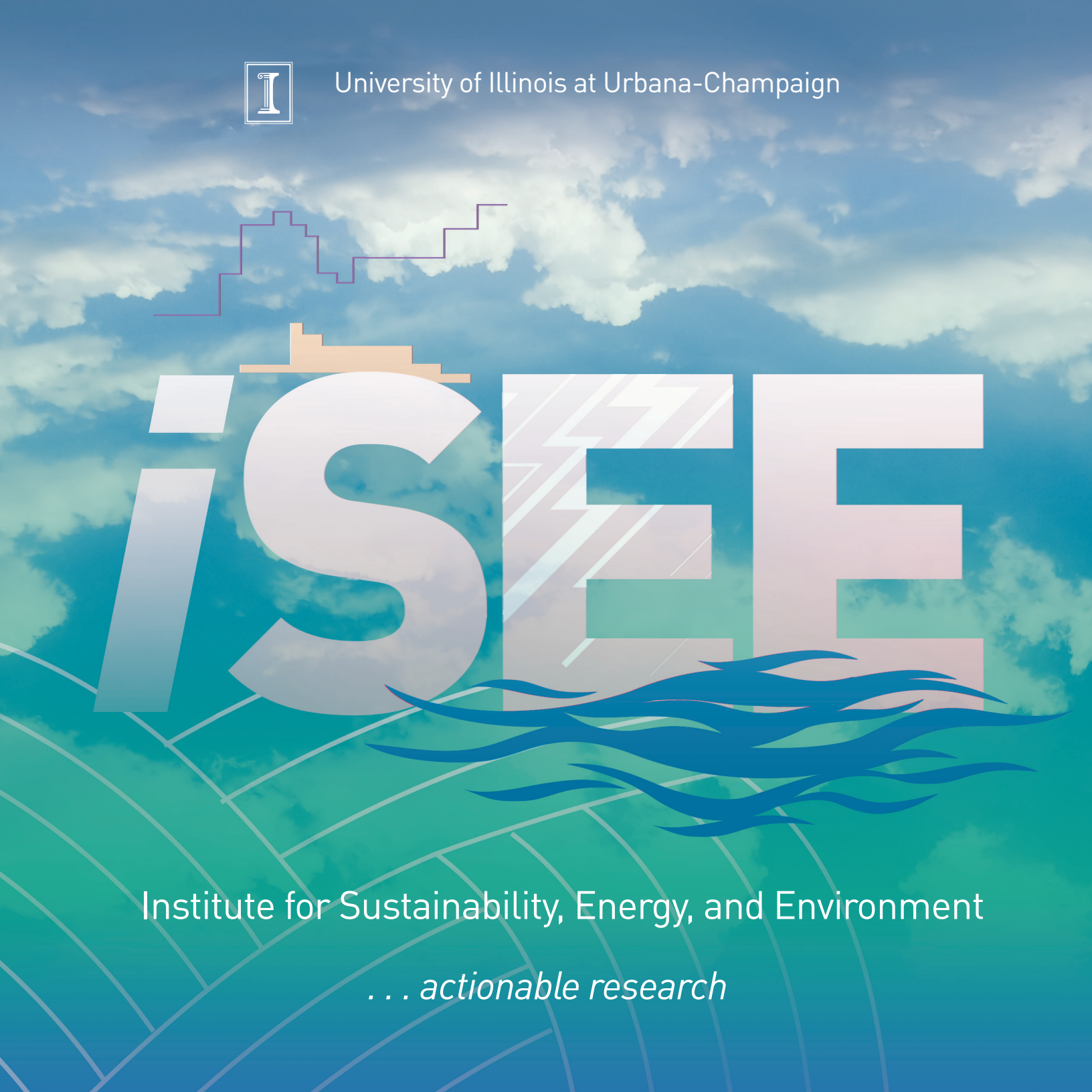

University of Illinois at Urbana-Champaign
iSEE
Institute for Sustainability, Energy, and Environment
. . . actionable research

"It is no ordinary work which we are set to do, and it comes to us under no ordinary circumstances... The hungry eyes of toiling millions are turned, with mingled hope and fear, upon us, to see what new and better solution we can possibly offer to the great problems on which their well-being and destiny depend."

John Milton Gregory, Regent
March 11, 1868, on the
inauguration of the Illinois
Industrial University

Extraordinary solutions at Illinois

Since that pivotal day when John Milton Gregory expressed the gravity of the mission of the University of Illinois — initially called Illinois Industrial University — this institution continually fulfills its promise as one of the world's top public research universities.

At the core of that promise is our land-grant mission: to not only make higher education accessible to all of the world's sons and daughters, but also for the teacher-mentors of these young citizens to continue the push for new knowledge through cutting-edge academic research — and then to share the fruits of these discoveries widely for the benefit of all humankind.

With our current world population of more than 7 billion projected to increase to 8 billion by 2023, and to as much as 16 billion in 2100, we urgently need solutions to the ever-growing demand for food, water and energy while we ensure a safe, productive and sustainable environment for all global citizens.

That's why the affirmative impact of the University of Illinois' research, teaching and public engagement is more critical now than ever before. And why it is imperative that we leverage our internationally renowned work in climate, water, food, alternative energy generation and storage to find those solutions.

So we've launched the Institute for Sustainability, Energy, and Environment (*i*SEE) … to boldly initiate and facilitate innovative research and initiatives to address these grand world challenges. Now discover why it can happen only at Illinois.

The Illinois Difference

One of only 22 schools — and the sole Big Ten institution — on the Princeton Review Green Honor Roll

Gold Level Recognition in the Association for the Advancement of Sustainability in Higher Education's STARS program

Ranked #1 in the Big Ten on Sierra Club's Cool Schools List

Climate solutions

Energy transitions

Put simply, our mission is to conduct actionable research and equip current and future scientific and policy leaders to solve global problems in the areas of sustainability, energy, and the environment — while using our campus and local community as a living laboratory. Our goal … to become a global model of sustainability by creating effective, positive change.

To accomplish this, *i*SEE will focus on five key areas: climate solutions, energy transitions, sustainable infrastructure, water and land stewardship, and secure and sustainable agriculture as we deploy Illinois' world-renowned academic strengths and interdisciplinary collaboration to:

- create and nurture partnerships to develop novel solutions to societal grand challenges;
- develop and disseminate practice-based knowledge;
- provide the collaborative structure to compete for multi-institutional and public-private grants and contracts;
- educate the next generation of leaders in the field by creating a cohesive interdisciplinary curricula for undergraduate and graduate students (both in the classroom and online); and
- ensure that new paradigms and technologies reach industry and the general public by communicating effectively about the accomplishments and activities.

*i*SEE: The essential hub

The Illinois Difference

University of Illinois research, led by Civil and Environmental Engineering Professor Tami Bond in partnership with colleagues at the University of California, Berkeley, found that kerosene wick lamps — which light millions of homes in developing countries — release 20 times more black carbon than previously thought. The effects on both indoor and outdoor air quality pinpoint black carbon as a hazard for human health and the environment.

The group's study was published in the journal *Environmental Science and Technology*, and is helping spur agencies in developing countries to distribute affordable replacements, such as LED lamps charged by solar panels. The Centers for Disease Control and Prevention, the National Institute of Environmental Health Sciences, the U.S. Agency for International Development and the Environmental Protection Agency supported the research.

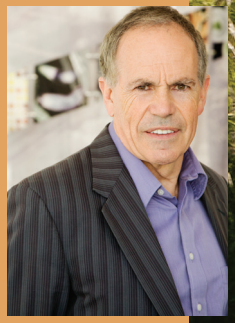
From changes in precipitation and storm activity to increases in ocean temperatures and sea levels, the indicators of climate change are all around us — with dramatic impacts on human health, our ecosystems, and society.

While the effects are serious in the U.S., the impacts pose even greater risks for agriculture, food and water supplies in developing nations — projected to experience the largest percentage of the world's growth from now until 2100. These threats could quickly erase recent gains in the fight against poverty, hunger, and disease.

That's why *i*SEE is taking a comprehensive approach with research and programs to address various aspects of climate solutions:

- Risk
- Mitigation and adaptation
- Human health
- Social vulnerability, conflict, and democracy
- Ecological integrity

Supplying climate solutions



The Illinois Difference

A 10-year report on U.S. field trials of *Miscanthus x giganteus*, a perennial grass used in bioenergy production, reveals that its exceptional yields are twice those of switchgrass, another perennial grass used as a bioenergy feedstock. Several growers in the U.S. pelletize *Miscanthus* for use as a renewable, carbon-neutral energy source to meet a growing market in the U.S. and in Europe.

The findings were published in the journal *Global Change Biology: Bioenergy* from a study led by University of Illinois Plant Biology Professor Stephen Long, also a professor in the Institute for Genomic Biology at Illinois. The research was supported by the Energy Biosciences Institute at the U of I.

Energy, a vital part of the world economy, is needed in ever-increasing amounts to sustain economic growth, raise living standards, and reduce poverty. As the world's population grows and economies become more industrialized, nonrenewable energy sources will become more scarce and more costly.

In fact, some reports caution that the world will need 40% more energy by 2030. That energy will need to be found in renewable sources — quickly and with reliability.

*i*SEE is fostering path-breaking new works in numerous areas of energy transitions:

- Renewables
- Optimization of supply and demand
- Systems and controls
- Micro grid and storage
- Pollution

Facilitating energy transitions

The Illinois Difference

Recent research from the Illinois Center for Transportation (ICT), working in partnership with the Illinois Department of Transportation and other universities in Illinois and across the nation, offered new insight on recycled asphalt pavement (RAP). The work of principal investigators Imad Al-Qadi, Director of ICT and the Founder Professor of Engineering in Civil & Environmental Engineering (left), and Samuel Carpenter, Associate Director of ICT and Professor Emeritus in Civil & Environmental Engineering, showed that mixes with RAP content above the 15% currently allowed by IDOT can be designed without compromising the mixtures' resistance to moisture and cracking susceptibility.

ICT's research, along with development and implementation of cost-effective technologies, led to its selection by the Illinois Tollway for a three-year project to design life-cycle assessment tools that measure the environment impact of roadways and bridges during their lifetimes.

In less than a century, the U.S. has experienced a major societal transition from designing and building urban environments and the associated pathways between destinations to maintaining the operational infrastructure of communities.

From massive repairs of aging systems for water, sanitation and more, to developing new improvements to preserve natural resources, it's imperative that we harness technology and public policy across engineering and urban planning disciplines to create sustainable solutions.

To address these concerns, *i*SEE is encouraging and coordinating work in key areas of sustainable infrastructure:

- Transportation
- Built environment
- Risk
- Pollution and waste
- Cities and urban environments

Creating sustainable infrastructure

The Illinois Difference

In a study led by Wei Zheng, a Senior Research Scientist at the Illinois Sustainable Technology Center, and an adjunct faculty member in the University of Illinois Department of Natural Resources and Environmental Sciences, researchers determined the effectiveness of rural lagoon systems at removing pharmaceuticals and personal care product (PPCP) contaminants from wastewater. Results of the research, conducted jointly with the Illinois State Water Survey, appeared in the journal *Science of the Total Environment*.

While the lagoon treatment systems reduced concentrations of most of the tested compounds, the study found a significant increase in the occurrence of PPCPs in surrounding watersheds, with potential to contaminate water sources. The study will aid the EPA in developing best practices for treated wastewater in U.S. agriculture.

Natural resources — fresh water, clean air, forests, grasslands, and marine assets — provide not only sustenance for humans and wildlife, but also a foundation for social and economic development.

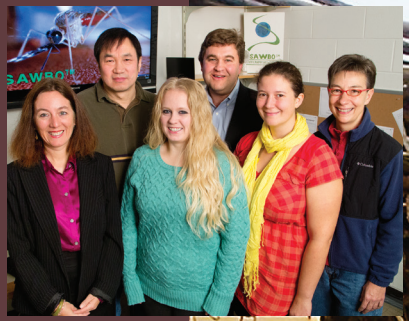
Degradation and loss of these natural assets is identified as a main threat to 85% of all species, according to the International Union for Conservation of Nature's Red List. What's more, the impact of chemical pollution is creating a chain reaction that's causing debilitating mutations to fish and animals while imposing unsafe levels of toxins to the human food supply.

To help halt this dramatic situation, *i*SEE is serving as a unified source for new insight into water and land stewardship:

- Land use change
- Freshwater resources and purity
- Conservation and biodiversity
- Land and resource tenure
- Health

Improving water and land stewardship

The Illinois Difference



Scientific Animations Without Borders (SAWBO), an initiative founded by Illinois Entomology Professor Barry Pittendrigh (back right) and Julia Bello-Bravo (front left) of Illinois Strategic International Partnerships, is offering educational content about global health and agriculture topics, delivered via cell phone videos. Designed for people in developing countries, the narrated, animated videos address a variety of challenging issues, including how to purify water to stop the spread of cholera and how to use bed nets to prevent mosquito-borne infections.

And other videos, funded through the ADM Institute for the Prevention of Postharvest Loss at Illinois, offer advice about stopping the waste of food crops as a result of insect infestations, spillage or spoilage — which currently prevents as much as one-third of the world's agricultural production from reaching its intended use. SAWBO also developed an online system for educators in various countries to download and distribute the videos in line with needs of specific regions.

With growing populations and higher demand for food, the impact of climate change could result in an increase of 20% of the world's people at risk of chronic hunger, according to a World Health Organization report.

The gap between agricultural production and demand can be closed by expanding agriculture to currently marginal or unused land, substituting new types of crops, and adopting new technologies — particularly in developing nations affected by large variations in rainfall and reduced water availability.

*i*SEE is spearheading initiatives in numerous areas of secure and sustainable agriculture:

- Greenhouse gas emissions and farming practices
- Nutrient management and soil health
- Technology for sustainable agriculture
- Regulation
- Public health, food safety, and policy

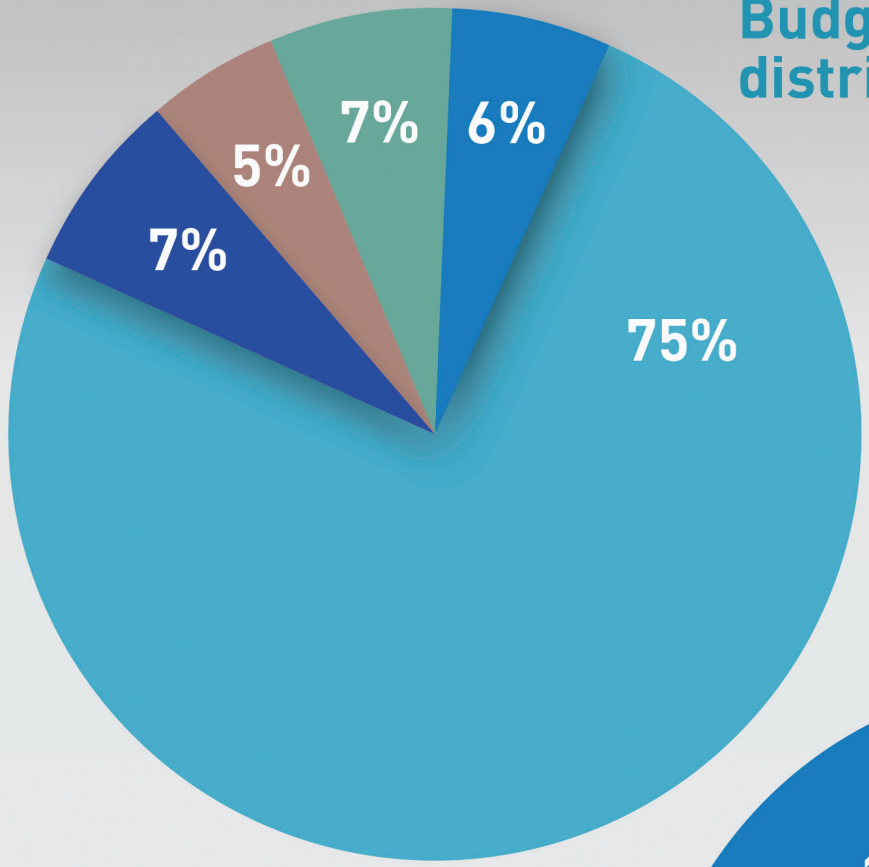
Growing secure and sustainable agriculture

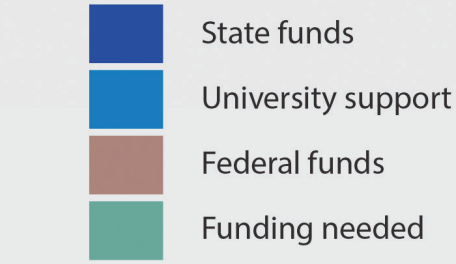
The Illinois Difference

Our budget model is specifically built to drive 75% of all funding to research projects ... assuring the greatest return on investment of intellectual capital.

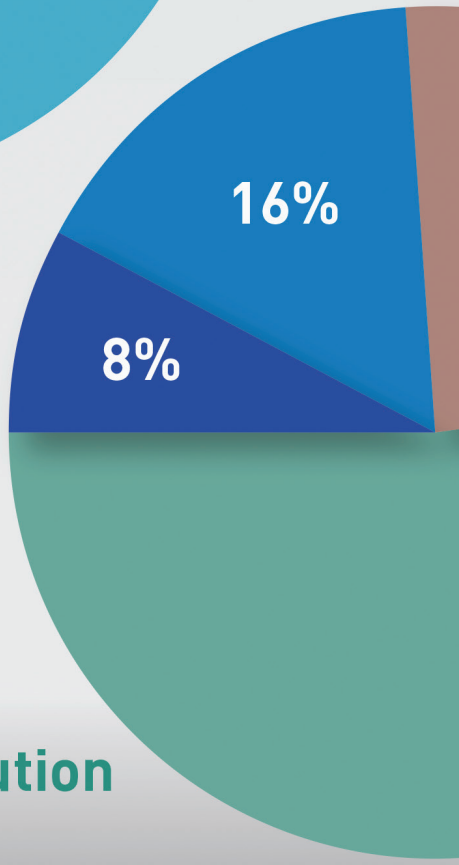
In addition to the university's financial support, we've also secured federal and state dollars (see income distribution chart), and are seeking the remaining 52% of our funding from private donors who want to partner with *i*SEE in achieving extraordinary sustainability solutions for our planet.

Budget distribution





Income distribution



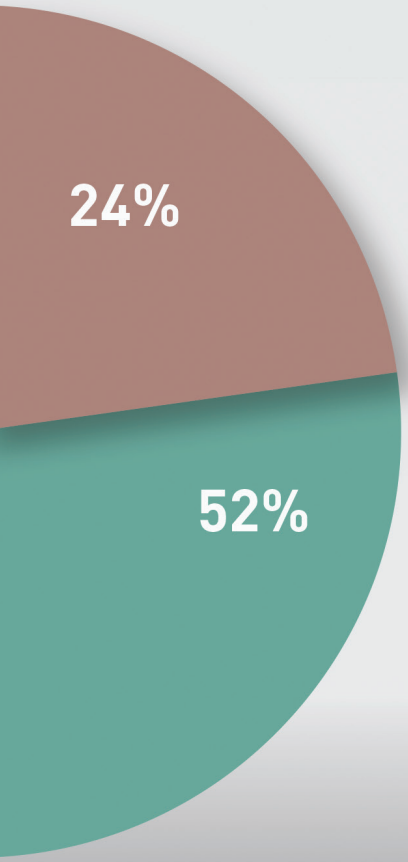
Outreach

Campus sustainability

Other

Salaries

Research



The grand challenges before us in the areas of sustainability, energy, and the environment may seem daunting … even impossible. Most life-altering work does. That's why we are tapping the academic strengths here at Illinois and reaching out to other higher education and corporate partners … to think and solve and teach and learn together in a way that exponentially intensifies our progress.

Our commitment to success is woven into the fabric of the Urbana-Champaign campus of the University of Illinois … with energy and environment issues as a crucial focus area for the Visioning Future Excellence-based campus strategic plan facilitated by Chancellor Phyllis Wise and Provost Ilesanmi Adesida.

*i*SEE brings together and draws on Illinois' strengths, coalesces our resources, and addresses essential gaps in advancing discovery, learning, and engagement. We seek endowments totalling $40 million or more. To this, the campus is providing a matching incentive of income from this $40 million endowment - generating the equivalent of an $80 million endowment.

Unparalleled opportunities for success

Please join our efforts

It is certainly no ordinary work we are set to do at this very important juncture. And with your support, we will find the new and better solutions required to assure our collective well-being and destiny.

We appreciate your interest, and thank you for your consideration of financial support for *i*SEE.

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