A Message From
The Department Head
Dr. Jagath Kaluarachchi

It's an exciting time to be part of the Biological Engineering Department at Utah State University. Our academic programs are growing; our world-class faculty members are leading cutting-edge research; and the career prospects for our BE graduates continue to expand.

In December, we bid farewell to Dr. Ron Sims who led the Biological Engineering department for more than 10 years. We're thankful to Dr. Sims for his tireless support and for what he has accomplished in building this impressive program. Dr. Sims will continue to serve as a full time faculty member involved with research, teaching and outreach. I will serve as the interim department head during the transition.

Since we last published the BE Magazine, there have been several exciting developments. Last spring, several BE students and faculty were recognized for research at the Institute of Biological Engineering's annual conference. This year, we have an even larger presence from USU both from faculty and students.

In August, Dr. Jixun Zhan had his second article published in the prestigious Proceedings of the National Academy of Sciences, or PNAS. Dr. Zhan continues to develop new innovative methods to engineer microbes for the production of biopharmaceuticals and natural products.

Recently Dr. Agblevor also received a Fulbright award to conduct his research at VTT Technical Research Center in Finland later this summer.

In other exciting news, last fall the department joined forces with a global leader for solutions for processing and system designs for municipal water, wastewater, and mineral industries, WesTech Engineering. Recently WesTech opened a satellite office in Cache Valley to take advantage of a great location and the talents of our future Biological Engineering graduates.

Another important accomplishment was our student iGEM team winning its sixth consecutive gold medal in Boston. The 2014 iGEM team’s project, titled “Stain Busters,” used synthetic biology to develop an enzymatic means of cleaning to reduce the amount of detergent needed to wash clothing.

In February, Dr. David Britt was recognized as the College of Engineering Teacher of the Year. Dr. Britt is an associate professor who specializes in biomaterials and biomedical engineering. Also Sean Bedingfield was recognized as the College of Engineering Senior of the year. Sean has an amazing record of being an author in two journal publications and very active in the undergraduate research program.

The department is also looking forward to several upcoming events including our Senior, Alumni & Industry Luncheon, or SAIL. We recently completed the fall visit of the ABET accreditation committee and this process will come to a successful completion in spring.

As we roll into 2015, we’re looking forward to a number of exciting events and opportunities for our students and researchers. Finally, I’d like to take the opportunity to thank students, faculty, staff, alumni, industry, and friends of the BE program for their help and support to the department.
After 11 years of service as Head of the Biological Engineering Department (2010-2014) and as Head of the Biological & Irrigation Engineering Department (2003-2010), I stepped aside effective January 1, 2015. I have most sincerely appreciated the strong support and enthusiasm of the college administration, the BE faculty, staff, students, and the Industry Advisory Board as well as alumni throughout the time of my service.

I became Head of the Biological and Irrigation Engineering Department in 2003 after serving as Director of the Utah Water Research Laboratory for seven years, and before that as head of the Environmental Engineering Division in the Department of Civil and Environmental Engineering (CEE) for 12 years. I have enjoyed 30 years of opportunities to serve in academic leadership service positions at USU. The culmination of my activities involved working with Dean Scott Hinton to obtain formal approval of the USU Board of Trustees in 2010 for the department name change to Biological Engineering.

Since I was appointed Head of BE/BIE, I have had the best time helping to build the numbers and at the same time, the quality of the Department. Through teamwork, energy, and the dedication of all of the BE citizens, BE was recognized as one of the top 30 such departments in the U.S. in 2014 and 2013 by U.S. News & World Report. BE had 198 undergraduate students as of fall 2014, 40 graduate students, and nine faculty members. Our three full time dedicated BE staff members, Jed Moss, Anne Martin, and Paul Veridian, have played critical functions to support efforts to achieve national and international reputations that BE/BIE earned working together over the past 11 years.

I plan to continue to serve as a full time faculty member in the BE Department involved with research, teaching, and outreach activities. I will be putting more energy into my position as Co-Director of the Sustainable Waste-to-Bioproducts Engineering Center (SWBEC). I will also continue to advise and mentor graduate students, and to involve undergraduate students in research projects, presentations, and publications.

I support the principles and philosophy underlying “Service Leadership” and “Servant Leadership,” and have worked on applying those guiding principles to work with and learn from the BE Community as we developed and grew the BE Department together. What works best is to help students with what they need to succeed, and then everyone wins, including the students, the BE Department, the College, USU, and the world. My practice has involved listening and then acting with integrity, sincerity, and enthusiasm for what I valued, after careful consideration, as best for the Department.

I am thankful for the support of my wife, Judith, and for the opportunity to serve the BE Department as Head for the past 11 years. I look forward to supporting the next BE department head and to continue strengthening the Department through the same teamwork and hard work that has brought us this far!

Be a Biological Engineer … and BE the Future!
Charge On!
Candace Clark (B.S., 2012) is working on innovative food engineering as a Cheese Research Scientist with Glanbia Foods in Twin Falls, Idaho. She credits her time in the USU Biological Engineering program with exposing her to diverse experiences and preparing her to tackle the challenges of working as an engineer.

Clark works with the Cheese Research and Development Group at Glanbia. Her primary responsibilities include developing new cheese products and processes, with a focus on developing new analytical lab methods.

Shortly after Clark began working with Glanbia, the company began the design and construction of the Cheese Innovation Center, a state-of-the-art research and development facility. The Cheese Innovation Center tests equipment and processes related to cheese-making, processing, development and functionality.

The facility is comprised of a pilot plant with equipment and processes used to make commercial products; processing equipment that replicates consumer uses of cheese, like slicing and shredding; a culinary laboratory with commercial grade restaurant equipment for testing how cheese products will perform as a pizza topping or melted in a sauce; and an analytical laboratory dedicated to research of cheese functionality and characteristics.

“I joined just at the perfect time to be able to help plan this building,” Clark said. “It was an awesome opportunity and really tied together a lot of the engineering processes and project management that I learned in class.”

Clark was hired by Glanbia after interacting with the company at a USU career fair. The recruiters from Glanbia originally intended to fill a mechanical engineering position, but they were impressed with Clark’s biological engineering background and her willingness to rise to a challenge. “I was able to convince them to take a chance on a biological engineering student,” Clark said. She has encouraged the company to hire other biological engineers. “We hired two [USU] biological engineers last year and had another biological engineering intern this last summer,” she said.

In her spare time, the Rigby, Idaho, native enjoys playing her violin with the Twin Falls Magic Valley Symphony. And finally, a cheese recommendation: “My favorite is our Jalapeno Habanero Pepper Jack,” she said.
Dr. Christopher Fox (B.S., 2003) began his career in the biomedical industry with a degree from USU BE. Fox holds the position of Director of Formulations with the Infectious Disease Research Institute (IDRI), a non-profit biotech organization that develops and designs diagnostics, vaccines, and drugs, located in Seattle, Wash.

As Director of Formulations, Fox works with vaccine adjuvant formulations. An adjuvant makes a vaccine more potent by boosting the body’s immune response to the vaccine. Fox’s responsibilities involve developing adjuvants and monitoring their stability. He began his work on adjuvant formulations during post-doctoral research with IDRI in 2007.

According to Fox, vaccine adjuvants are difficult to access from pharmaceutical companies due to intellectual property restrictions. One of IDRI’s goals is to act as a clearinghouse to provide adjuvants to other institutes around the world. “We’re trying to allow developing countries and other companies to access adjuvants so they can move forward their vaccine programs,” Fox said. “Modern vaccines are very dependent on effective adjuvants.”

One of his team’s greatest accomplishments has been developing safe and effective formulations that are currently in clinical trials. “These are for diseases that don’t get a lot of attention and funding,” Fox said. “We’re really filling a gap by focusing on these.”

IDRI also participates in technology transfers, teaching institutes and companies in developing areas how to produce their own vaccines and adjuvants, with the goal of self-sufficiency. “We’re enabling them to make their own vaccines...for instance, if there’s a pandemic of influenza again, [developing nations] wouldn’t be reliant on rich countries to make vaccines to cover their populations. We’re proud of that too,” Fox said.

As an undergraduate biological engineering student, Fox worked in Dr. David Britt’s lab, setting up equipment and acquiring materials. His research with Dr. Britt was focused on surface modifications of biomaterials to make them more biocompatible. After graduating from USU with his bachelor’s degree, Fox earned his PhD in bioengineering from the University of Utah.

Fox is from Logan, Utah, and decided that USU’s biological engineering program was a good fit for him because of the focus on applied uses for engineering. “I felt like bioengineering was sort of the marriage between a healthcare career and a research engineering career,” Fox said. “I wanted something that was applied and could help people.”
Logan Christenson (B.S. 2009, M.S. 2011) currently holds a position as a patent attorney with the Salt Lake City-based Intellectual Property firm Workman Nydegger, where he helps inventors, start-ups, and developed technology companies from a variety of fields obtain protection for their inventions.

Although not the typical career route taken by an engineer, Logan credits his ability to work in the patent field to the engineering-based thinking skills he learned in the Biological Engineering program: “Patent law is a strange mix because you are learning about cutting edge technology on one hand while trying to navigating a complex area of law on the other, but fortunately the engineering mindset is pretty comfortable with the need to find solutions that fit within a given set of constraints, be they legal, technological, economic, or all of the above.”

While at USU, Logan earned his M.S. while working with Dr. Ron Sims to develop a rotating algal biofilm reactor designed to produce economically harvestable biomass while treating wastewater. After graduating, he attended law school at the University of Virginia. He graduated in 2014 and moved back to Utah to begin practicing as an attorney.

As for working as a patent attorney, Logan says that “it’s a lot of fun helping engineers and scientists move their ideas from early concept stages toward getting a product ready for introduction into society and into the market.”

According to Logan, one of the greatest advantages of the Biological Engineering degree is its versatility: “I know enough biology, enough chemistry, enough process engineering, enough general mechanical engineering, and even enough electrical engineering to be able to work with almost any inventor.”
Michael Mellott (B.S. 1997) credits his time as an undergraduate in USU’s Biological Engineering department with giving him the critical thinking and creative problem solving skills that he uses as a Process Technology Development (TD) Engineer with Intel Corporation in Hillsboro, Ore.

In his position as a Process TD Engineer, Mellott is responsible for the design of frames and structures for Intel’s products. Frames are the spaces that surround a chip and are used to house layered structures for manufacturing and testing. According to Mellott, these structures are integral for testing and alignment. “It’s kind of like a jigsaw puzzle,” he said. “If one layer is a different size than the rest, it won’t fit together.”

Mellott began working for Intel in 2001, after earning a PhD in chemical engineering from Texas A&M University. He started as a process engineer, making computer chips. He has worked in several positions within Intel, and has held his current position for the past two years.

While at USU, Mellott enjoyed the variety of courses offered. He particularly enjoyed taking a biosensors class that allowed students to use equipment in the field. “A lot of it was different than the normal academic course work,” Mellott said. “That was definitely a different class…it was fun in its own way.” He also worked on student research using biosensors to detect pathogens.

In his spare time, the Huxley, Iowa, native spends time with his two teenage sons. “They keep me very busy. I like to be involved in their activities,” he said.
Dawance Chea (B.S. 2011) is in the thick of his second year of medical school at The Commonwealth Medical College in Scranton, Penn. Chea’s path to medical school began with the encouragement and mentorship he received as an undergraduate in the USU Biological Engineering program.

While at USU, Chea worked on algae research with Department Head Dr. Ron Sims, whom he credits as a mentor. “Nothing can really prepare you for medical school,” Chea said, “but the people I was surrounded by at Utah State helped me realize what I really wanted to do with my life.”

Chea began his studies at The Commonwealth Medical College in 2013. He is interested in completing a dual residency program in either emergency medicine and internal medicine or emergency medicine and family medicine. Upon completion of one of these programs, he would be proficient in both acute care and chronic care. After his expected graduation from medical school in 2017, Chea will continue his training as a resident.

According to Chea, his goal for his medical career is to improve healthcare delivery to underserved populations, especially immigrant populations. In October of 2013, Chea earned his master’s degree in Human Nutrition from Columbia University, where his research focused on nutrition education for African immigrants.

Chea and his family are immigrants and have firsthand experience with the common struggles of immigrants. “We had to kind of start over, with economic hardships and such,” he said, describing his family’s immigration from France to Logan, Utah. “I’m an immigrant, and I know what immigrants face.”

“Utah State has been kind of a home away from home because of the Biological Engineering department and their support,” Chea said.
Kirsten Sims (M.S. 2012) recently accepted a position at WesTech Engineering in Salt Lake City, as a Process Engineer. Sims has been selected to participate in a one-year “rotational training program”, at WesTech, wherein she is given the opportunity to spend time training in various engineering and business units throughout WesTech Engineering in order to gain an in-depth understanding of WesTech’s products, key markets, and business model.

After graduating with a B.S. in Biology from Gonzaga University, Sims decided to pursue a higher degree in Biological Engineering at Utah State University. Her thesis research at USU focused on optimizing the enzymatic conversion of lignocellulosic biomass into feedstock for renewable energy production. Specifically, she investigated various pretreatment strategies and kinetic models for lignocellulose degradation for use as precursors in ethanol production. Additionally, under the direction of Dr. Charles Miller, Sims worked to optimize conditions for algae degradation in high rate anaerobic treatment systems to enhance biogas production and achieve resource recovery from domestic and industrial wastewater.

During her final year as an M.S. student in Biological Engineering at USU, Sims accepted a position working part time in intellectual property for IMDS, a medical device company located in Logan, Utah. After completing her M.S., she transitioned to a full time position with IMDS as a Patent Search Specialist and Technical Advisor. Her responsibilities included conducting patent searches, drafting and prosecuting patent applications, and leading “brainstorming” sessions related to novel medical devices. Working under the advisement of patent agents and patent attorneys, Sims was inspired to expand and refine her skill set in intellectual property, and began preparations to take the “Patent Registration Exam.” Sims successfully passed the U.S. Patent Registration Exam in December of 2014, and is now a Patent Agent before the United States Patent and Trademark Office.

After working for several years in intellectual property at IMDS, Sims decided to pursue an M.B.A. at Utah State University. During her studies in the USU MBA program, Sims worked with a team of students to develop a business plan focused on resource recovery
from wastewater using algae. She and her team were selected as state finalists in the Utah Entrepreneurship Challenge business plan competition. Sims also served as the President of the USU MBA Association.

After completing her MBA in 2014, Sims accepted her position as a Process Engineer at WesTech Engineering. She hopes that her diverse background (life sciences, engineering, entrepreneurship training and patent law experience) will position her to become a valuable asset to WesTech Engineering, and so far is very happy with her new position. In addition to spending time training in various units throughout WesTech, Sims is also serving as a member of the WesTech “Waste-to-Resources” steering committee, as well as a member of the Patent Committee.

Sims was elected to serve as one of 13 national councilors of the Institute of Biological Engineering for 2015. She previously served as the national graduate student councilor for IBE for three 1-year terms.

In her spare time, Sims enjoys spending time salsa dancing with her husband Nurivan and playing with her 2-year old daughter Elena. She is also a martial artist (3rd degree black belt in Aikido) and an avid skier.
Nicholas Hoaglin (B.S., 2006) is putting his Biological Engineering degree to use at ConAgra Foods Lamb Weston. Hoaglin works in Twin Falls, Idaho as the Manager of Plant Engineering for a manufacturing facility that produces French fries and specialty potato products.

Hoaglin began working with ConAgra in May 2006, directly after he graduated with his bachelor’s degree. He was hired as a Production Team Leader and transitioned to a project engineering position.

During his time as a Project Engineer, Hoaglin worked on a two-year project designing a new process for producing sweet potato French fries. “I was able to go from R&D all the way through installation, start-up, and commissioning of that system,” Hoaglin said. “It was a new venture for our company.” Hoaglin worked in Delhi, La. for a year overseeing and troubleshooting the start-up of the plant. The plant was LEED Platinum certified.

After a promotion to Manager of Plant Engineering at the company’s Warden, Wash. facility, Hoaglin relocated to his current position as Manager of Plant Engineering in Twin Falls, Idaho. One of his major responsibilities as Manager of Plant Engineering is leading the facility’s capital investment program. Hoaglin manages capital projects ranging from $50,000 to $10,000,000, ensuring that the facility remains a viable manufacturing site. Hoaglin is responsible for roughly 120 employees. “I am a leader of a highly motivated, safety oriented team that has a high level of ownership and accountability,” he said.

While at USU, an upper division food engineering course taught by Dr. Timothy Taylor piqued Hoaglin’s interest in the food industry. Hoaglin worked with Dr. Anhong Zhou as an undergraduate researcher for three years. His research focused on using biosensors to detect volatile organic compounds and bacteria. “It really helped me prepare for my job,” Hoaglin said. “It was very a valuable experience.”

When he’s not working, the Ogden, Utah native enjoys spending time with his two children and playing his guitar.
Rob Gardner (B.S. 2006, M.S. 2008) began his path to a career in academia and research with his undergraduate and graduate degrees in Biological Engineering from USU. He currently works as an Assistant Professor of Renewable Energy Systems and Sustainability for the University of Minnesota in Minneapolis-Saint Paul, Minn. Gardner teaches “Renewable Energy and the Environment,” an online course, to over 400 students.

While at USU, Gardner worked with Dr. Anhong Zhou to develop a microsensor with applications for water quality and heavy metal detection. He worked on his project in a laboratory setting in the microfabrication lab at the University of Utah, an “amazingly unique opportunity,” he said. “Not a lot of research programs allow students to go to other universities or industry. I was able to network and meet new people.”

After completing his master’s degree in 2008, Gardner began a PhD in chemical engineering, and subsequently postdoctoral research at Montana State University. His PhD research delved into the control and regulation of lipid accumulation in microalgae. His postdoctoral research involved phototrophic renewable energy systems and deriving useful products from atmospheric CO$_2$ and nitrogen. Gardner’s current research at the University of Minnesota focuses on microbiology and chemical engineering applications.

According to Gardner, many of the engineering problems that scientists face, such as fuel development, pollution, and chemical remediation are multi-disciplinary. “Having a biological and an engineering background is advantageous,” he said. “The really interesting problems involve biology.”

In his spare time, the Star Valley, WY., native enjoys hunting and fishing in the “land of a thousand lakes.”
WesTech engineers and manufactures process equipment to provide solutions for customers in the industrial, mineral, municipal water, and municipal wastewater industries. Leaders in process expertise, WesTech helps design and build small scaled projects to large scale system builds that require seamless integration in our customers specifications.

IMDS is a leading innovator in contract, full-service medical device development and manufacturing. We are the only company of our kind that can provide our partners all the steps of the product realization process, from ideation and innovation to high-volume production, and every step in between. With an intense focus on innovation, speed to market, and our partners’ goals, we deliver products that enhance the quality of life and standard of care for patients.

Glanbia Foods is a division of Glanbia plc, a leading international food and ingredient company headquartered in Kilkenny, Ireland. Glanbia plc is one of Europe's leading dairy companies, and one of the world's largest cheese manufacturers.

Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics and increase laboratory productivity.

We develop, manufacture and distribute medical devices used by an array of practitioners in the process of gaining access to the cardiovascular system for the purpose of delivering chemotherapy, blood products, antibiotics, drugs or nutrition.

Amgen is committed to unlocking the potential of biology for patients suffering from serious illnesses by discovering, developing, manufacturing and delivering innovative human therapeutics.

Our Vision: To make a difference in the lives of people globally through our innovative medicines, vaccines, biologic therapies, consumer care and animal health products.

We've become a leading supplier of advanced nano-optical and X-ray components for display electronics, imaging and analytical instrumentation.
Since 1994, EarthSoft has been developing innovative environmental database management software. EarthSoft’s EQuIS™ (Environmental Quality Information System) is the world's most widely used software for environmental data management.

At Quansys Biosciences we’re dedicated to the development and manufacture of immunoassays that aid scientists in better understanding disease.

BD is a medical technology company that serves healthcare institutions, life science, researchers, clinical laboratories, industry and the general public. BD manufactures and sells a broad range of medical supplies, devices, laboratory equipment and diagnostic products.

The ELITechGroup manufactures and distributes diagnostic products for clinical chemistry, microbiology, immunology, and molecular biology through direct sales and a distribution network encompassing more than 100 countries.

At W|N, we understand the importance of working to meet the business objectives of our clients. We are committed to helping our clients create and protect a portfolio of intellectual property that is designed to deliver measurable value and concrete results.

Fresenius Medical Care North America is a division of Fresenius Medical Care (NYSE: FMS), the world’s largest integrated provider of products and services for individuals undergoing dialysis because of chronic kidney failure, a condition that affects more than 2.1 million individuals worldwide.

Campbell Scientific has developed increasingly powerful dataloggers that have achieved worldwide use in environmental, research, and industrial markets for diverse applications. Over the years, Campbell Scientific has also established itself as a reputable manufacturer of numerous related product lines for the measurement field, including a wide variety of sensors, as well as devices for the collection, storage, communication, and retrieval of data.

Oak Ridge National Laboratory is DOE’s largest multiprogram science and energy laboratory, with scientific and technical capabilities spanning the continuum from basic to applied research.
DOWL HKM is a multi-disciplined consulting firm owned by senior managers from within the company. DOWL HKM maintains in-house expertise in Environmental and Land Development, Water/Water Resources, Transportation, Civil Engineering, and Geo-Construction.

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement and performance solutions services help our customers to deliver better care to more people around the world at a lower cost.

As a brand of Thermo Fisher Scientific, Life Technologies believes in the power of science to transform lives. To support scientists worldwide, we offer high-quality, innovative life science solutions—from everyday essentials to instruments—for every lab, every application.

AMEC is one of the world’s leading engineering, project management and consultancy companies. Our goal is to deliver profitable, safe and sustainable projects and services for our customers in the oil and gas, mining, clean energy, environment and infrastructure markets.

Norwest Engineering is a technology driven consulting engineering company providing multi-disciplined engineering and related services to government and industrial clients. Our professional and technical personnel have been committed to quality service in the application of engineering and technology for over thirty-five years.

Hansen, Allen & Luce (HAL) was organized in 1974 as Vaughn Hansen Associates by Dr. Vaughn E. Hansen, a leader in water resources engineering.

Biogen Idec is one of the world’s leading biotechnology companies. We develop medicines that change the lives of people living with neurodegenerative diseases, hematologic conditions and autoimmune disorders.

ASIF RAHMAN, Ph.D.
Sustainable Production of Novel Biomaterials in *Escherichia coli*
Major Professor: Dr. Charles Miller

ANDREW DECEUSTER, Ph.D.
The Effects of Laser Etching on Biocompatibility and Mechanical Properties of Polyetheretherketone
Major Professor: Dr. Leijun Li

BO ZHAO, Ph.D.
Alkaloid Production by Hairy Root Cultures
Major Professor: Dr. Foster Agblevor

CHAUNCEY TUCKER, M.S.
Mechanical and Physical Properties of Spider Silk Films Made From Organic and Water Based Dopes
Major Professor: Dr. Randolph V. Lewis

MICHAEL DAVIS, M.S.
Excimer-Monomer Switching Molecular Beacon: The Study on Synthetic *Cryptosporidium* DNA Detection, Thermodynamics, and Magnesium Effects
Major Professor: Dr. Anhong Zhou

OUMOU DIALLO, M.S.
Effect of Poultry Litter Biochar on *Saccharomyces cerevisiae* Growth and Ethanol Production from Steam-Exploded Poplar and Corn Stover
Major Professor: Dr. Foster Agblevor

SARAH ALLRED, M.S.
Metabolic Modeling of Spider Silk Production in *E. coli*
Major Professor: Scott Hinton

YESSICA CASTRO, M.S.
Optimization of Wastewater Microalgae Pretreatment for Acetone, Butanol, and Ethanol (ABE) Fermentation
Major Professor: Dr. Ronald C. Sims
A message especially to you. Remember when you were in the program and we were unable to support you for scholarships? Well, not much has changed. To combat this issue, we have created the “BE Endowment” to support students in the BE Department.

The BE Department was ranked number 29 in the latest U.S. News and World Report listing of top programs in Biological and/or Biological and Agricultural Engineering, and much of that recognition was due to our national reputation developed by students participating in iGEM and IBE competitions. During the last ten years the undergraduate enrollment has increased from about 70 students to 190 students, and graduate enrollment has increased from 10 students to 40 students.

The BE Department faculty and staff have contributed $1,600 during the first week of this start-up period. We are asking for your help toward reaching the goal of $25k. (We need the amount of $25k [corpus] before we can start to draw on the interest and provide scholarship help to more BE students.) Any amount that you will give will be greatly appreciated. We will use the interest from the BE Endowment as scholarships to support our students, who are our “ambassadors” to the world.

Depending on your gift level, we can recognize you in the following ways:

- Recognition on our “Wall of Fame”
- Undergraduate scholarship award in your name
- Graduate scholarship award in your name
- Diversity award in your name
- Academic excellence award in your name
Engineering Week Awards 2015

Sean Bedingfield, Outstanding Senior
Cody Maughan, Outstanding Junior
Emilee Madsen, Outstanding Pre-Professional
Ryan Putman, Outstanding Undergrad Researcher
Lifu Xiao, Outstanding Graduate Researcher
Nicholas Hoaglin, Outstanding Alumni
Andrew Driggs, Service
Anne Martin, Service
Jixun Zhan, Researcher
David Britt, Teacher
Charles Miller, Undergraduate Faculty Advisor

College of Engineering Awards

David Britt, College of Engineering Teaching Excellence Award
Sean Bedingfield, College of Engineering Outstanding Senior
A group of Biological Engineering faculty, alumni, and graduating seniors gathered on the Utah State University campus in late April to celebrate the continuing success and expansion of the department by holding its first Senior, Alumni, and Industry Luncheon (SAIL).
The event was organized by the department as a way to congratulate the hardworking seniors graduating with degrees in biological engineering. The department wanted to give the students an event that would not only show appreciation to them for all their hard work, but also provide the students an opportunity to meet and network with biological engineering alumni and industry employers.

“The event gave me a unique opportunity to network with those interested in biological engineering,” said Sherissa Ward, biological engineering graduate and current biological engineering master’s student. “I enjoyed talking to people that saw my degree as valuable, and I was glad that so many alumni attended because it was useful and it was interesting to see where their careers had taken them.”

Several biological engineering alumni from around the region attended the event and were excited to return to campus, meet with faculty members, and reminisce. Industries that were represented included WesTech Engineering, Bard Access Systems, Quansys Biosciences, ConAgra Foods, Glanbia Food, and Sorenson Forensics.

“We wanted our alumni to be able to visit and reconnect with biological engineering faculty members as well as meet new faculty members in our department,” said Ron Sims, department head for Biological Engineering. “We also provided tours of our new biological engineering laboratories and facilities and showcased our current research with topics ranging from synthetic biological engineering, biomaterial engineering, micro and nanobiotechnology, bioenergy research and biomedical engineering.”
During the luncheon, Rex Plaizier, president and CEO of WesTech Engineering, Inc., was presented the Biological Engineering Citizenship Award for 2014. Mr. Plaizier is a long-standing member of the department’s Industry Advisory Board and is also working with USU’s Sustainable Waste-to-Bioproducts Engineering Center (SWBEC) on the rotating algae biofilm reactor (RABR) project.

“We are a better company because of the USU biological engineering graduates that work for us,” said Mr. Plaizier. “Our main offices are located in Salt Lake, but we are opening an office in Logan specifically to work with the biological engineering department’s faculty and students, and benefit from their research.”

The event was such a success that the department plans to continue the tradition every spring.
The Sustainable Waste-to-Bioproducts Engineering Center (SWBEC) celebrated the end of the year with an event that highlighted the new partnership between the center and WesTech Engineering. In November 2014, WesTech opened a new office at the USU Innovation Campus in order to collaborate with SWBEC and the USU Biological Engineering department.

WesTech Engineering is a Salt Lake City-based process engineering company that designs and produces equipment for use in the industrial, mineral and municipal water industry. The collaboration between SWBEC and WesTech will be beneficial for both the company and the center, as well as for students in the biological engineering department. “[WesTech] would look at hiring our undergraduate students as interns, hiring our graduate students as employees, writing joint proposals together and designing and building new systems for making bioproducts from waste,” said SWBEC co-director Ron Sims.
The November 21, 2014, event was attended by Rex Plaizier, WesTech CEO and president, Issa Hamud, SWBEC Co-Director and Head of the Logan City Environmental Engineering Department, Logan City Mayor Craig Peterson, as well as representatives from the engineering industry, South Davis Sewer District, and various USU departments, including the Commercial Enterprise Office, the Synthetic Biomanufacturing Institute, the College of Engineering and the Agricultural Experiment Station.

SWBEC continues to develop its research efforts surrounding the transformation of municipal, agricultural and industrial waste into valuable bioproducts. One of the tools used to convert waste to bioproducts is the Rotating Algae Biofilm Reactor (RABR). WesTech and SWBEC collaborated on the design of the RABR, which uses wastewater and associated nutrients to grow algae.

The algae grown on the RABR can then be converted into valuable products such as protein-rich livestock feed, bioplastics, methane gas and medically useful chemicals.

Municipal, agricultural and industrial wastewater is traditionally regarded as waste, but according to Sims, “We look at waste as a resource, free water in the desert”.

Sims, who stepped down as Head of the Biological Engineering Department at the end of 2014, will further the collaboration between SWBEC and WesTech by working with WesTech during a three-month sabbatical. Sims will work at both the company’s Salt Lake City office and the newly-founded Logan office from January through March of 2015. He hopes to increase the number and types of collaborations between the company and SWBEC by working in the industrial setting.

The opportunity to work with industry will provide new perspectives for the future of the USU Biological Engineering Department and SWBEC. “SWBEC is the link between academics and industry”, Sims said. At the end of his sabbatical, Sims will return to the Biological Engineering Department as a professor and co-director of SWBEC.
The 18th annual Institute of Biological Engineering (IBE) conference once again served as a showcase for USU Biological Engineering (BE) students’ excellence in research. Undergraduate and graduate students from the BE Department and USU’s Synthetic Biomanufacturing Institute travelled to Lexington, Ky., for the three-day conference, held March 6-8, 2014.
The Institute of Biological Engineering is a national professional organization that aims to advance biology-inspired engineering. Among its members are university faculty, researchers, industry representatives and undergraduate and graduate students from across the nation. The conference serves as a forum for networking and as an opportunity for students to present and defend their research.

USU teams submitted posters detailing their research in the poster competition and came away with four out of eight of the competition’s awards. Graduate students from the BE Department and the Synthetic Biomanufacturing Institute won Grand Prize and Third Place, respectively, in the graduate poster category. Undergraduate students from the BE Department won First Place and Third Place in the undergraduate poster category.

USU gained further acclaim with a place in the top five winners of the Bioethics Essay Competition. Undergraduate Sean Bedingfield won an Honorable Mention for his essay “Helices and Ladders: Impacts on ethics of the future professional world of biological engineers.”

“We compete very well at this event,” said IBE Past President and USU BE professor Ron Sims.

In keeping with the tradition of USU’s significant involvement with the IBE Council, two BE Department faculty members were re-elected to serve for the 2015 year. As members of the council, Dr. Jixun Zhan and Dr. Charles Miller will help administer the organization and provide technical direction for its future. Adding to USU’s influential role is BE undergraduate student Ryan Putman, who will serve as the National Undergraduate Representative for the IBE Council for 2015.

Involvement in the conference has positive impacts on biological engineering students, both academically and personally, according to Sims. “It connects the real world with their classroom theory,” Sims said. “It improves their observation, analysis, ability to compare and contrast and to draw conclusions. It really brings the classroom alive.”
Utah State University Biological Engineering students won their sixth consecutive gold medal at the international Genetically Engineered Machine (iGEM) competition. In celebration of iGEM’s 10-year anniversary a giant jamboree was held. From October 30th to November 3rd over 2,500 Synthetic Biology researchers from 245 universities across 32 countries gathered at the Hynes Convention Center in Boston, MA. This was the largest synthetic biological engineering event to date.

The iGEM competition was developed at Massachusetts Institute of Technology to promote Synthetic Biology research; specifically the construction, characterization and dissemination of standard biological parts called BioBricks. Student researchers compete to solve real-world issues by building genetically engineered biological systems with these standard, interchangeable parts. Teams are also challenged to actively consider and address the safety, security and environmental implications of their work.

The 2014 USU iGEM team’s project, titled “Stain Busters”, used synthetic biology to develop an enzymatic means of cleaning to reduce the amount of detergent needed to wash clothing. The team engineered *E. coli* to produce enzymes that can be used to effectively remove laundry stains, such as grass stains. Along the way, the team created 41 new BioBrick parts and submitted 17 to the Parts Registry at MIT. Teams were judged on their oral presentation, poster, and website designed to document their research. After analysis of their performance, the 2014 USU iGEM team was awarded a gold medal.

The USU team consisted of 11 BE undergraduate students and one graduate advisor. Team participants were: Ryan Putman, Sara Gertsch, Dallin Christensen, Cody Maxfield, Andrea Halling, Sean Bedingfield, Austin Ewell, Andrew Parker, Cody Maughan, Michelle Bonebrake, and Nicholas D. Lauritzen. Dr. Asif Rahman (USU Ph.D 2014) served as the graduate advisor for the team. Dr. Charles Miller of the Biological Engineering Department served as the team’s faculty advisor and was a judge at the competition. Ryan Putman, Sara Gertsch, Dallin Christensen, Cody Maxfield and Dr. Miller traveled to Boston to represent the 2014 USU iGEM team.
Can algae biotechnology transform an African country: Rwanda? (And can Rwanda transform algae biotechnology?)

Presented by
Dr. Charles Harper, Founder and President, Simbuka Energy, LLC

FEBRUARY 26, 2014

Thoughts from the new Dean

Presented by
Dr. Christine Hailey, Dean of Engineering

NOVEMBER 7, 2014

Strategies for Multi-Level, Multi-Scale Modeling of Biological Systems

Presented by
Eberhard Voit, Georgia Tech

DECEMBER 5, 2014

Using Computations to Reconstruct, Analyze and Aredirect Metabolism

Presented by
Costas Maranas, Penn State University
BE students won first and second prizes at the Utah State University (USU) – University of Nevada Las Vegas (UNLV) Mini-Symposium on Biotechnology, Energy and Materials (BEM) in Las Vegas on May 6th, 2014. Students from science and engineering fields attended this conference.

First Prize
AMPed up E. coli: Production and purification of antimicrobial peptides.
Ryan J. Putman, Asif Ramman, Charles D. Miller

Second Prize
Synergistic actions of tailoring enzymes in pradimicin biosynthesis.
Kandy Napan, Shuwei Zhang, Whitney Morgan, Thomas Anderson, Jon Y. Takemoto, Jixun Zhan

The 2014 BE Citizenship Award went to Mr. Rex Plaizier President and CEO of WesTech-Inc., with M.S. Degrees in Mining Engineering and Business Administration and a 27-year career with WesTech.

Mr. Plaizier has served the BE Department as a member of the Industry Advisory Board (IAB) for seven years and served as Chair of the IAB in 2009 and 2010, years when the department was in transition from an irrigation emphasis (Biological and Irrigation Engineering) to the current emphasis on engineered cellular processes. The IAB plays a critical role in the evaluation of the BE academic program for ABET accreditation and Mr. Plaizier prepared the IAB reports in support of the changes to the BE curriculum during the critical years of transition.

Under Mr. Plaizier’s leadership, WesTech has also sponsored several undergraduate student projects in the BE Department and has hired eight BE students, including undergraduate and graduate alumni. Recently, Mr. Plaizier announced that WesTech will open three offices at USU’s Innovation Park, staffed with BE alumni, and plans to expand collaboration with the Sustainable Waste-to-Bioproducts Engineering Center (SWBEC).

The BE Department expresses appreciation and gratitude to Mr. Plaizier for the important role that WesTech has played under his leadership in the history of the development of the BE Department and will continue to play in the future of the Department.


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