

A close-up photograph of a person's hand holding a mound of dark brown soil. The person is wearing a green button-down shirt and white pants. The background is a blurred outdoor setting with dry ground. The overall theme is sustainability and agriculture.

# Creating Global Leaders in Sustainability

Dow Sustainability Fellows Program Fourth Annual Report

July 2016







## The University of Michigan's work on sustainability

—teaching, research, and public service—is an essential part of our commitment to serving the people of Michigan and the world by generating new knowledge and applying it to the complex and critical problems that face our society. The Dow Sustainability Fellows Program helps us to fulfill this fundamental commitment. The University's deep academic strength in the liberal arts and the power of our outstanding professional schools lend themselves to interdisciplinary research in fields key to sustainability.

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Work on sustainability is, by definition, something that will involve many generations. The Dow Sustainability Fellows Program has trained four cohorts of researchers at all levels, and their work will have a critical impact on the students who follow them into the field.

Masters level students have gained theoretical understanding of key issues in sustainability. Through the program they have developed skills in areas such as project negotiation and communication about scientific questions that, when coupled with their skills in fields including climate modeling and survey methodology, prepare them well for a wide range of careers.

Doctoral fellows have immersed themselves in the very challenging questions raised by sustainability. Employing approaches such as integrated assessment and big data analytics, these students are opening new pathways to understanding and addressing sustainability concerns.

Postdoctoral researchers and distinguished faculty fellows are leaders in advancing the field of sustainability through research and through its integration into formal course work and informal academic activities that engage the next generation of students with the critical questions that arise in work on sustainability.

Informed public discussion and debate about science and science policy is critical to society. An important aspect of the Dow Sustainability Fellows Program is the fellows' ability to share scientific knowledge with public audiences. We are pleased and proud that the fellows are developing skills in this area and engaging in this valuable work.

The generous support of The Dow Chemical Company and The Dow Chemical Company Foundation enables students from a wide array of backgrounds to engage in sustainability work. The diverse perspectives of the fellows ensure that new and promising approaches to sustainability will continue to develop. Most importantly, these students learn to work across disciplinary boundaries and stakeholder perspectives as they must when addressing the big sustainability challenges faced by society. They are uniquely ready for the complex interdisciplinary environment that will be the norm when they graduate.

The University of Michigan is deeply appreciative of Dow's support of work that is of lasting value for people in Michigan and far beyond.

**MARTHA E. POLLACK**

*Provost and Executive Vice President for Academic Affairs*

# Preparing Sustainability Leaders to Make a Positive Impact in Organizations Worldwide



## INVESTING IN A CLEANER, GREENER PLANET

The Dow Sustainability Fellows Program was launched at the University of Michigan in 2012 with a visionary \$10 million gift from The Dow Chemical Company. The goal was ambitious: create interdisciplinary leaders capable of generating innovative, concrete, actionable solutions to the big sustainability challenges of our time.

Over the life of the gift, this one-of-a-kind leadership development initiative will support more than 500 sustainability students in exploring topics as diverse as water, energy, health, consumption, green chemistry, transportation, the built environment, climate change, biodiversity, human behavior, environmental law, and public policy—among others.

Major program components include cohorts of fellows at the masters/professional degree, doctoral, and postdoctoral levels, as well as a Distinguished Awards for Interdisciplinary Sustainability competition that supports high-potential sustainability projects. In this campus-wide contest, students present their ideas for applied projects that cut across disciplines and involve U-M students at all academic levels, including undergraduates. Projects focus on compelling and actionable efforts to advance sustainability at the local, national, and global level.

## CREATING A SEISMIC SHIFT IN SUSTAINABILITY

Dow Sustainability Fellows learn from one another within and across cohorts. They thrive on collaboration. They learn to employ interdisciplinary thinking. They seek out diverse stakeholder perspectives. They develop and lead applied projects with the potential to make a meaningful difference. And more than 100 alumni fellows are already at work in organizations around the world, applying all that they've learned and helping to shape a sustainable future.

In just four years, the program has produced truly impressive results and continues to be positively received, both within and beyond the university. Media coverage during the past year spanned outlets from Michigan to India, and included accolades from a prominent business sustainability publication and acclaim in a high-profile academic report on innovation in higher education. In addition, the Dow Sustainability Fellows Program website (<http://sustainability.umich.edu/dow>) is a rich resource for the public, sharing results of the students' work.



# The Dow Sustainability Fellows Program

Assures a consistently **high level of skill and aptitude** among fellows through rigorous, interdisciplinary application processes that incorporate diverse faculty reviews

Supports **student-led, applied interdisciplinary projects and experiences** with far-reaching implications

**Engages with communities across the globe** to help them implement sustainable practices

Promotes **systems-thinking approaches** to sustainability through case studies

Develops a **supportive, cohort-based leadership network** among peers across disciplines

Provides experience in **translating science and research** for interdisciplinary and practitioner audiences

Gives practitioners **access to innovative sustainability-related research** and approaches

**Cultivates skills** needed to lead interdisciplinary and applied sustainability research in future work



**“This transformative program represents the leading edge of sustainability education. As such, it is unparalleled in size and diversity across disciplines and academic levels.”**

**DONALD SCAVIA** /// Director, U-M Dow Sustainability Fellows Program

# 54

Companies and organizations currently employing Dow Sustainability alumni

# 225

Dow Sustainability

Fellows supported *to-date*

Projects supported by

the Dow Distinguished

Awards competition

*since 2013, with 9 winning*

*large awards*

# 45

# 30

Completed Masters

Fellows team projects

*with 8 additional projects*

*currently in progress*

Clients served by

applied sustainability

projects *to-date*

# 36

# 253

Students

supported through

Dow Distinguished

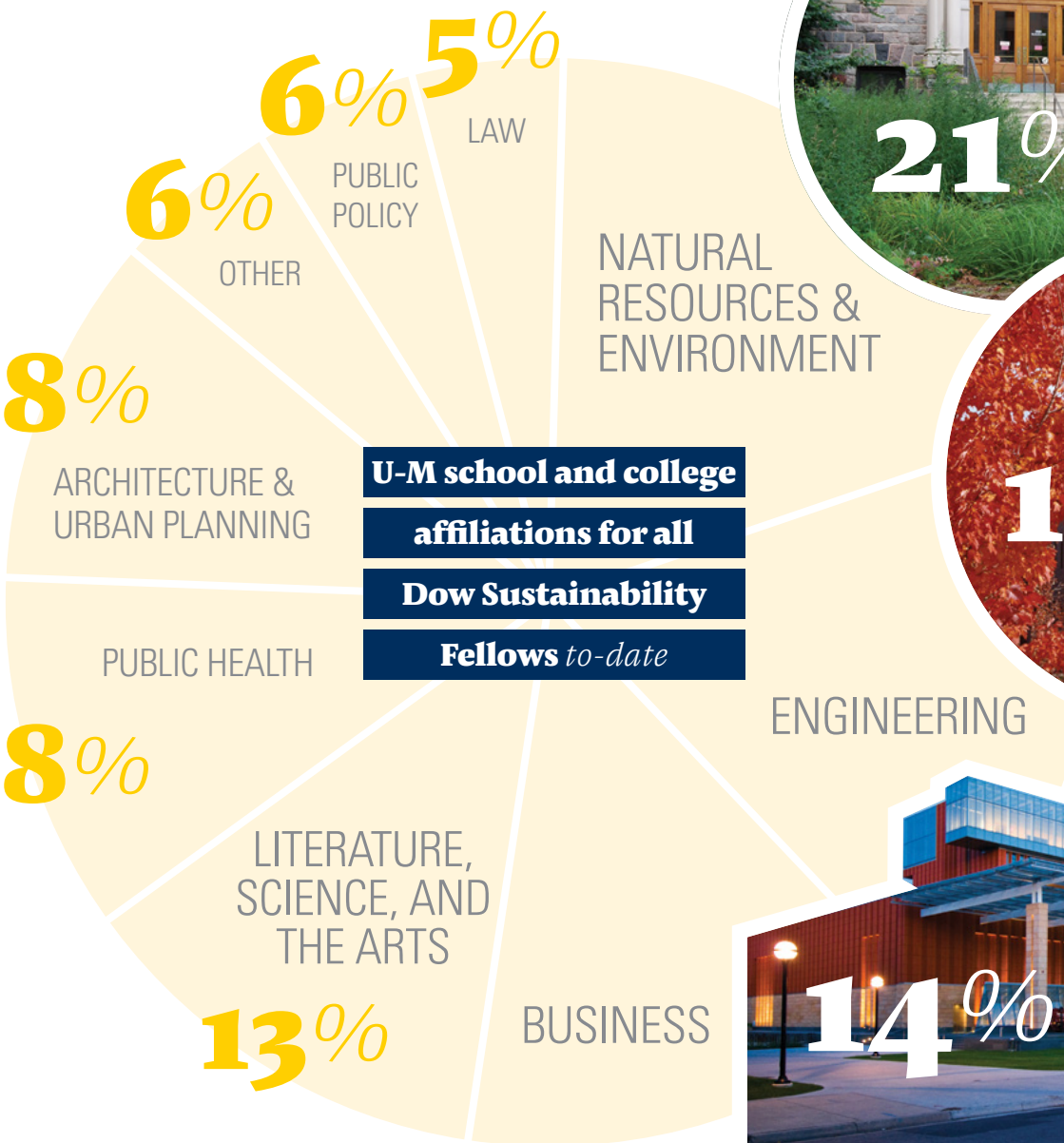
Awards *since 2013*



# 17

U-M schools and colleges engaged with Dow Sustainability Fellows since 2013

# of 19



**U-M school and college affiliations for all Dow Sustainability Fellows to-date**







### The Cohort

Our 2016 cohort consists of 39 masters and professional degree students from 11 U-M units, selected from a pool of 86 nominees. This year for the first time ever, nominees were accepted from the schools of medicine, social work, and dentistry—further expanding the diversity of participants’ academic backgrounds.

### The Projects

Currently, teams of four to six fellows are working on eight applied interdisciplinary action-based projects of their own choosing. Each team receives a \$5,000 grant in support of this work in addition to the fellowship stipends.

These projects address a wide range of challenges with the potential for local to global impact. Examples include:

- Building a community solar business model for a Detroit neighborhood
- Exploring avenues for dental practices to pursue sustainable infrastructure and operations
- Delving into methods of sustainable food production by developing and marketing a sustainable cacao product

### Support

With collaboration, engagement, and applied learning as key priorities, the program offers numerous opportunities for scholars to discuss, brainstorm, network, and share their interests. Masters Fellows have an open invitation to cross-cohort skills sessions with doctoral and postdoctoral fellows. They also receive input and direction from program alumni and from multi-sector sustainability leaders who serve on a university-level sustainability advisory board.

### Cohort-Specific Activities

In addition, masters fellows participate in cohort-specific activities. In the 2015–16 academic year, these included a roundtable discussion on a proposed open-pit copper mine near Bristol Bay, Alaska. Fellows also had an opportunity to engage with Professor Andy Hoffman, who led an interdisciplinary workshop entitled “How Culture Shapes the Climate Debate.”

[Visit the Dow Global Impact Series Page](#)







## Growing Our Local Food System

Consumers nationwide are beginning to realize what farmers have long known: buying locally grown food benefits public health, builds food security, saves transportation costs, improves the local economy, and encourages more diverse crops.

In 2015, a Dow study team used surveys and interviews to identify key challenges facing newer farmers. Based on their findings, they presented the Washtenaw County (Michigan) Food Policy Council with three strategies for building connections among farmers, retailers, and consumers:

- **Farmer-to-Farmer Networks:** Simple email lists or more robust websites run by farmers, for farmers, to share equipment, offer workshops, and promote marketing opportunities.
- **Farmer Brain Trust:** A directory that connects local farmers to trusted specialists in accounting, legal aid, grant writing, equipment maintenance, and other agricultural or business sectors.
- **Local Foods Liaison:** To promote lesser known crop varieties, keep buyers up-to-date on the growing season, and maintain relationships with wholesalers, grocery stores, and distributors.

**“I valued the Dow program for its interdisciplinary experience. My team and I were able to holistically address a common area of interest, and we were eager to learn about one another’s research and how that research could improve our own.”** —2015 Dow Sustainability Masters Fellow

## How do you get 39 fellows with different backgrounds and myriad interests talking and working together?

**With an academic version of speed dating, of course.** In this case, Masters Fellows with similar interests engaged in a series of five-minute conversations with one another to identify opportunities for collaboration. This was just one of several novel ideas developed by the fellows to provide their cohort with vital connections and support. Other activities included:

- A “baseball card” deck with a card for each fellow featuring their photo, discipline, undergraduate degree, and one fun fact
- Pitch sessions where fellows could hear more about a proposed project before forming a team
- A group spreadsheet for sharing project ideas and interests
- An informal social gathering to strengthen personal connections

## The Cohort

In April 2016, 10 new doctoral students were offered fellowships and will join 10 returning doctoral fellows in the fall. Reflecting the broad appeal of the program, our new fellows hail from disciplines as diverse as civil and environmental engineering, economics, ecology, environmental health sciences, chemical engineering, architecture, and policy and behavior.

## The Program

The Doctoral Fellows experience is comprised of three components:

### MONTHLY SEMINARS

During these lively sessions, second-year fellows present their research while a first-year fellow facilitates group discussion focused on the synergies of the work and its big picture applications for sustainability. Discussions often touch on methodologies and models used across disciplines, and the potential for “cross-pollination” of best practices.

### COLLABORATIVE, INTERDISCIPLINARY PROJECT

In 2016, many of our Doctoral Fellows chose to work on the editorial board of **The Michigan Journal of Sustainability** ([www.sustainability.umich.edu/mjs](http://www.sustainability.umich.edu/mjs)). Other projects included developing a micro-grid energy system in Liberia.

### COHORT ACTIVITIES

In addition to cross-cohort collaborations, Doctoral Fellows participated in skills training throughout the year. One session featured practicing Ph.D. professionals who work outside of academia, an area of interest to many current fellows.

## The Michigan Journal of Sustainability

Launched by Dow Sustainability Doctoral Fellows in 2013, this peer-reviewed publication has an editorial board composed exclusively of Dow Sustainability Doctoral Fellows. The online, free-access journal ([www.sustainability.umich.edu/mjs](http://www.sustainability.umich.edu/mjs)) invites authors to address freshwater systems, livable communities, and climate issues across local-to-global scales. It also makes leading sustainability research accessible to applied sustainability practitioners and professionals. Submissions include articles, lab and field notes, photo essays, reviews, and teaching-and-learning pieces.



Toward a Theory of Spatial Justice, Justin Williams, Doctoral Candidate. Photo taken in Detroit. Photographer: Logan Chadde



**A Sampling of Doctoral & Postdoctoral**

**Fellow Research Topics** *for 2015-2016*

- BUILDING ABANDONMENT IN DETROIT
- CLEAN TECHNOLOGY INDUSTRY DEVELOPMENT
- FOREST GOVERNANCE IN INDONESIA
- SUSTAINABLE SEMICONDUCTOR MATERIALS DEVELOPMENT
- WATER RESOURCES IN MEGACITIES
- WATER MICROBIOME AND HUMAN HEALTH**
- GRID-SCALE ENERGY STORAGE
- ALGAL BLOOM IMPACTS ON AIR QUALITY
- NATIVE POLLINATORS SUPPORT THROUGH URBAN AGRICULTURE
- INCREASING SUSTAINABLE BEHAVIORS
- ENVIRONMENTALLY-ORIENTED COLLECTIVE ACTION IMPACT
- MARKET MECHANISMS FOR A SMART GRID
- RISKS TO GLOBAL SUPPLY CHAINS BY CLIMATE CHANGE
- STAKEHOLDER-DRIVEN WATERSHED RESTORATION
- AUTOMATED VEHICLES**
- EVALUATING BUSINESS SUSTAINABILITY INITIATIVES
- FUEL AND CHEMICAL PRODUCTION FROM BIOMASS

**The Cohort**

In 2015-16, the cohort consisted of 17 fellows representing 11 disciplines and a wide array of research interests. Eight of these fellows will continue this fall. Of the remaining nine, several will complete their two-year fellowships while others will leave the program to accept faculty positions or pursue non-academic career opportunities. Six new fellows will join the cohort for the Fall 2016 term.



Above: Stakeholder-driven agricultural conservation scenarios for Lake Erie water quality. Margaret Kalcic, Postdoctoral Fellow

**The Program**

The Postdoctoral Fellows experience consists of two basic program components:

**LUNCH COLLOQUIA**

During these monthly sessions, fellows present their research to peers, fostering rich discussion of potential interdisciplinary benefits and future collaborations.

**DINNER SEMINARS**

Once each month, Distinguished Faculty Fellows from across campus join the Dow Sustainability Postdoctoral Fellows for dialogue and mentorship. Both second-year postdoctoral fellows and first-year faculty fellows present their research at these dinners, followed by group discussion. Among the many topics broached during the past year was the future of sustainability education at the University of Michigan.

# Each spring, interdisciplinary teams from across the university

made up of students at all academic levels submit their proposals for high-impact sustainability projects. The winners receive a \$5,000 seed grant and, with it, the opportunity to compete in the fall competition for large projects grants of up to \$50,000.

Teams vying for the large grants present their pitch to a “dragons’ den” of sustainability scholars and practitioners who judge each project based on interdisciplinarity, innovation, potential for significant social benefits and sustainability impact, supporting data and/or analysis, ability to be scaled or replicated, and likelihood of success.

## Dow Distinguished Award Winners

November 2015

Last year, two Dow project teams were awarded \$37,500 each to continue their work and put their recommendations into practice in international communities.

### Together We Make Santa Marta Home

#### FOSTERING COMMUNITY AND STEWARDSHIP IN BRAZIL

Originally settled around a nearby dumpsite, Santa Marta is one of the poorest informal settlements in Sao Leopoldo, an industrial city in Brazil. The community is plagued by environmental challenges such as trash dumping in public spaces, trash burning, and poor infrastructure for sewage, water and roads. An interdisciplinary team of students launched a public campaign to shift social norms and perceptions about trash disposal in Santa Marta, build community, and educate residents about municipal services.

To identify key issues and underlying factors, the team conducted on-site interviews, surveys, participatory mapping exercises, and visioning sessions. They also conferred with a local school, municipal government agencies, and the Santa Marta Neighborhood Association. The result was a series of recommendations and a guidebook for community leaders. Now the team is using its \$37,500 award to implement its initiatives for activating public spaces, creating environmental education programs, improving communication between local government and residents, upgrading infrastructure, and building a sense of community pride and ownership.



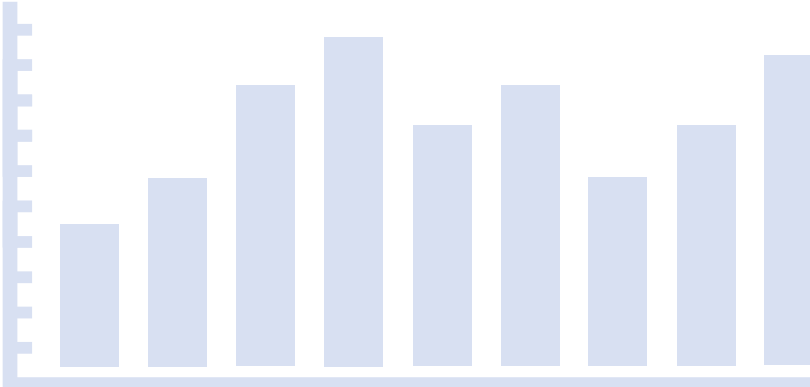
### Big Data & Small Farmers

#### USING DATA SCIENCE TO INFORM BEST FARMING PRACTICES IN INDIA

Rural households in Telangana, India, have been farming the same land for generations, and more than half of the population is supported directly by agriculture. In recent years, climate change, depletion of soil and water, and volatile markets have pushed the average farmer into a quagmire of uninformed decision-making. The result has been rampant poverty.

A survey of 1,100 Telangana farmers by Dow Sustainability Fellows and other students revealed startling variations in crop productivity within and across villages. Since then, the team has been leveraging data science to educate farmers about nutrient management practices and—ultimately—improve household income and sustainable agriculture.

To date, the team has established the first-ever computer network in two villages, designed a data collection system, and hired field managers to conduct daily surveys of 400 farmers. They have also created tools to monitor and analyze data in order to develop best standard practices and promote effective decision making by individual farmers. Future work will focus on standardizing data collection and feedback, and scaling up the networks to reach as many as 11,200 villages and impact up to 23 million rural residents in Telangana, India.







## 2016 Local to Global Impact Seed Grants

The Spring 2016 competition drew a total of 15 innovative, practicable project proposals designed to foster sustainability at the local, national, or global level. Each project team represented at least three U-M schools or colleges, ensuring an interdisciplinary approach. In all, 85 U-M students are involved in these projects, representing 14 schools and colleges across graduate and undergraduate levels.

### **Adapting Outdoor Aquaponics Systems to Seasonal Locations**

DETROIT, MICHIGAN

### **BLUElab NicarAGUA: Developing Sustainable Water Technologies**

NICARAGUA

### **Kulisha: Fish for the Future**

KENYA

### **The Carbon Connection Program**

ANN ARBOR, MICHIGAN

### **Sustainable Park Trail & Interpretive Systems in a High Tech World**

VALLES CALDERA, NEW MEXICO

### **Solar Power Desalination Plant for Freshwater Supply in Coastal Communities**

MEXICO

### **Expanding a Micro-Grid from University of Liberia to Surrounding Communities**

LIBERIA

### **Food Security**

WEST TALLAHATCHIE COUNTY, MISSISSIPPI

### **Conservation and Economic Vitalization through Silvopasture**

NICARAGUA

### **Condon Crow House—Urban Permaculture**

DETROIT, MICHIGAN

### **The Dreamscape Project, Boggs School**

DETROIT, MICHIGAN

### **Community Assessment & Border Initiative**

HAITI

### **Fresh Fridge Mobile App: Reducing Consumer Food Waste**

MICHIGAN

### **Strengthening Sustainable Food Systems Through Environmental Education Workshops**

WASHTENAW COUNTY, MICHIGAN

### **See for Yourself: What's in Your Water? Visualizing the Drinking Water Delivery System**

FLINT, MICHIGAN

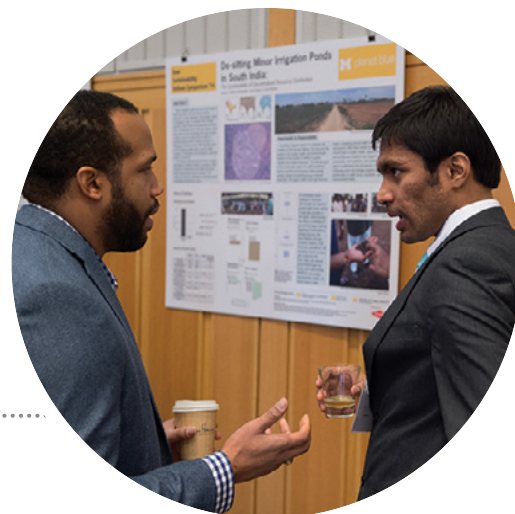
**“I think the Dow Sustainability Fellows Program is really important because it brings together a bunch of sustainability leaders on campus that may not be talking otherwise.”**

—2014 Dow Sustainability Masters Fellow

**B**road engagement across cohort levels is a top priority for the program, and all fellows are encouraged to collaborate throughout the year. Fellows participate in skill sessions and other events which are open to all cohorts and often include sustainability-minded undergraduate students.

**In 2015-16, the program hosted a long list of activities, among them:**

- Media interaction training presented by professional journalists
- A workshop on developing a professional presence in social media and online
- A day trip to The Dow Chemical Company headquarters in Midland, Michigan
- Informal coffee hour chats with practicing sustainability professionals from Ford Motor Company, the Nature Conservancy, the City of Ypsilanti, MI, the Michigan Supreme Court, Green Garage, the Environmental Protection Agency, the Kresge Foundation, Fiat Chrysler, the Council of Great Lakes Industries, and Data Driven Detroit.



## **The Second Annual Dow Sustainability Fall Symposium**

**“You need to understand how your own perceptions change the problems of the world you see. You need to break the rules. You are the generation that will have to do it. It’s in your hands. You’ve got to think: how do we solve these unsolvable problems?”**

**T**his was the core message that Dr. Steven Hamburg, chief scientist for the Environmental Defense Fund (EDF), delivered to students and scholars last November at the 2015 Dow Sustainability Fellows Symposium. As the annual marquee event for the Dow Sustainability Fellows Program, the symposium provides a venue where fellows come together to showcase their work, make new connections, meet prospective collaborators, learn from prominent sustainability leaders, and present their work in an interdisciplinary setting.

In addition to Hamburg’s keynote address, the event featured discussions of student posters and a lively exchange of ideas over lunch as well as presentation of the 2015 Dow Distinguished Awards for Interdisciplinary Sustainability.





**The University of Michigan is honored to serve as the academic home for what has become the nation's premier program in interdisciplinary sustainability education, research, and leadership development.**

That status was validated earlier this year when The American Academy of Arts and Sciences recognized the Dow Sustainability Fellows Program as an exemplar for public-private partnerships in its report entitled *The Lincoln Project: Excellence and Access in Public Higher Education*. Coming as it does from a leading center for policy research in the United States, this is high praise indeed.

While we are extremely pleased with the program's success and current trajectory, we continue to seek ways of enhancing and enriching the experience—both for the students involved and for those beyond the university who are touched by their work.

In the year ahead, we will advance efforts to promote ever richer interaction across the cohorts. Most notably, the Doctoral and Postdoctoral Fellows will begin meeting together in both lunch colloquia and dinner seminars. This integrative approach reflects input from fellows in both cohorts, who are eager to expand their perspectives, grow their networks, and discover new opportunities for collaboration and mentorship.

In addition, the program's full suite of co-curricular activities will be open to Dow Sustainability Fellows at all academic levels, and will also allow for interaction with undergraduate sustainability scholars. Activities will include roundtable discussions with sustainability practitioners, seminars presented by an array of U-M sustainability professors, training sessions focused on developing professional advancement skills, student-initiated community volunteer efforts, and social mixers organized around particular topics of student interest.

We are deeply grateful to The Dow Chemical Company and Foundation for their continuing commitment to this program. Their vision and generosity is making a profound difference for hundreds of students here at the University of Michigan, and for countless others who benefit from their work.

Going forward, the Dow Sustainability Fellows Program will continue setting the standard in interdisciplinary sustainability education. And together, our fellows, our faculty, and our stakeholders will continue to make a profound and positive impact on our environment and our society.

**DONALD SCAVIA**

*Director, U-M Dow Sustainability Fellows Program*

*Special Counsel to the U-M President for Sustainability*

*Graham Family Professor and Director,  
Graham Sustainability Institute*

*Professor, Natural Resources & Environment  
and Environmental Engineering*



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UNIVERSITY OF MICHIGAN

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