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IonE Community Exchange

The IonE Community Exchange is an opportunity to explore and celebrate the diverse work being done within the IonE Community. IonE is comprised of hundreds of students, staff, and faculty from across all 5 UMN campuses. We are leaders, teachers, researchers, and artists. Below is a selection from the 30+ projects that will be highlighted in this exchange. Learn more about these projects over lunch and the reception at the annual meeting on September 28. The complete list of work will be available before September 7.

Acara Student Projects

Acara will present the "Acara Game Board": an interactive game in which participants can guess which descriptions of Acara student projects are real examples of work done here by UMN students. Prizes included!

Assuring Clean Water and Sustainable Ecosystems Via Improved Agroecological Management

Grand Challenge, Lawrence P. Wackett

We are addressing the Grand Challenges and IonE Initiatives on Water with the goal of protecting billions of gallons of water from contamination while maintaining agricultural productivity. Specifically, we are investigating the fate of nitrogen amendments in agriculture at a fundamental micro-level using computer predictions, experimental measurements, and further modeling to determine the interactions that determine the fate of the chemicals. The chemicals added are to provide nitrogen for the plants. The rate of release of assimilable nitrogen is determined by microbial biodegradation and that can be lowered by optimizing the chemical fertilizer mixtures. This is the basis for this Grand Challenge, and we are bringing to bear genomics, ecology, plant science, business, and policy approaches to solving this large, difficult but, we believe, tractable problem.

CREATE Initiative

Grand Challenge, Bonnie Keeler

CREATE (Co-developing Research and Engaged Approaches to Transform our Environment)
The CREATE Initiative addresses grand challenges at the intersection of water and equity through community-engaged research. Research is co-developed and co-produced through collaborative efforts between University researchers and community partners.Through this process, CREATE has identified a need to consider the justice and equity implications of investments in parks and green infrastructure, particularly concerns around gentrification and displacement.
In tandem with this research agenda, CREATE is supporting a new interdisciplinary graduate fellowship program. The program will combine a practicum course with experiential learning and funded externships. CREATE aims to train the next generation of sustainability scholars in effective community-engaged, solution-oriented research.

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Environment Reports

GLI and IonE Communications, Barrett Colombo and Peder Engstrom

Published by the Institute on the Environment, Environment Reports is a collaboration among an international group of scientists, writers and designers to create incisive narratives about environmental challenges, backed up by cutting-edge data.

The site is intended for use by public and private sector professionals as well as those in academia who influence or educate environmental decision makers. It will provide several primers and useful visuals covering key aspects of the global food system, including projected future demand and yield trends, environmental sustainability, diet, food waste, climate change and more.

http://www.environmentreports.com/livestock-climate-variability/#section2

Geofinancial Analytics

Mini Grant, Nathaniel Springer

Levers beyond governmental policy are needed to improve the odds of averting catastrophic climate change. Financial market pressure is already playing a central role. Yet, while long-term institutional investors such as sovereign wealth and pension funds are integrating climate-change and other sustainability considerations into their investment decisions, such efforts fall well short of the necessary action. One of the main reasons for this shortfall is the difficulty of connecting specific investment assets to the consequences of companies' actions.

We therefore propose a new approach called "geofinancial analytics" to leverage the capital markets to change human impact on the physical world and improve the odds of averting catastrophic climate change and unsustainable development. Our team is building a tool to first test one promising example: live satellite data on methane venting and accidental leaks by publicly-traded fossil fuel producers. We will present an very early alpha version of this this tool, an interactive cartogram called MethaneScan, which shows how satellite data on flaring activities can be linked to production activity and attributed to public companies.

Queer Science

Mini Grant, Mohamed Yakub

Queer Science is the first of its kind program to specifically provide outreach to queer youth interested in STEM fields. Queer Science builds on similar models to "Girls can Code," "Black Girls can Code," and KAYSC's "Youth Science Day" by ensuring that underrepresented minorities get a voice in STEM fields. To help promote queer representation in STEM, we started Queer Science as an outreach to queer high school students. Through hands-on experiments and personal interactions, queer high school students can see possibility models who are successful queer scientists and researchers. We are hosting events and programs spanning 18-months of unique opportunities. This includes our current free day-long events, partnerships with other organization's events, and new programs such as ACT preparation and college application retreats.

Roots To Healing

Mini Grant, Lisa Philander

Roots to Healing: An exhibit that provides a brief survey of the past present and future of plant based remedies in Minnesota. It was housed in Northrop Gallery from March -Dec 2017. It will be at the Andersen Horticultural Library at the Minnesota Landscape Arboretum from Jan 8- April 30, 2019.

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Talking Arts, Sciences and Sustainability: A Roundtable Discussion Series

Mini Grant, David Syring

Humans have always depended on artistic expression energized by observing and participating in the ecological world. Whether we call it science, traditional knowledge, wisdom of elders, or by some other words, we need the insights of our empirical curiosities to survive; and, we need the ability to communicate those insights through linguistic, graphic, bodily, and musical arts.

Field biologist and award winning writer Gary Paul Nabhan, in Cross-Pollinations: The Marriage of Science and Poetry, presents a credo for reinvigorating the practices of the sciences and the arts. Nabhan writes: "Cross-pollination is not some perk or frill that benefits only an elite few. Tens of thousands of kinds of plants need cross-pollination if they are to yield fertile seeds and plump, ripe, delicious fruit…Artists and scientists also need cross-fertilization or else their isolated endeavors will atrophy, wither, or fall short of their aspirations … The spark that moves between us ultimately has the capacity to sustain us over the long run" (p. 13).

For this project, I take a cue from Nabhan and seek, through a series of discussions with artists, scientists, and educators to harvest a multidisciplinary set of stories, metaphors, and perspectives on how the arts collaborate with the sciences to sustain societies.

Understanding the zoonotic risk of echinococcosis for a northern Minnesota tribal community

Mini Grant, Tiffany Wolf

Echinococcus spp. are multi-host pathogens that can cause severe disease in humans. In North America, the life cycle of Echinococcus spp. is predominantly in wildlife hosts such as wolves, foxes, moose, and rodents; however, domestic dogs and occasionally cats also serve as hosts. Due to many ecological factors that are not well understood, prevalence of these parasites has been increasing in both natural and accidental hosts in the last few decades. We recently collected pilot data in a northern Minnesota indigenous community where Echinococcus is known to circulate in wolves and moose. In our pilot project, we surveyed fecal samples of the primary canid hosts present on the Grand Portage Indian Reservation: wolves, foxes, and domestic dogs. We found E. canadensis (genotype G8/G10) in 36% of sampled domestic dogs (n=14). This finding is alarming considering the sample prevalence of dogs approached that of wolves (41%, n=56; foxes = 9%, n=11), and is far higher than other studies of dogs in indigenous communities (6%, n=153). Primary risk factors for E. canadensis infection in dogs were the consumption of scraps from cervid carcasses and lack of veterinary care. This pilot study made clear the need for further work to fully understand the role of domestic dogs and risks of zoonotic Echinococcus transmission in our Minnesota (MN) indigenous communities, and provided a foundation for the recent award of another grant through the Academic Health Center to explore these questions further in other MN indigenous communities.

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The View from Up Here is Great: Fostering University-wide Collaborations in Unmanned Aerial Vehicle Research

Mini Grant, George Host

We sponsored "Duluth Drone Days", a two-day workshop that brought University researchers together with MN Dept of Natural Resources, Soil and Water Conservation District and county land managers to learn about capabilities of using Unmanned Aerial Vehicles for assessing natural resources. In a conference session, staff from the U of MN Remote Sensing and Geospatial Analysis Laboratory covered point cloud processing, object-based image analysis, and use of Ground Control Points for accuracy assessment. This was followed by an outdoor demonstration at the UMD Research and Field Studies Center, where several platforms were flown over the farm property and a riparian restoration site. Imagery was processed over the evening and results discussed on the 2nd day. The Drone Days demo was featured as a front page article on the next day's Duluth News Tribune.