About Golisano Institute for Sustainability

The Golisano Institute for Sustainability is a multidisciplinary academic unit at Rochester Institute of Technology whose mission is to undertake world-class education and research programs in sustainability with major foci on sustainable production, sustainable energy, sustainable mobility and ecologically friendly information technology systems.

The Institute was founded in 2007 with a $10M gift from B. Thomas Golisano. The Ph.D. program started in 2008—offering the world’s first doctorate in sustainable production. An M.S. Program in Sustainable Systems was approved and begun in 2010. The first graduates received their diplomas in 2011.

BE AT THE FOREFRONT OF FINDING A SOLUTION

For more information on how you can be part of the solution, please contact:

Craig Smith
Associate Vice President for Development
chsdar@rit.edu
585.475.7838

SUPPORTING THE NEED FOR GRADUATE FELLOWSHIPS IN

THE GOLISANO INSTITUTE FOR SUSTAINABILITY
Sustainability at a Glance

Sustainability means that things can keep going—they can sustain themselves, continue into the future and go on forever. From a human perspective, sustainability for our planet means that it can continue to do what it was designed to do—provide fresh air and clean water, produce food and allow us all to have a high quality of life forever. Unsustainable means that the earth cannot continue to do these things forever and unfortunately, that is the state our planet is in now.

The definition of sustainability contains four basic principles that can be seen as the “care instructions” for our planet: 1) reduce dependence on fossil fuels and heavy metals; 2) reduce our dependence on synthetic chemicals that persist in nature; 3) reduce our destruction of nature; and 4) ensure we are not stopping people from meeting their basic needs. Simply, demand for our planet’s services—air, water and food—increases as the population increases and living standards rise. But, the earth’s ability to provide these services is declining because of the unsustainable way we’re living. In our search for prosperity, growth and success, we are destroying the system that man is completely dependent upon—nature. We have essentially become a threat to our own way of life.

The earth is a system and everything is connected: society, environment and economy. To live sustainability, we need to follow these four care instructions and apply them to everything we do at home and at work. Following these care instructions means that working together we’ll create less and pollute less. Doing so means, we can become sustainable and have a far better quality of life now and in the future.

The Need

Solving globally impactful problems requires significant resources—resources that RIT and our students do not have. The need to fully fund fellowships in the field of sustainability to solve the world’s problems is great. Without this funding, the vital work RIT students are doing to help solve these challenges will simply not occur. The problems are huge, the research required extensive, but the results will be forever lasting. Your help to fund fellowships so that this crucial work will continue means that you can be at forefront of finding a solution.

Wanted: T-shaped Professionals in Sustainability

According to many professionals in the talent-seeking field, the most sought-after candidates for management, consulting, research, and other leadership positions are T-shaped. The vertical stem of the T is the foundation or an in-depth specialized knowledge in one or two fields. The horizontal bar refers to the complementary skills of communication, creativity, the ability to apply knowledge across disciplines and see from other perspectives, and an understanding of fields outside the primary area of expertise. In sustainability, the goal of a T-shaped professional is largely to drive research initiatives, develop solutions, and make decisions that benefit all stakeholders—the environment, industry, consumers and the world at large. In essence, the goal of a T-shaped professional is to solve problems holistically without creating new problems.

Rochester Institute of Technology is recognized in the field of sustainability as the first program in the world to take a unique systems and multi-disciplinary approach to sustainability—developing these highly sought after T-shaped professionals. Our approach embraces a broad understanding of many environmental, economic, and social impacts along with proficiency in technological specialties. The graduate and doctorate programs in sustainability seek to advance research and education in alternative-energy development, sustainable production, sustainable mobility, and eco-IT. The program’s curriculum emphasizes sustainable production systems, which create goods and services using processes that are:

- Non-polluting
- Conserve energy and natural resources
- Economically viable
- Safe for workers, communities, and consumers

RIT Ph.D. Candidates: T-shaped Professionals in the Making

Erinn Ryen is a Ph.D. candidate in Sustainability who has spent the last five years researching the environmental impact of consumer electronics and how to design products to minimize electronic waste.

Electronic equipment is the fastest growing waste stream in the U.S. and across the globe. For many, electronics are part of modern life—cell phones, laptops, tablets, TVs and a growing number of gadgets. Every year we buy new, updated equipment to support our needs and wishes—in 2012, global sales of new equipment included 238.5 million televisions, 444.4 million computers and tablets, and 1.75 billion mobile phones (Gartner Research). All of these electronics become obsolete or unwanted, often within one to three years of purchase. This global mountain of waste is expected to continue growing eight percent per year, indefinitely (BCC Research). Think about the number of electronic gadgets you use daily and how frequently you update them? Where does all your electronic waste go?
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Electronic waste in the United States is growing exponentially and unfortunately, only a small percentage of e-waste is recycled. Even when we take it to a recycling center, if available, there is no guarantee that it is actually recycled—not in the way most of us think of that term. A small percentage of electronic waste is estimated to be sent to recyclers. In the U.S., this is as little as 11–14 percent. The remainder is most often dumped or burned—either in formal landfills and incinerators, or informally dumped or burned. These inappropriate disposal methods for electronic waste fail to reclaim valuable materials or manage the toxic materials safely. In effect, our soil, water, and air are easily contaminated. So, not only do these toxins present risks to communities and the global ecosystem, but also to electronics recycling workers around the world.

Electronic waste has been a problem for years, but the explosive growth in our use of technology makes it a crisis today. Erinn is devoting her work to better understanding this mounting problem; how to design products that both minimize waste as well as how to reclaim resources at the product’s end of life. Upon graduation, Erinn plans to continue her research and teach future sustainability professionals while she also contributes guidance to manufacturers and governments on future policies and regulations specific to the manufacturing of electronics and their eventual disposal. But ultimately, it is the behavior of consumers that needs to be altered and it is the work being done by people like Erinn where a sustainable future becomes a real possibility.

Meet Jackie Ebner—a former mechanical engineer with an MBA in marketing, a long-standing career with Xerox and mother of three, turned Ph.D. candidate in the Golisano Institute of Sustainability at RIT. Jackie, like so many other students, has chosen her eventual second career and current field of sustainability research because she wants to be part of the solution that her children and her grandchildren will face—what to do with all the organic waste created in this country. And specifically, how to convert agricultural and food waste into sustainable energy sources. According to the Natural Resources Defense Council (NRDC), getting food from ‘the farm to our fork’ eats up 10 percent of the total U.S. energy budget, uses 50 percent of U.S. land, and swallows 80 percent of all freshwater consumed in the United States. Yet, 40 percent of food in the U.S. today goes uneaten and to waste. This not only means that Americans are throwing out the equivalent of $165 billion each year (includes household and industrial food waste), but also that the uneaten food ends up rotting in landfills as the single largest component of U.S. municipal solid waste where it accounts for a large portion of U.S. methane emissions. It is these emissions which are contributing to greenhouse gases and ultimately global warming.

A Rochester-area resident, Jackie has made it her life’s work to help find the solution to organic waste material. Right here in the New York Finger Lakes region, Jackie is working in her lab at RIT to better understand the potential of digester systems and their implementation to produce clean renewable energy and lessen the greenhouse gas effect. Through her work, Jackie has developed a food waste locator application for this region of the country and is studying ways to help local industries eliminate or avoid waste as well as manage and harness organic waste that is unavoidable—essentially leveraging a natural cycle where waste is both reduced and reused.

Tess Garvey, with an undergraduate degree in physics, is pursuing her Ph.D. in sustainability at RIT because she is looking to make a bigger impact with applied research. Tess is working on overcoming an entirely different problem facing the world today—the environmental and human health risks of nanomaterials currently being used in consumer products and energy systems; and what policies and regulations will be needed in the not-too-distant future to protect both the environment and human beings.

Nanomaterials are incredibly small—each nanoparticle is about the size of a single cell; nanomaterials are both engineered while also existing in nature. They can exhibit unique characteristics that are leading scientists and researchers like Tess to question what implications they may have for our health.

Nanotechnology is a relatively new science and, as a result, the health and environmental implications associated with engineered nanomaterials have not yet been fully determined. Much of today’s information on health effects is from decades of understanding the effects from natural or incidentally formed nano-sized materials such as ultrafine particles from dust or incomplete combustion.

Research is needed to determine whether exposure to manufactured nanomaterials can lead to adverse effects to the heart, lungs, skin; alter reproductive performance; or contribute to cancer. The scientific challenge to understand the potential human health risk of manufactured nanomaterials...
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**Steven Barber**, with an undergraduate degree in geology, a master’s degree in business finance and a career as a financial consultant, is a first year Ph.D. candidate with Golisano Institute for Sustainability who would one day like to help New York State grow in a sustainable way.

Steven is doing his research in the area of pyrolysis and on the outputs of the process—biochar. Pyrolysis is the heating of an organic material, in the absence of oxygen. Because no oxygen is present the material does not combust but the chemical compounds that make up that material thermally decompose into combustible gases and biochar.

It is the biochar produced that Steven is particularly interested in because it can be used on the farm as an excellent soil amender that can sequester carbon. Biochar is highly absorbent and therefore increases the soil’s ability to retain water, nutrients and agricultural chemicals, preventing water contamination and soil erosion while also lessening the need for extreme fertilizing. Soil application of biochar may enhance both soil quality and be an effective means of sequestering large amounts of carbon but the soil application of biochar is also a significant way to help mitigate global climate change through carbon sequestration—with biochar we are able to put the carbon back into the earth which over time leads to a more sustainable earth. Additionally, use of biochar as a soil amendment will offset many of the states’, the country’s and the world’s problems associated with removing crop residues from the land—New York State and its dairy farms among them.

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**How can you be part of the solution?**

RIT’s Golisano Institute for Sustainability is developing these highly sought-after T-shaped professionals. For Erinn, Jackie, Tess, and Steven their systems approach to solving globally impactful problems require tremendous resources—resources that students and RIT do not have. Sustainability is a heavy research-driven field but research-intensive graduate and doctoral study are developing areas for RIT. Without funded fellowships, this vital work will simply not occur. Currently, only eight to ten RIT sustainability students are funded from among the program’s more than 80 graduate level applications. Fellowships to build T-shaped sustainability professionals are greatly needed to address the majority of students seeking to be part of the solution to the country’s and the world’s most pressing problems. **We urgently need to scale up this critically needed research and make a bigger difference, faster—time is of the essence and the time is NOW.**

**Graduate Fellowships**

Graduate Fellowships support masters and Ph.D. candidates as they complete their studies and conduct the necessary research to solve the world’s most challenging problems. Funding helps to address tuition costs and provides a living stipend to enable students to focus on their advanced degree work.

Graduate level tuition is slightly higher than undergraduate tuition, but when coupled with the undergraduate debt burden that many graduate students carry into their advanced study, the need for support can be profound. In addition, the competition for top masters level and Ph.D. students, especially in sustainability-based fields, is fierce. The quality of graduate students has a tremendous impact on the overall quality of the graduate programs, and also helps to drive new knowledge and academic quality in undergraduate programs. As RIT strives to attract highly-qualified masters and Ph.D. students, graduate fellowships will play an important role in making the university more appealing to those who are at the top of their field enabling them to do the vital work that needs to be done.

There are two key opportunities to provide support for graduate fellowships in sustainability at RIT:

**SUPPORT A SUSTAINABILITY FELLOW**

- **MS Sustainability Fellow** $10,000/year $200,000 Endowed
- **Ph.D. Sustainability Fellow** $15,000/year $300,000 Endowed

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Chart by Avellio Bioenergy.
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