schedule:

2 May – “Learn more about Trees!”; Co-leaders: Elizabeth Fallon and Ryan Briscoe Runquist

9 May – “Compost and Soils”; Leader: John Benning

16 May – “Seedling Development and Gardening for your Climate”; Leader: Amanda Waters

23 May – “Fun with Flowers!”; Leader: Erin Treiber

30 May – “Fun with Fungi”; Leader: Derek Nedveck

Other possible topics:

“Pollinators”

“All About Corn”

“Learn about Prairies”

“Water and Soil Quality”

“Plant Breeding”

“All about Bugs!”

“Fun with Botany”

“All about Birds”

“Symbiosis and Mutualisms in Nature”

“Plant Diseases”

“All about Butterflies”

“Plant Dormancy and Harvest Time”

Future of Market Science – We will develop and catalogue materials from this year including handouts and activity plans for use in future years at the Market. This handbook can be used to sustain Market Science as a long-term outreach project that can partner with the Institute on the Environment and the College of Biological Sciences to create continuity for new and continuing leadership. Once refined, these materials could be distributed to other scientist or departments interesting in developing their own Market Science program. Lastly, if the project continues to be successful at the Midtown Farmer’s Market and we have interest from many postdoctoral associates, graduate students, and undergraduate students, we may also pilot the project at other Twin City Farmer’s Markets.

Work Completed

Please provide a summary of the work that was completed for the mini grant project.

Market Science Summer 2015:

In Spring/Summer 2015, Market Science received funding from IonE, UMN College of Biological Sciences, UMN Department of Plant Biology, and the Plant Biology Graduate Students. With this funding, Market Science extended its presence to 20 weeks at the Midtown Farmer's Market. Finally, we increased our presence at the Midtown Farmer's Market, where Market-goers became more comfortable approaching us to participate and ask questions in successive weeks. In the Summer 2015, we served a total of 2360 market-goers. On average this included about 68 children and 102 adults each week.

Partnerships & Collaborations

Please provide a summary of the project personnel, partnerships and collaborations that worked directly on the project or were started as a direct result of the mini grant project.

We began to develop more activities and expanded our program to incorporate groups outside of the College of Biological Sciences and the University of Minnesota. We worked with faculty and students from CFANS and CSE within the University of Minnesota. We also partnered with other organizations including: the Minnesota Zoo, University of St. Thomas, and The Nature Conservancy. We also increased our volunteer base and were joined by many undergraduate, graduate, and faculty volunteers from UMN and outside organizations.

In the upcoming season we will also be working with The UMN Raptor center, LacCore, Minnesota Healthy Praries, and the USDA.

Project Outcomes & Impacts

Please provide a summary of the outcomes and /or impacts of the mini grant project including future plans for the project.

For the year 2015, we established actionable goals. Below are the goals set forth (in italics) followed by our progress.

2015 Action Plan Items and Implementation

Increase visibility

This year we are planning to have a community table at the MFM every Saturday. Last year, we were only available every other week. This will provide more opportunities to cover more scientific topics and allow market-goers to participate in a greater variety of hands-on activities. This will also allow for a greater number of scientists to participate in this outreach opportunity.

We have also created a website (marketsciencemn.wordpress.com) and a twitter account (@_MarketSci) to increase our digital presence. The website will feature blogs that discuss the weeks activities. We will also feature guest blogs from scientists about topics or research of particular interest.

Increase Visibility: We succeeded in increasing our visibility at the MFM in Summer 2015. Many market-goers returned weekly to participate in activities and ask questions. Many also asked that we return in Summer 2016. We also increased the number of volunteer opportunities and had much greater undergraduate and graduate participation.

Our website (marketsci.org) features blogs detailing the activities at the MFM for each week in the summer as well as more information about Market Science and our summer schedule. The website receives multiple visits everyday from all over the world. We have also increased our digital presence by using our twitter account. We now have 144 twitter followers from the Twin Cities area and all over the world.

Increase core group of scientists

This year, we are extending the opportunity to multiple graduate groups across the life sciences to allow for more students to become involved and to increase the breadth and depth of scientific topics that we can cover. We anticipate that the interdisciplinary interaction of scientists from different areas of research will result in collaborated responses to the public, and a diverse representation of scientists. We have sent out a form to five graduate groups (Plant Biology; Ecology, Evolution and Behavior; Conservation Biology; Applied Plant Science; Forestry) to solicit volunteers for each week.

We will also increase the number of undergraduate volunteers. Undergraduates can use this as an outreach opportunity for civic engagement and share their scientific knowledge.

Increase Core Scientists: We expanded our volunteer recruitment to many graduate groups within CBS and CFANS. We were able to recruit undergraduate and graduate volunteers from both colleges. We were also able to expand our volunteer base to over 40 graduate students, 10 undergraduate students, and 5 postdoctoral associates. We were also supported by a number of UMN staff and faculty in donating time to help us plan and materials.

Assessment

We will be partnering with Dr. Robin Wright, head of the department of Biology Teaching and Learning, and senior associate dean for undergraduates in CBS and Dr. Tyler Koep, post-doctoral associate leading the InSciEd In project to develop formal assessment tools for the program. This will allow us to better understand the impacts of Market Science and subsequently improve the program. Using these assessment tools will also enable us to formally publish our findings about the effectiveness of Market Science and potentially encourage Market Science programs in other areas. In addition we will track the number of visitors that stop at our table.

Assessment: We worked with Dr. Robin Wright and Dr. Tyler Koep to begin to develop methods to assess the impacts of Market Science. We also conducted some informal, information gathering, interviews with market-goers at the end of the season to ascertain what they like about the program and what other activities they would like to see in the coming years. From these surveys, we learned that people really liked learning about new things and interacting with scientific equipment. We also learned that many of the children at the market would seek us out each week to see what new activities that we had, which drove a lot of the visits to our table.

Outreach mentorship

We are in contact with leaders in scientific outreach at the University of Minnesota – Twin Cities to improve our communication and outreach skills. We have setup meeting with Drs. Kathryn Quick, Carissa Schively-Slotterback, and have contacted Dr. Mark Seeley. We have also contacted Dr. Gillian Roehrig to discuss ways in which we can improve our inclusivity. We are very mindful of the potential for unconscious bias and want to address this directly in our planning process for summer 2015. We will also use information from our meetings to prepare materials on effective outreach techniques and scientific communication to give to our volunteers. This will help to promote an effective experience for our scientist volunteers and market-goers.

Outreach mentorship: We were able to speak with Drs. Kathryn Quick and Carissa Schively-Slotterback. They provided invaluable information on how to effectively communicate with the public and encourage interactions. They were especially instrumental in helping us think about designing stations to promote interaction with the public.

Schedule

We have developed a schedule for the month of May and have begun preparation of activities for the chosen topics. Each week will be led by an early-career researcher that helps plan activities, organize volunteers, and write a post for the website on the activities of the day. We have also come up with a list of other potential topics for the season and are entertaining possibilities from participating scientists.

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“Fun with Botany”	“All about Birds”	“Symbiosis and Mutualisms in Nature”
“Plant Diseases”	“All about Butterflies”	“Plant Dormancy and Harvest Time”

2015 Summer Schedule:

May 2nd – Trees

Ever wondered why maple trees flower before they produce leaves? Or how acorns are made? Check out a variety of local spring-flowering trees with MS on Saturday. (Storify)

May 9th – Soils

The world beneath your feet is startlingly alive, and is one of our most important (and threatened) natural resources. See what dirt’s all about with lessons on soil composition and biology, and fun experiments with reactive organic matter! (Storify)

May 16th – Seeds & Plant Development

Seeds come in a huge variety of shapes and sizes, and are the starting point for (almost) all the plants around us. Learn about native MN seeds and how a seedling's environment affects its growth with Amanda and Mandy on Saturday. (Storify)

May 23rd – Fun with Flowers

Flowers are all around us, but what are they, really? Did you know a sunflower is actually hundreds of individual flowers? Or that fig flowers are pollinated by wasps? Come learn about the fascinating world of flowers with MS on Saturday. (Storify)

May 30th – Fungi

Fungi are so much more than mushrooms — come hang out with the UMN Mycology Club to learn all about the fascinating world of plant – fungi partnerships, edible mushrooms, wood decomposers and more!

June 6th – Amphibians

What's the difference between a newt and a salamander? How can an organism be adapted to land and water? Come learn all about these incredible creatures with Market Scientist Marta. (Storify)

June 13th – Butterflies

From Monarchs to Skippers to Admirals, Minnesota is home to an astounding array of beautiful butterflies. Come explore from caterpillar to chrysalis and beyond with a butterfly expert from the Minnesota Zoo, and learn how you can attract native butterflies to your yard! (Storify)

June 20th – Pollinators

How do we get from flower to fruit?? Often, it's only with the help of pollinators! We'll have lessons about how pollination works, who's working the flowers in your backyard, and what you can do to help conserve some of Minnesota's most fascinating insect pollinators. (Storify)

June 27th – Chemistry Fun Day!

What is the difference between an acid and a base? Do you know foods that are acidic or basic? Come to Market Science and have fun with chemistry. We will have amazing demonstrations and hands-on activities.

July 4th – Have a Happy 4th of July!

We are on a break this week.

July 11th – Prairie Ecology

Did you know that MN used to be home to millions of acres of prairie? This incredible ecosystem now covers a miniscule fraction of the area it once did, but these prairie remnants have a lot to tell us about their unique organisms, fire regimes, and ecological impact. Come learn about this piece of MN eco-history with Market Science! (Storify)

July 18th – Water Quality

We live in the land of 10,000 lakes! There is water all around us and it is an integral part of all of our lives. What affects the quality of our water? What are things that you can do to keep our rivers, lakes, and streams healthy? Join us at Market Science to learn more about the little critters that live in the water and ways to keep it healthy. (Storify)

July 25th – Entomology (Bugs!)

Bugs are the best! Co-hosted with the UMN Entomology Club, this Science Saturday will explore the wonderful world of arthropods. Come learn the difference between bugs and insects, see some beautiful beetles, and chat with UMN entomologists about the huge impact of these little insects. We'll have activities for kids and lots of fascinating info for adults!

August 1st – Biological Interactions

Did you know that your gut is home to billions of bacteria? Or that 80% of all land plants form partnerships with fungi underground? Or that some salamanders develop with algae living in their cells?? Come by the MS table on August 1st to learn about how organisms interact with each other in some pretty wild ways.

August 8th – Geology

Why are the banks of the Mississippi so steep in the Twin Cities? How are the glaciers that covered Minnesota thousands of years ago still affecting us today? How can we use sediment cores to learn about the Midwest's climatic and geologic history? Geologists from the University of St. Thomas will be on hand with fun activities for kids and lots of info for adults!

August 15th – Plant Breeding

Did you know that cabbage, broccoli, cauliflower, kale, collard greens and kohlrabi are all the same species of plant?? Plant breeders have been developing tasty food crops for thousands of years, along with astounding ornamental varieties for your home and garden. Come talk with plant breeders from the University of Minnesota on August 15th and learn how it all works!

August 22nd – Corn!

Celebrate Festival del Maiz at the Midtown Farmers Market on August 22nd and learn all about this fascinating grain. From its beginnings as an unremarkable grass to being the #1 crop in the U.S.A., it's surely an A-MAIZE-ING plant!

August 29th – Market Botany

We all know market veggies are delicious, but there's lots else to learn about the biology behind your market favorites. From flowers to fruit and seedlings to seeds, we'll be showcasing the incredible diversity of plants available at the Midtown Farmers Market, with fun activities for kids!

September 5th – Fun with Fungi

The UMN Mycology Club is back with another awesome session on incredible, (sometimes) edible fungi! Learn about mycelium and mushrooms, ask about our native fungal species, and learn how you can go on your own fungal foray!

September 12th – Virus Biology

What are viruses, exactly? Are they even alive?? Why does human DNA contain fragments of viral DNA? Learn all about virology and the effects of viruses on plants and other organisms.

September 19th – Weird Plants

Let's face it — there are lots of weird plants out there. From parasites to carnivores to plants that don't photosynthesize, you'll learn all about these botanical bizzaros on September 19th.

Future of Market Science

We will develop and catalogue materials from this year including handouts and activity plans for use in future years at the Market. We received funding from This handbook can be used to sustain Market Science as a long-term outreach project that can partner with the Institute on the Environment and the College of Biological Sciences to create continuity for new and continuing leadership. Once refined, these materials could be distributed to other scientist or departments interesting in developing their own Market Science program. Lastly, if the project continues to be successful at the Midtown Farmer's Market and we have interest from many faculty, postdoctoral associates, graduate students, and undergraduate students. We will also continue to engage external science organizations. We area also exploring the possibility of piloting the project at other Twin City Farmer's Markets for a few sessions in the upcoming year. Lastly, we continue to explore and apply for funding from a diverse array of organizations that support science communication.