Leave it all on the field – or not?
With millions of Iowa's acres planted in corn annually, key to the state's economy is developing technologies to make better use of the entire plant – from kernel to stalk – for both food and fuel.

Photo: Scott Sinklier
Cover: Getty Images

Dinner plate and gas tank are often viewed as vying for the same resources. Yet in the global bioeconomy, food and energy security alike are critical. That's why Iowa State is taking a multipronged approach to address both, now and for the future.

By Jodi O'Donnell
Bernaldo Del Campo is eager to show off the contents of two containers on his windowsill in the Biorenewables Research Laboratory on Iowa State University’s campus. The wheatgrass sputtering in the dark soil in both containers looks similar, save for one detail: The plants in one are visibly taller than the other. So what made the difference? “Biochar,” del Campo said excitedly.

As a graduate student in biorenewable resources and technologies and in industrial and agricultural technologies, del Campo has become fascinated with biochar, the byproduct of super-heating biomass—such as grass, corn stalks or wood—in a process called fast pyrolysis to make bio-oil. Biochar’s main attribute is storing in a stable form the harmful carbon dioxide that would otherwise return to the atmosphere.

Yet the sooty substance also has been shown to boost moisture and nutrient retention when added to soil, as in del Campo’s simple demonstration. As such, “Biochar could make a huge difference to farmers, not just in countries with poor quality soils, but here in Iowa, where we’ve lost 50 percent of our native soil’s organic carbon through decades of planting, tilling and erosion.” Thus, “Developing biofuels, increasing yields, and stewarding the environment can actually go hand in hand.”

Del Campo is just one of hundreds of students coming to Iowa State because of the university’s leadership in developing the bio-based fuels, chemicals and technologies poised to completely change how the world accesses energy. Yet even more, he was drawn here from his native Uruguay to work with the teams of faculty and researchers who are driven to solve the global crises in both food and fuel, responsibly and sustainably.

Expanding the paradigm

While America is making progress in developing biofuels as one way of reducing our reliance on imported oil, the debate about whether agriculture should be part of our energy portfolio rages on. Much of the tension rises from the perception that asking agriculture to fulfill a dual role threatens the world food supply—a perception Robert C. Brown is keen to debunk.

“Over the past century, the petroleum economy allowed us to divorce agriculture from its historical role of providing calories for both food and fuel. So now, as we’re expanding today’s energy paradigm to again include agriculture, some people see it as a dangerous precedent rather than a return to our roots,” Brown said.

That’s why a more comprehensive view of agriculture is imperative. “As finite fossil fuel reserves decline, it would be the height of negligence not to plan for agriculture to help supply the renewable energy needed for a sustainable future.”

Brown, the Gary and Donna Hoover Chair in Mechanical Engineering, is also Iowa Farm Bureau Director of the Bioeconomy Institute at Iowa State. The institute brings together faculty in disciplines across all seven colleges and 20 research centers at Iowa State, enabling the university to tackle the sustainable energy challenge from multiple sides.

“Rather than focusing on a particular technology or discipline, the Bioeconomy Institute begins with defining the large problems facing society, then maps out the strategies for solving them,” Brown said. “This requires us to take a systems perspective, with faculty and students working across the value chain and collaborating with others from outside their own disciplines—not only engineering, the physical sciences and agriculture, but also economics and sociology.”

The Grand Challenges

With the world’s population projected to rise to 9 billion by 2050, grain production globally must double.
Biomass appeal
High-yielding biomass crops mean less land is needed for the same fuel production. The challenge has been finding perennials that compete with grain crops in value. Emily Heaton, assistant professor of agronomy, believes miscanthus grass holds that promise. “Miscanthus produces two and a half times more biomass per acre than switchgrass,” she said, potentially enough to meet national renewable fuel goals just by substituting it on land currently producing corn for ethanol. As such, “Biomass crops like miscanthus can be a tool for getting more perennials in the landscape and addressing Iowa’s economic needs.”

Learn more online about how Iowa State is tackling the food and fuel challenges at www.foundation.iastate.edu/forwardmag.

This multidisciplinary approach not only helps ensure that the results of this work are practical and useful, Brown says, it also resonates with students such as del Campo. “Because we’re looking at the impact on soils and wildlife, on the consumer who’s buying these products, and every step in between, we’ll have the best chance of discovering how to sustainably produce food and energy so everyone, including future generations, is assured access to both.”

The power of seed
Outside Manjit Misra’s office in the Seed Science Center stands sculptor Christian Petersen’s statue of George Washington Carver. The figure holds a peanut, for which the groundbreaking researcher developed new uses. But look closer: The veins in the hand holding the peanut are actually its life-giving roots.

One could extend the metaphor to Iowa State as a whole: The first corn hybrids were pioneered here, and Iowa State played a major role in sequencing the corn genome. The university is also home to the nation’s premier soybean breeding program, which is working to develop increasingly disease resistant, better yielding, and nutritionally enhanced soybeans.

“Seed is indeed a powerful medium of delivery,” said Misra, who holds the Dean’s Chair for Distinction in the College of Agriculture and Life Sciences. He directs both the center, which houses the world’s largest public seed-testing laboratory, and the Biosafety Institute for Genetically Modified Agricultural Products, providing science-based analysis of the risks and benefits of genetically modified plant and animal products. So he knows perhaps better than most where the greatest opportunities are for addressing global food shortages.

“Seed technology can be adjusted not only for specific growing conditions, but also to increase the ability to store, transport and market food crops, and to use food properly,” he said. “If we can provide quality seed and ensure the water supply, we can realize a 50 to 60 percent growth in food production worldwide.”

Like Brown, Misra doesn’t limit the impact of such technology to one side of the food-fuel equation. “All people need access to safe, secure food and energy, because energy is a basic requirement for growing food,” he said. For that reason, “Biofuels must be a tool in our food supply technology and policy toolkit, so that we’re using the whole plant: a potion for food purposes, the rest for fuel.”

This is one goal of Iowa State’s world-renowned Plant Sciences Institute. Faculty in the institute’s nine centers are working at the molecular level to develop seed and crop production technologies to help meet both global food and fuel demands — for example, by improving corn stover’s biomass capabilities along with corn’s grain yield.

Taking this approach will result in discoveries across all areas of plant science, Misra says. Whether developing technology to improve nutrition or produce energy, “When we work together from the beginning, we’re asking questions of one another and considering the impact on people and the planet.”

Sustainable and sustained
On a chilly mid-November morning, when most crops are already out of the field, Emily Heaton is thinking that the plot of tall, tasseled grass north of Ames is still a few months from harvesting. And that’s a good thing.

“T o meet food and fuel demands, we need to make Mother Nature work year-round,” she said.

Iowa State is taking a systems perspective, with faculty and students working across the value chain and collaborating with others from outside their own disciplines — not only engineering, the physical sciences and agriculture, but also economics and sociology.

ROBERT C. BROWN
Gary and Donna Hoover Chair in Mechanical Engineering, Iowa Farm Bureau Director of the Bioeconomy Institute

“Research that matters”

Biomass crops like miscanthus can be a tool for getting more perennials in the landscape and addressing Iowa’s economic needs.
GIFTS at WORK
EXTENDING IOWA STATE’S IMPACT THROUGH PHILANTHROPIC GIVING

What you can do
Much like assembling a dream team of the most qualified and talented individuals in their fields, ongoing philanthropic support for Iowa State’s people ensures progress continues to be made in building sustainable food and fuel systems globally.

Support for faculty – from endowed positions to unrestricted contributions to college funds – provides the flexibility that allows them to embark on fresh, innovative avenues of research to ensure food and energy for all.

Support for graduate students enables them to be involved in leading-edge research at Iowa State, so they can become the change agents bringing new discoveries to the world.

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A thousand poinsettias of light
Poinsettias for the Horticulture Club’s annual fundraiser thrived in the new teaching and research greenhouses on campus, made possible in part with nearly $1 million in private support.

Heaton, assistant professor of agronomy, and her team are developing management practices in Iowa for giant miscanthus, an ornamental grass with great promise as a high-yielding biomass crop. (See “Research That Matters,” p. 7) The project is part of a larger endeavor with researchers across several areas at Iowa State to develop cropping systems that will not only produce large quantities of biofuel feedstocks but also help conserve and protect soil and water, and increase biodiversity.

“The reason Iowa State is getting grants for biobased fuel is because of the emphasis we’ve established in biorenewables, like this is because of the emphasis on perennials,” Heaton said. “Then we need to be able to work in this area for 10 to 20 years, because that’s how long it takes to tell the whole story.”

Creating the climate for change
While the factors at play are complicated and the dynamics ever-changing, meeting today’s food and fuel challenges is achievable, Heaton says, especially with philanthropy strategically engaged. “Often it’s philanthropic investments in key areas that bring attention to issues and generate momentum to get others on board.”

Indeed, public-private projects such as the BioCentury Research Farm and the Biorenewables Complex – with Virgil B. Elings Hall and Sukup Hall in progress – are providing the setting for Iowa State to ensure prevailing technologies and practices in biorenewables are scientifically sound and sustainable. The Roy J. Carver Co-Laboratory, home to the Plant Sciences Institute, brings university and private sector scientists together to facilitate economic development in plant biotechnology. And support for Iowa State’s people is assuring that virtually no stone is unturned in the quest to create real and lasting solutions for supplying the world with food and fuel.

As Brown said, “We’re asking not only what are the problems society faces, but what’s unique about Iowa State that can contribute to answering these questions. And we’re creating the environment and putting the people in the right seats to address these grand challenges.”

“Just setting up infrastructure and establishing the multidisciplinary team that’s needed to answer the big questions is expensive,” Heaton said. “But putting the people in the right seats to answer these questions is the value added.”

Through leadership and philanthropic giving, what’s needed to answer the big questions is possible.

Photo: Cameron Campbell
INSTRUMENTAL JOURNEYS
EXPANDING STUDENTS’ HORIZONS THROUGH STUDY ABROAD

Being immersed in another culture is life changing. Scholarships help students plunge right in.

By Debra Gibson

ALTHOUGH BEN CLOUGH (11) traveled to Europe for a short student ambassador trip in high school, those who know the self-described introvert would probably be surprised he’d venture to Scotland to study abroad for an entire semester.

And they’d likely never recognize the young man who stood in pouring rain outside a Glasgow voting precinct last May, trying to convince local Scots to vote for a candidate named Bill Kidd.

Suffice it to say, Clough’s study abroad experience brought him out of his shell—and into a whole new world.

The Fort Dodge, Iowa, native was a senior majoring in history and political science when he spent spring semester 2011 in the University of Edinburgh’s Parliamentary Programme—the first Iowa State University student ever admitted to the prestigious program. While there, Clough interned for Kidd, a member of the Scottish Parliament.

“I worked with Bill every day and really got to see how things work in the Parliament,” Clough said.

He also became involved in Kidd’s efforts to make Scotland a nuclear weapons-free zone, writing informational materials and researching topics for speeches and debates. “If the program were to work, it would make a huge difference in the world,” Clough said.

Financial support for students to pursue such opportunities is critical, and Clough received the Trudy Huskamp and Gary Peterson Scholarship for Study Abroad.

“Financial support for students to pursue study abroad is a desirable trait for employers,” she explained. “Economics are changing, the world is changing, and these students are able to build a skill set that provides them with an edge in the marketplace.”

And not surprisingly, students learn to become change agents themselves. “Bill won his election by just seven votes,” said Clough, who plans to attend law school. “I like to think that my standing out in the rain all day helped.”

The Peterson Scholarship for Study Abroad allowed her to study the Mediterranean shoreline, a natural environment far different from the Midwestern prairies back home.

Fetterman also wanted to immerse herself in the Spanish language, which she had never studied. “I now feel fairly comfortable reading and conversing in Spanish!” she said.

She’s currently working toward a master’s degree in education at Stanford University. “My study abroad experience really helped me become more well-rounded in my discipline, an important quality for me to possess as a future high school biology teacher,” she said.

Such expanded perspectives are another key benefit of international study, Guthrie said.

“as more companies expand into the global marketplace, study and internship abroad experience is a desirable trait for employers,” she explained. “As the world is changing, and these students are able to build a skill set that provides them with an edge in the marketplace.”

The more we understand about each other, the better place the world becomes.”

By Debra Gibson

Donor spotlight
Trudy Huskamp Peterson (’67) former Acting Archivist of the United States, and her husband, Gary Peterson (’67), a retired attorney with the Department of Justice, have long advocated international study for college students. Their enthusiasm is rooted in large part in Trudy’s participation in the International Foreign Youth Exchange program while a student at Iowa State University in 1966.

As many as 10 students in the College of Liberal Arts and Sciences annually receive $1,000 scholarships funded by the Petersons to support their own participation in international academic programs. “Living abroad was so influential in changing my life,” Trudy said. “I’ve enjoyed a wonderful worldwide career, and found myself comfortable in many different countries and settings. The more we understand about each other, the better place the world becomes.”

To support students studying abroad, contact us: 515.294.4607 toll-free 888.419.6768 questions@foundation.iastate.edu
MEET THE LEATHS
NEW PRESIDENT AND HIS WIFE: IOWA STATE FEELS LIKE “HOME”

Steve and Janet Leath’s roots in the land-grant heritage go deep

By Jodi O’Donnell | Photo: Images by Ngaire

THE LAND-GRA NT UNIVERSITY heritage has figured largely in Steve Leath’s life. He was educated at three land-grant institutions – Pennsylvania State University, where his father, Ken, was in plant pathology research, the University of Delaware, and the University of Illinois. Most of his professional career has been at North Carolina State University. And now he has come to Iowa State University to serve as its 15th president.

Leath shares his land-grant connection – and a connection to the land – with his wife, Janet, whom he met at Delaware. On their small farm in North Carolina they’ve grown everything over the years from fruit for farmers markets to Christmas trees, and even raised Black Angus beef cattle. In addition to building a successful insurance agency, Janet developed the gardens surrounding their home near Raleigh, including a 60-specimen collection of Japanese maples and dwarf conifers.

Often helping them in these endeavors have been their two sons, Eric, a legislative assistant to U.S. Senator Richard Burr of North Carolina, and Scott, a junior at Appalachian State University.

Although Leath just took over as president of Iowa State on Jan. 16, the Leaths have already found much at Iowa State and in its people to embrace, as Forward recently learned.

Q What appealed to you about Iowa State?

Steve Leath
I graduated from three land-grant universities and worked and taught for more than 20 years at another. So land-grant institutions are where I have a passion and feel I best fit. This kind of position is really about fit, and the more Janet and I learned about Iowa State, the more convinced we were that this place was right for us. It seems Iowa State feels the same way about us – that’s what makes us so excited about being here.

Janet Leath
I was surprised, but by the second day on campus, I said to Steve, “This feels like home already.” We experienced that from the beginning, so we’re very happy to be at Iowa State.

SL And Janet looks good in red, too.

Q How would you like to be involved with students?

SL Janet and I are at the point in our lives where we’re both interested in fostering the success of others, and helping students grow is very rewarding. I think Janet’s experience of putting herself through college and building a business from scratch will make her an effective role model and mentor.

JL I was a nontraditional student, and I certainly can relate to where many students are today, paying for college themselves.

JL What are you most looking forward to at Iowa State?

SL I want to make a difference in the overall success of the university and the people associated with it. President Geoffroy did an outstanding job and turned the university over in a strong position that I’m excited to build on.

Iowa State in some ways has been too humble. I’m proud to be able to tell Iowa State’s story, and to raise the stature and notoriety of this great university.

STEVE LEATH
President
Iowa State University

By Jodi O’Donnell | Photo: Images by Ngaire

LEARN MORE
Learn more about Steve and Janet Leath online at www.foundation.iastate.edu/forwardmag.

Learn more about Steve and Janet Leath online at www.foundation.iastate.edu/forwardmag.
LEARNING

TOP 10
IN THE NATION. That’s where Iowa State’s undergraduate programs in architecture and landscape architecture are ranked by the professional publication DesignIntelligence.

9,000
HOURS. Cyclone student-athletes log more than 9,000 hours in tutorial support a semester in the Rod and Connie French Athletic Academic Center. Such all-out efforts put Iowa State’s student-athlete graduation rate at the top of the Big 12 Conference.

When Troxel Hall opens in spring 2013, potentially every undergraduate student will attend a class in the lecture hall during his or her college career—an estimated 100,000 students over the next 20 years alone.

FIRST IN THE COLLEGE OF DESIGN Contributing to such stellar rankings is Thomas Leslie (center), who is the inaugural holder of the Pickard Chilton Professorship in Architecture, the first endowed faculty position in the college.

LEAGACY

Extending impact
When Bruce Thompson, director of the Center for Nondestructive Evaluation at Iowa State University, passed away in 2011, the nondestructive evaluation community worldwide lost one of its foremost leaders—a dedicated educator, scientist and mentor.

Yet through the R. Bruce Thompson Engineering Fellowship in Nondestructive Evaluation established at Iowa State, future generations of engineers and scientists will extend his impact on research, discovery and education in the noninvasive methods and instruments needed to assess the integrity of our structures and the materials we use to make them.

“While we miss Bruce,” the center’s associate director Lisa Brasche said, “his legacy will continue through the science he delivered, and the students and collaborators who are striving to move it forward.”

THAT’S THE YEAR St. Thomas Aquinas’ “Quaestiones de veritate,” the oldest book in Iowa State University Library’s collection, was printed. This fall, honors students in “Smelling Old Books: The Art and Science of Preserving Our Past” learned about the scientific methods for preserving such precious works in the new Special Collections and Preservation classroom in Parks Library, thanks to a gift from the Roy J. Carver Charitable Trust.

1475
THANKS FOR THE MEMORIES Before bidding retiring president Gregory L. Geoffroy and his wife, Kathy, a fond farewell in January, the Iowa State community said a collective “thanks.” Give forward to this fund at www.foundation.iastate.edu/thompson-nde.

WATCH ONLINE

Watch the video: www.foundation.iastate.edu/geoffroytribute.
A ’bookend’ to Christian Petersen’s legacy
For more than a decade, Iowa State University Museums has built Christian Petersen’s legacy at Iowa State and in the context of American art history as the nation’s first permanent college artist-in-residence. Now, through the generosity of private support, Iowa State has acquired “Panthers,” Petersen’s first large-scale sculpture.

Created around 1920, the work consists of two massive bronze panthers clashing over a deer. After 15 years of research and investigation, the sculpture was finally found on the campus of Middlebury College in Vermont.

When “Panthers” is installed on campus during VEISHEA 2012, it will fill an important place in Iowa State’s Petersen collection, which contains sculptures from all stages of his career, including his final works. Said Museums Director Lynette Pohlman, “These first sculptures are an important bookend to the collection.”

Learn more about Christian Petersen and University Museums at www.museums.iastate.edu.

**Gifts add up to big difference**

Ironically, the experience that kindled Jason Miller’s passion for health care and helping others is the very same that made it more difficult for him to attend college.

Two years ago, Miller was majoring in journalism at Iowa State University, when helping his critically ill father get in shape for a possible lung transplant “was the spark that got me into kinesiology,” he said.

Sadly, his father, Mike Miller, passed away not long after, placing additional strain on the family’s financial situation. Jason worked weekends managing the golf club in his hometown of Coon Rapids, Iowa, to help pay his way through Iowa State, a demanding job that already took most of his free time. And while he thought of quitting school, “I really couldn’t imagine not having a college education,” Miller said. “I love learning, and I love knowledge.”

He’s a student for whom the late Margaret Wiese would likely have had a soft spot. Wiese, a 1941 Iowa State home economics education graduate and a health education professor at the University of Oregon, saw firsthand the struggle financially strapped students have paying for college, said longtime friend and colleague Loraine Davis, acting provost at Oregon. This understanding led Wiese to establish a heartfelt scholarship for such students in Iowa State’s College of Human Sciences in 2006. Her gift, combined with others—from annual gifts to the college’s general support fund, to major gifts establishing endowed scholarships—provided the support that is enabling Miller to earn his degree in kinesiology and pursue the passion ignited two years ago.

“After seeing my dad go through what he did, I want to be in the health field,” said Miller, now a senior. “Support like the Margaret Wiese Scholarship makes all the difference in my being able to pursue my education without worrying how to pay for it.”

**$10 BILLION**

ENSURING THE HEALTH of Iowa’s $10 billion animal agriculture industry are the faculty, students and staff at work in the Food Animal and Camelid Hospital in the Dr. W. Eugene and Linda Lloyd Veterinary Medical Center, opened in 2008.
GIFTS IN MOTION STAY IN MOTION

How one alumnus is passing the good turn he received on to others

By Dave Gieseke | Photo: Special Collections, Iowa State University Library

Then-veterinary medicine student Kenneth Throlson, right, receives an award from Dr. Ralph Kitchell, dean of the College of Veterinary Medicine, in 1968.

Dr. Kenneth Throlson had no idea where to turn. It was 1968, his final year as a veterinary medicine student at Iowa State University, and his wife, Doris, had been diagnosed with Hodgkin’s disease. The clinic providing her cancer treatments was refusing to continue care if a payment on the outstanding bill wasn’t made.

“I was really pressed for cash,” Throlson said. “I didn’t know what I was going to do. I thought I might have to drop out of school. Then I learned I had received the Lane-Wells Scholarship.”

The scholarship was “a godsend” to him and his wife. “It was a very difficult time in my life,” Throlson said. “I didn’t know what I was going to do. Iowa State gave me as good a background as any veterinarian I’ve met in all my travels.”

The Lane-Wells Scholarship was established in 1936 by two engineering alumni, 1909 graduate Willfred G. Lane and 1910 graduate Walter T. Wells. Since then, the endowed fund has helped nearly 700 Iowa State students facing challenges paying their way through college, as Throlson had. His gift to the fund will mean even greater benefit in the future.

“I’m Throlson’s way of keeping the generosity going,” he said. “I hope others who have benefited from a gift that made an Iowa State education possible will ‘pay it forward,’ too.”

Then-veterinary medicine student Kenneth Throlson, right, receives an award from Dr. Ralph Kitchell, dean of the College of Veterinary Medicine, in 1968.

The Iowa State University Foundation can help you to give a gift that moves lives forward.

HOW THEY GAVE:
- Connecting at the individual level
  Since 2004, the Mark and Julie Blake Scholarship has been awarded to four undergraduate students in the College of Business. And while the couple’s desire to make a difference in the lives of their recipients has been realized many times over, “We did not expect the rewards we would receive ourselves,” Julie said. “These kids are like family to me.”
- Planning for maximum impact
  Annual gifts allow the Eden Prairie, Minn., couple to see the immediate impact of their scholarship, while an estate gift and designated life insurance policies will ensure their scholarship will benefit Iowa State students for years to come.
- A special relationship
  The Blakes worked with Jeremy Galvin, assistant vice president for development, and others at the ISU Foundation on a blend of outright and deferred giving that would allow each new College of Business class to have a Blake Scholar, and for students to receive the scholarship all four years in the program, so they can count on it. “We had no idea what the process was to create a scholarship, but the Iowa State University Foundation made it very easy for us,” Julie said. “They provided templates that we were able to adapt to fit our goals.”

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Through the faculty positions they’ve chosen to support, donors such as Chuck and Jane Olsen are fueling discovery, setting innovation afloat, and sparking students’ imaginations. So it’s not unusual that this kind of philanthropic gift inspires a special relationship between donors and faculty recipients that in itself brings rewards.

giveforward

View more photos online at www.foundation.iastate.edu/forwardmag