Welcome to our 2014 Newsletter with best wishes to all of our friends and alumni. While 2013-2014 brought many good things our way, we are particularly excited for 2014-2015. Marjolein van der Meulen has become the new chair of BME as of July 1, 2014. You will read more about Marjolein in the next article, but I believe that we are fortunate to have her step into the chair’s role. She has been at Cornell for almost 20 years and is well-prepared to lead the BME effort. As you will see in the next article, she has been appointed to have her step into the chair’s role. She has been at Cornell for almost 20 years and is well-prepared to lead the BME effort.

The building renovation of Kimball Hall has begun and will provide space for BME, Mechanical and Aerospace, and Materials Science faculty. BME has been allocated two faculty laboratories in Kimball. With a growing department, this space will be very important to us until a new building for BME is completed.

Another important milestone for the department is the approval by the Cornell Board of Trustees of a proposal to initiate a B.S. degree program in BME. Our proposal now moves to New York State, which must approve all degree programs in the state. We hope that this process will be successful, but realize that it will take significant time before the program may become a reality.

The department was honored by the Biomedical Engineering Society (BMES) with the BMES 2013 Diversity Award. It is the first time the award has been given to an organization or department rather than an individual. Our success continues with 32% of the entering class of Ph.D.s for 2014 from underrepresented minority groups.

We continue to be successful with our students winning NSF Fellowships with six of our current students being awarded NSF Fellowships and two of our incoming Ph.D. students have NSF Fellowships. Since 2008, we have had 48 NSF fellows in the Ph.D. program, which is remarkable for a department with a modest size.

We have added one new faculty member, Iwijn De Vlaminck, who is currently a post-doctoral associate at Stanford working with Professor Steve Quake. He begins January 2015 at Cornell and will develop new approaches for single-cell genomics measurements and to understand the ecology of heterogeneous cell states.

Our students and faculty continue to do well as can be seen from the list of awards and recognitions they have received. Two of our fairly recent Ph.D. students, Bobby Bowles and Ben Hawkins, have initiated independent academic careers at Utah and San Jose State University, respectively.

I have been proud to have served Cornell and BME as its founding chair. It is with great pleasure that I look at what has been accomplished with the efforts of the staff, students, external advisory board, and BME faculty. Much still needs to be done to achieve our goal of being a highly effective full service department. I am pleased that Marjolein van der Meulen has agreed to become chair and to work with the department to achieve our goals.

Sincerely,

Michael L. Shuler
Professor and former Chair
We are pleased to announce that Marjolein C.H. van der Meulen has accepted our offer to serve as the Chair of the Department for a five-year term starting July 1, 2014 and ending June 30, 2019.

Marjolein van der Meulen is the Swan-son Professor of Biomedical Engineering in the Department of Biomedical Engineering and the Sibley School of Mechanical and Aerospace Engineering at Cornell University. Her research in orthopaedic biome-chanics focuses on musculoskeletal mech-anobiology and bone biomechanics. She is interested in the modulation of musculo-skeletal tissues by mechanical loading and in the determinants of skeletal structure and load bearing function, both relevant to diseases such as osteoporosis and osteoar-thritis.

She received her S.B. from MIT and M.S. and Ph.D. from Stanford University, all in Mechanical Engineering. Before joining the faculty at Cornell, Professor van der Meulen worked for three years as a biomedical engineer at the Rehabilitation R&D Center of the Department of Veterans Affairs, in Palo Alto, California. In 1995, she received an NIH FIRST Award and in 1999 an NSF Faculty Early Career Development Award. Professor van der Meulen is a member of the American Society for Bone and Mineral Research (ASBMR), the American and European Societies of Biomechan-ics, and the Orthopaedic Research Society. She is a fellow of the American Institute for Medical and Biological Engineering and the American Society of Mechanical Engi-neers. Professor van der Meulen is the Sec-retary of the Orthopaedic Research Society, Deputy Editor for the Journal of Orthopaedic Research, member of the NIH Skeletal Biology, Structure and Regeneration study sec-tion, and steering committee member for the IBMS Sun Valley Workshop on Muscu-loskelatal Biology. She recently served on the ASMBR Task Force on Atypical Femur Fractures.

Professor van der Meulen has served in many important leadership roles at Cornell. Most recently, she was the Associate Dean of Research in the College of Engineering. She was also a Co-PI and co-founder of the NSF-funded CU-ADVANCE Center for the hiring, promotion, retention and advance-ment of women faculty. She also serves on the advisory board of Diversity Programs in Engineering. In addition, she has strong connections to Weill Cornell Medical Col-lege as a Senior Scientist at the Hospital for Special Surgery.

We are delighted to have her serve in this vitally important role and anticipate growth and success under her leadership. We will benefit greatly from her experience, breadth of vision, and commitment to edu-cation and outreach.

SALUTATION FROM PROFESSOR VAN DER MEULEN

Being selected as the new chair of Biomedical Engineering at Cornell is quite an honor and responsibility. Mike Shuler has led a decade of incredible success follow-ing the establishment of the department in 2004. The faculty, staff and students are outstanding as evident from the recent ac-complishments described in Mike’s letter.

(Continued on next page)

The opportunities in BME at Cornell are quite exciting. Looking forward major highlights of the future will include:

- Hiring the Robert Langer Endowed Chair in Biomedical Engineering,
- Establishing a new undergraduate major, the first new major in the College of Engineering at Cornell since materials science and engineering was founded in 1964, and
- Designing and constructing a new BME building.

As my transition progresses, I look forward to getting to know the entire Cornell BME community, including those of you beyond our Ithaca campus reached by this newsletter. While we will provide updates to you in the future, please do not hesitate to contact me with your thoughts and updates.

Sincerely,

Marjolein C. H. van der Meulen
James M. and Marsha McCormick Chair of Biomedical Engineering
Swanson Professor of Biomedical Engineering
The Biomedical Engineering Society (BMES) selected Cornell’s Department of Biomedical Engineering to receive the 2013 Biomedical Engineering Society’s (BMES) diversity award. It was the first time the award was given to a group or organization. This reflects the department’s comprehensive approach taken to promote diversity.

The BMES Diversity Award honors an individual, project, organization or institution for outstanding contributions to improving gender and racial diversity in biomedical engineering. The award is given for a broad range of activities, including research, education, and services that improve diversity in biomedical engineering industry and/or academia. It recognizes lifetime achievements as well as innovative or high impact activities.

Cornell BME has been highly successful in recruiting, matriculating, graduating, and promoting the success of female and underrepresented minority Ph.D. students. Last academic year, the department’s Ph.D. program had 114 with 43% women and 15% underrepresented minorities. This year, we matriculated new Ph.D. students with 37% women and 32% underrepresented minorities. BMES attributed the department’s success to its “inclusive programming, faculty-student engagement, cross-institutional partnerships and outreach programs.” Our department strives to promote diversity one student at a time through individual conversations between talented recruits and our faculty and current students. The department brings a large fraction of our faculty to the BMES annual meeting to encourage talented students from all backgrounds to consider Cornell for graduate studies. The department has also established relationships with predominantly minority serving undergraduate institutions to encourage top students from these institutions to apply to Cornell.

The Department of Biomedical Engineering proudly congratulates the eight students who won the 2014 National Science Foundation’s Graduate Research Fellowship. This year’s winners are (from the left, top row) Leah Paganuzzi, David Bassen, Aniqua Rahman, (bottom row) Gregory Fedorchak, Neymar Ortiz-Otero, Jonathan Mutbrey, (not pictured) Kory Grayson, and Liz Feeney.

The NSF Graduate Research Fellowship program helps “ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity. The program recognizes and supports outstanding graduate students in the NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master’s and doctoral degrees at accredited U.S. institutions.”

Professor William Olbricht is currently serving as the Director of the Particulate and Multiphase Processes (PMP) program at the National Science Foundation (NSF). The NSF is the largest supporter of basic research in science and engineering with an annual budget of about $7 billion. Program directors serve one- to four-year terms, after which Professor Olbricht will return to Cornell full-time. In addition to deciding which proposals in the program receive funding, program directors champion research initiatives and new directions for the nation. In order to evaluate and fund a wide variety of research, NSF uses a peer review process that relies on proposal reviews from other scientists. Among Professor Olbricht’s duties are to select the panels of scientists who review research proposals based on intellectual merit and broader impact. Particulate and Multiphase Processes program is in the Division of Chemical, Bioengineering, Environmental, and Transport Systems and covers the physics and chemistry of systems consisting of particulates or multiple phases of matter. Topics are as varied as bubbles, fluid suspensions and blood flow with applications ranging from biotechnology to manufacturing.

Professor Olbricht says one of the highlights of the position is the opportunity to learn about cutting-edge research from experts in other fields. He also enjoys learning about, and supporting creative approaches to science and engineering. For example, Professor Olbricht participated on a panel on scientific research inspired by origami.
Lawrence Bonassar

Dr. Bonassar’s research group focuses on the regeneration and analysis of musculoskeletal tissues, including bone and cartilage. The approach involves a multidisciplinary strategy using techniques in biomechanics, biomaterials, cell biology, and biochemistry. Applications of this technology include the repair of articular cartilage, intervertebral disc, trachea and craniofacial defects.

Read more:

Jonathan Butcher

Dr. Butcher’s research group focuses on identifying engineering principals regulating embryonic valvular development and applying these to motivate new regenerative engineering strategies for heart and valve disease. His lab has developed expertise in three areas necessary to undertake this effort: multi-scale intercellular mechanobiology, quantitative volumetric live imaging, and 3D tissue printing.

Read more:

Ben Cosgrove

Professor Cosgrove’s research group, which started at Cornell this July, develops and implements systems bioengineering approaches to study the signaling network dysregulations underlying the decline of stem cell function and tissue regeneration in aging and disease. His laboratory is broadly interested in understanding how stem cells use the integrative action of their regulatory circuitry to interpret and balance diverse streams of microenvironmental “information.” They focus on mouse-model systems that exhibit aging-related declines in regenerative capacity, including skeletal muscle, liver, and hematopoietic tissues. This work aims to reveal new therapeutic approaches to reverse the progression of aging and prolong the regenerative capacity of these tissues. Dr. Cosgrove provided foundation for this approach in a recent paper from his postdoctoral research, which was highlighted by the editors of both Science (343:950, 2014) and Nature (506:268–269, 2014).

Read more:

Claudia Fischbach-Teschl

Microenvironmental conditions (e.g., 3-D cell-cell and cell-extracellular matrix interactions) are critically important in tumor induction and progression, and mediate the establishment of metastases at preferential target sites. By exploring diversified tissue-engineered model systems and polymeric growth factor delivery strategies, our research aims at elucidating microenvironmental events that currently impair the prognosis of cancer patients and to develop new drug delivery systems for more effective treatment of cancer.

Read more:

Rejuvenated muscle stem cells repair of damaged muscle fibers (green) in aged mice, enhancing their strength to youthful levels.
Cynthia Reinhart-King

Cancer and atherosclerosis, while very different diseases, have numerous similarities in both the behaviors of the cells and the changes in tissue properties: both disease states are marked by uncontrolled cell growth and proliferation, increased cell migration, inflammatory cell recruitment, increased growth factor production, changes in extracellular matrix production and tissue stiffness. Using techniques and expertise from the fields of tissue engineering, biomaterials, microfabrication, mechanics and chemistry, we have designed, built, and utilized systems that can be tuned to match the chemical and mechanical properties of the diseased microenvironment. To build these models, we characterize normal and diseased tissue using microscopy, biochemistry and mechanical testing. We use this information to build accurate in vitro models and then use these models to understand how changes in the microenvironment promote disease. As an example of this approach, in recent work, we demonstrated that the naturally-occurring, age-related changes that occur in the mechanical properties of arteries contribute to atherosclerosis progression by altering endothelial cell contractility, disrupting the barrier integrity of the endothelium[1]. Notably, inhibition of increased endothelial cell contractility can restore barrier function both in vitro and in vivo. These results point to a novel mechanism by which aging leads to atherosclerosis. Using similar approaches to study metastasis, we have found metastatic cells can adopt a follow-the-leader approach when escaping a primary tumor, where leader cells carve out microchannels that follower cells can use to move through the stroma[2]. Here, we fabricated microchannels in 3D collagen gels that mimic the paths made by leader cells and we used these models to investigate the molecular mechanisms driving the motility of follower cells[3]. This approach (in vivo characterization -> model building -> identification of molecular mechanism -> in vivo therapy) will lead to the identification of novel therapeutic targets designed to prevent metastasis.

Tissues and atherosclerosis, while very different diseases, have numerous similarities in both the behaviors of the cells and the changes in tissue properties: both disease states are marked by uncontrolled cell growth and proliferation, increased cell migration, inflammatory cell recruitment, increased growth factor production, changes in extracellular matrix production and tissue stiffness. Using techniques and expertise from the fields of tissue engineering, biomaterials, microfabrication, mechanics and chemistry, we have designed, built, and utilized systems that can be tuned to match the chemical and mechanical properties of the diseased microenvironment. To build these models, we characterize normal and diseased tissue using microscopy, biochemistry and mechanical testing. We use this information to build accurate in vitro models and then use these models to understand how changes in the microenvironment promote disease. As an example of this approach, in recent work, we demonstrated that the naturally-occurring, age-related changes that occur in the mechanical properties of arteries contribute to atherosclerosis progression by altering endothelial cell contractility, disrupting the barrier integrity of the endothelium[1]. Notably, inhibition of increased endothelial cell contractility can restore barrier function both in vitro and in vivo. These results point to a novel mechanism by which aging leads to atherosclerosis. Using similar approaches to study metastasis, we have found metastatic cells can adopt a follow-the-leader approach when escaping a primary tumor, where leader cells carve out microchannels that follower cells can use to move through the stroma[2]. Here, we fabricated microchannels in 3D collagen gels that mimic the paths made by leader cells and we used these models to investigate the molecular mechanisms driving the motility of follower cells[3]. This approach (in vivo characterization -> model building -> identification of molecular mechanism -> in vivo therapy) will lead to the identification of novel therapeutic targets designed to prevent metastasis.

As we age, our muscles get weaker and lose their ability to repair themselves. The proficient regenerative capacity of healthy muscle depends on a rare population of resident stem cells. These cells, often called satellite cells, are alerted to divide and repair muscle tissue following minor injuries. Scientists have known that the muscle stem cells struggle to repair tissues in older humans and animal models, but they have not been able to identify the cellular changes responsible for the decline, nor have they developed effective drug strategies to counteract it.

A recent study led by Ben Cosgrove, a new BME faculty member, published in Nature Medicine has demonstrated for the first time that muscle stem cells isolated from old mice, equivalent in age to 80 year-old humans, are inherently defective in repairing muscles, even when transplanted into healthy, young mice. Dr. Cosgrove and colleagues in his postdoctoral research group showed that aging-accumulated changes to a molecular signaling circuit driven by the protein p38 MAP kinase in the muscle stem cells themselves underlies their defective function.

This provided an intriguing chance to target the signaling defect and rejuvenate the function of the old stem cells. To achieve this, Dr. Cosgrove engineered a biomaterial hydrogel substrate with a tunable compliance to support the muscle stem cells outside of the body and then developed a pharmacological drug treatment to interfere with the aberrant p38 signaling circuit. In response to these synergistic bio-physical and biochemical stimuli, the old muscle stem cells multiplied rapidly and gained a youthful ability to engrant and repair muscles. Critically, transplanting of this rejuvenated stem cell population back into the damaged muscles of old mice enhanced their strength back to those of healthy young mice.

The potential of this “rejuvenation” cell therapy for impacting the treatment of muscle aging has grabbed the attention of the regenerative medicine field. The paper was highlighted as by the editors of both Science and Nature upon its publication. It has even been written about in lifestyle magazines such as Men’s Journal.

Dr. Cosgrove says, “our finding that these defective cells can be enhanced outside the body and be used to strengthen muscles has excited lots of people.” He explains, “though the cells cannot be used like a blood transfusion, they hold promise to help specific injured muscles in aged individuals. There is a long way to go to improve and adapt this knowledge to human patients but our work has provided a jump start.”

His research here at Cornell will focus on finding improved combinations of therapies that aid in tissue regeneration in the elderly. “Youthful tissue regeneration is going to require treating both the defective stem cells and the changes in the tissue itself. By engineering and analyzing more complete biomimetic models of aged tissues, I believe we can get there.”

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BME WELCOMES IWIJN DE VLAMINCK

Before moving into biomedical engineering, Iwijn De Vlaminck was trained as an electrical engineer at the KU Leuven, Belgium, and his Ph.D. work, with Gustaaf Borghs atimec in Belgium, focused on topics in applied physics. Postdoctoral training at the Tu Delft in the lab of Cees Dekker and later at Stanford University in the lab of Stephen Quake allowed him to pursue an interest in bioengineering and biology.

De Vlaminck has been interested in developing precision measurement principles along the way. Most recently, as a postdoc in the Quake lab, he co-developed a simple blood test for the occurrence of graft rejection in transplantation. In close collaboration with Stanford Hospital, the Quake lab team demonstrated that donor DNA circulating in the plasma of heart and lung transplant recipients signals rejection.

The Stanford team showed that the spectrum of infectious agents can be measured using sequencing and they discovered that the composition of viral agents reflects the level of immunosuppression of the patient.

In the lab of Cees Dekker at the Tu Delft, the Netherlands, De Vlaminck’s research concerned the molecular biology of cellular DNA repair mechanisms. He was in particular interested in the mechanism of sequence recognition in homologous recombination, an intricate repair pathway that enables the error-free repair of DNA breaks. Homologous recombination relies on the pairing of the broken DNA molecule with a second DNA molecule with similar, homologous sequence. The sequence pairing is mediated by a protein filament of RecA. The team from Tu Delft developed an instrument based on optical manipulation of a single DNA molecule and a single RecA filament. Sensitive measurements of the dynamics of intermolecular interactions allowed the Delft team to formulate a new model for homology recognition that captured the sensitivity and speed of homology recognition in the cell. The Delft team furthermore developed a host of techniques that increase the throughput of single-molecule measurements.

Single-molecule measurement techniques have allowed a new perspective on molecular biology by providing access to information on the structural, temporal and spatial heterogeneity of biomolecular interactions. In a similar vein, single-cell genome sequencing techniques are currently revolutionizing biology by providing access to the genetic heterogeneity of cells and the transcriptomic heterogeneity of cell types and cell states. Single-cell sequencing is consequently becoming an exciting field in biomedical engineering at the junction between biophysics and genomics.

In the Quake Lab, De Vlaminck studied single-cell sequencing methods, in particular methods for the robust amplification of individual microbial genomes. As a new faculty at Cornell, De Vlaminck will develop single-cell genomics measurements that retain information about temporal dynamics and spatial context. The lab will use these techniques to study the role of chemical gradients and cellular microenvironments in the ecology of heterogeneous cell states. The lab will furthermore pursue avenues to go beyond genomic and transcriptomic measurements in single cell biology. The lab will apply single-cell genomics to the study of the heterogeneity of disease states at the single cell level, in particular in the context of infection. De Vlaminck will join the Department of Biomedical Engineering at Cornell in January of 2015.

PROTEIN DESTROYS METASTASIZING CANCER CELLS

De Vlaminck, working with Wayne and Michael Mitchell in the King laboratory, discovered a new way to fight cancer by attaching a cancer-killer protein to white blood cells that destroys metastasizing cancer cells on contact.


FACULTY AWARDS

Lawrence Bonassar’s bioengineered ears won first place at the World Technology Summit.

Claudia Fischbach-Teschl was elected to serve as a permanent member of the NIH study section ‘Tumor microenvironment.’

FACULTY

- Lawrence Bonassar: Professor, Associate Chair of BME.
- Chris B. Schaffer: Associate Professor, Director of Graduate Studies.
- Jesse H. Goldberg: Assistant Professor.
- Cynthia Reinhart-King: Associate Professor.
- Michael King: Professor.
- Ankur Singh: Assistant Professor.
- Yi Wang: Professor.
- Xiling Shen: Assistant Professor.

AWARDS

- Lawrence Bonassar was elected to serve on the University Faculty Committee.
- Michael King won the 2013 Outstanding Speaker Award from the American Association of Clinical Chemistry (AACC). This award recognizes his achievement in earning a speaker evaluation rating of 4.5 or higher during a 2013 continuing education activity accredited by AACC. King was also elected to the American Institute of Medical and Biological Engineering (AIMBE) College of Fellows, Class of 2014. The College of Fellows are the most accomplished and distinguished leaders in the fields of medical and biological engineering in academia, industry and government.
- Cynthia Reinhart-King was elected to the Cellular and Molecular Bioengineering Council of BMES.
- Ankur Singh was selected as a recipient of the Rising Star Award for the 2014 Biomedical Engineering Society Cellular and Molecular Engineering (BMES-CMBE) meeting held in La Jolla, CA. The theme for this scientific meeting was Multi Scale Mechanobiology—from Morphogenesis to Nuclear Mechanotransduction.
- Yi Wang was named an Institute of Electrical and Electronics Engineers (IEEE) fellow for his contributions to cardiovascular magnetic resonance imaging (MRI) development and quantitative susceptibility mapping (QSM), which have been adopted in clinical practice and provides a biomarker for many major diseases including stroke and neurodegenerative diseases.
- Xiling Shen received an NSF Young Investigator CAREER Award.

PROMOTIONS & TENURE

Effective August 2013: Chris Schaffer became the new Director of Graduate Studies.

Effective January 2014: Lawrence Bonassar was promoted to the rank of Full Professor.

ALUMNI

Robby Bowles, Ph.D. 2011

Robby Bowles agreed to join the faculty of the University of Utah as an Assistant Professor of Bioengineering in Fall of 2014. Bowles came to Cornell in 2005 after receiving his B.S.E. in Bioengineering from the University of Pennsylvania. He completed his Ph.D. in Biomedical Engineering at Cornell under the supervision of Professor Larry Bonassar, with his research focusing on tissue engineering approach to treating degenerative disc disease. Since 2011, he has been a postdoctoral associate at Duke University studying biochemical and mechanical contributions to back pain. He has published 7 papers on the topic of therapeutics for spinal disorders and has won multiple awards including Best Poster Award at the World Forum for Spine Research and an F32/Ruth L. Kirschstein NRSA Postdoctoral Fellowship from the NIH.

Benjamin Hawkins, Ph.D. 2011

After graduating, Benjamin Hawkins received a fellowship from the National Research Council to conduct postdoctoral research at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland. Under the guidance of David Ross and Samuel Ferry in the Bioassay Methods Group, Hawkins worked to develop and characterize a microfluidic technique for growing and studying bacterial biofilms. Biofilms are surface or interfacial aggregates of bacterial cells and excreted lipids, polysaccharides, DNA, proteins, and other biomolecules. Biofilms play a central role in a number of industries, but notably are implicated in more than 80% of nosocomial (hospital acquired) infections. Currently published standards for growth and characterization are cumbersome and wasteful; his work aimed to streamline the growth and characterization process using microfluidics. Characterization of traditional macro-scale and micro-scale biofilms is an essential part of developing a new standard measurement platform for biofilm research. In August of 2012, he accepted a position as Assistant Professor in the Biomedical, Chemical, and Materials Engineering Department at San José State University. He will continue to work in microfluidics and dielectrophoresis and applying those fields to the study of biofilms of Mycobacterial species. In addition to his research interests, Hawkins is also teaching graduate and undergraduate courses including Biointerface Phenomena, Biomedical Microfluidic Systems, and Senior Design. One of his primary efforts in this area is to develop an “immersion program” for his students that will give them clinical exposure and provide some measure of the experience he received in the BME program at Cornell, one which has proved invaluable in providing concrete context for his work as a Biomedical Engineer.

Elizabeth Wellings, M.Eng. 2011

Since graduating in May 2011, Elizabeth Wellings has been working as a product development engineer at Biomet, an orthopedic implant company. After working in the medical device industry for several
years, Wellings decided that she was more interested in the clinical side of biomedical engineering, so she chose to go to medical school to pursue a career in orthopedic surgery. Wellings will be starting medical school in August 2014. She attributes the strength of her medical school application to her industry experience. For those looking to practice medicine in the future, the trend in applicants is leaning towards non-traditional applicants who have pursued other careers and have real-world experience.

Abby George, M.Eng. 2012

Abby George entered the Biomedical M.Eng program at Cornell to become more specialized within the broad spectrum of biomedical engineering, specifically with bone mechanics. At Cornell, George worked with Dr. Chris Hernandez’s research team designing and developing alignment fixtures for rat vertebral surgeries. She began her professional career at Lumenous Device Technologies in Sunnyvale, CA working as an Applications Engineer developing processes for manufacturing vascular stents. For the past year, George has been working as a Service Development Engineer at Accuray Inc. where she has had the opportunity to work on The CyberKnife®, a robotic radiosurgery system that saves cancer patients’ lives. Her time at Accuray is spent preparing for new product introduction to the field and ensuring continued support of the CyberKnife® System worldwide. When she’s not working with robots, she enjoys horseback riding and exploring the beautiful outdoors of Northern California.

Alex Morency, M.Eng. 2012

Alex Morency completed his M.Eng degree in Biomedical Engineering from Cornell University in the Fall of 2012 and has since been working for Baxter Healthcare. Baxter Healthcare is a global health-care company that develops, manufactures and markets products that save and sustain the lives of people with hemophilia, immune disorders, infectious diseases, kidney disease, trauma, and other chronic and acute medical conditions. Morency is currently in a rotational program called the Technology Development Program (TDP) designed to accelerate the development of talented engineers by exposing them to Baxter’s businesses through a variety of critical assignments and targeted training. He works in the manufacturing side of engineering working on an exciting project for a home peritoneal dialysis (PD) device. This project involves a collaborative team including members of their supply chain and design center to develop a strategy and find areas of opportunity for the cost-out initiative. He was given the direct responsibility to coordinate this effort and lead the assignment.

Ealier this year, Donald Morel M.S. ’83, Ph.D. ’84 MBE gave to BME to establish a graduate fellowship in his name to recognize and recruit talented Ph.D. students. The first Donald Morel Fellowship will go to an incoming first-year Ph.D. student, Amanda Rooney. Rooney received her undergraduate degree in biomedical engineering from the University of Virginia, where she graduated summa cum laude and was an officer in the Tau Beta Pi Engineering Honor Society. As an undergraduate, she worked with Professor Jack Lewis to test and model the mechanical properties of tissue-engineered cartilage. While tissue engineering holds great promise for creating tissues that can be used to repair or replace damaged organs in patients, a challenge remains to properly match the properties of engineered constructs with the native tissue they are meant to replace. This is especially true for the musculoskeletal system, for which the engineered tissue must have mechanical properties that can withstand the functional loads associated with movement. Rooney’s work aims to help refine the techniques for measuring and modeling the mechanical properties of engineered and native tissues. With better tools to characterize engineered tissues, such as the cartilage Rooney worked on, researchers will be able to more rapidly optimize the approaches to creating these tissues and develop workable solutions that can improve the lives of patients.

for more information on how to support bme, contact

June Losurdo, Director of Development
jml235@cornell.edu • 607-254-1643
**STUDENT & POSTDOC AWARDS**

Olufumilayo Adebayo, a third year Ph.D. student in the van der Meulen Lab, won the 2014 Zellman Warhaft Commitment to Diversity Graduate Student award in recognition for her work in programs supporting the retention of undergraduate students.

Aparna Ashok, M.Eng ’13, was awarded Best Poster for her Master of Engineering project poster at the 2nd annual Student Research Summit at the General Electric (GE) Global Research site in Niskayuna, NY on Friday, August 9th, 2013.

Maya Bakshi, an undergraduate student in the Lammerting Lab, was selected for the 2014 Teach for America Corps.

Sara Che, a fourth year Ph.D. student in the Shuler lab, was awarded the Hsien and Daisy Yen Wu Memorial Award.

Huanhuan Chen, a fourth year Ph.D. student in the Shen Lab, won a National Cancer Institute (NCI) Physical Science Oncology Center (PSOC) Trans-Network Young Investigator Award.

Emily Farrar, a fourth year Ph.D. student in the Butcher Lab, won the 2014 Zellman Warhaft Commitment to Diversity Graduate Student award in recognition for her work in programs supporting the retention of undergraduate students.

**AWARDS**

**STUDENT AWARD**

Emily Farrar, a third year Ph.D. student in the van der Meulen Lab, received an ASBMR Harold M. Frost Young Investigator Award to attend the 44th Sun Valley Workshop on Musculoskeletal Biology in Sun Valley, Idaho, August 3-6, 2014. Her abstract is entitled “RNA Seq-based Gene Expression in Mechanically Loaded Mouse Cortical and Cancellous Bone” by N.H. Kelly, J.C. Schiavo, A. Sato, R. Aparicio, M. Kohn, K. Martin, K. Martin, and M. Lynch.

**Honor Mention**

Julie Kohn, a second year Ph.D. student in the Reinhardt-King Lab, received an Engaged Learning and Research Conference Grant Award.

**Honor Mention**

Maureen Lynch, a postdoctoral researcher in the Fischbach Lab, will be an Assistant Professor of Mechanical Engineering at University of Massachusetts, Amherst in January 2015.

**Honor Mention**

Gabriel Lopez, an undergraduate summer REU in the Lammerding Lab, won the Outstanding Presentation Award and Certificate Achievement in the Engineering, Physics and Mathematics Category for his poster “Designing a Microfluidic Device to Study the Deformability of Cancer Cells” at the 2013 Annual Biomedical Research Conference for Minority Students (ABRCMS) in Nashville, Tenn.

**Outstanding Graduate Student Research Award**

Brooke Mason, a sixth year Ph.D. student in the Reinhardt-King Lab, was awarded a student travel grant from the Biomedical Engineering Society (BMES).

**Outstanding Graduate Student Research Award**

Kevin Martin, an undergraduate student in the Reinhardt-King Lab, received an undergraduate research award from the Engineering Learning Initiative.

**Outstanding Graduate Student Research Award**

Joseph Miller, a third year Ph.D. student in the Reinhardt-King Lab, was awarded a grant from the Kavli Institute to build an optical platform for imaging strains in tissue in collaboration with Susan Panulla at Weill Cornell Medical College.

**Outstanding Graduate Student Research Award**

Jorge Mogica-Santiago, a second year Ph.D. student in the Bonassar Lab, earned the Second Place Poster Award at the 2nd International Spine Research Symposium in Philadelphia, PA. For his paper titled “Characterization of Canine-Sized Aligned/Collapsed Tissue-Engineered Intervertebral Discs.”

**Outstanding Graduate Student Research Award**

Samantha Olyha, an undergraduate student in the Lammerding Lab, was awarded a Marshall Scholarship to study at Oxford University.

**Outstanding Graduate Student Research Award**

Jennifer Puetzer, a fifth year Ph.D. student in the Bonassar Lab, was named to the Young Investigator Council of the journal Tissue Engineering. Puetzer also won first place at the Ph.D. student paper competition at the World Congress of Biomechanics for her paper titled, “Development of Tissue Engineered Meniscus with Physiologically Distributed Loading.”

**Outstanding Graduate Student Research Award**

Bo Ri Seo, a sixth year Ph.D. student in the Fischbach Lab, won award for best poster presentation for Biomaterials and Tissue Engineering at the Gordon Research Conference.

Elizabeth Wayne, a fourth year Ph.D. student in the Schaffer Lab, was one of 8 recipients of the 2014 Cook Award from Cornell University. The Cook Award is named in honor of the late President E. Cook, Cornell’s first woman vice president, and the late Professor Emeritus Alice E. Cook, founding member of the Advisory Committee on the Status of Women. The Award honors individuals who deserve recognition for their commitment to women’s issues and their contributions for changing the climate for women at Cornell.

Aniqua Rahman, a first year student in the Reinhardt-King Lab, received an honorable mention from the Ford Foundation.

Kirk Samaroo, a fifth year Ph.D. student in the Bonassar Lab, won second place at the Ph.D. student paper competition at the World Congress of Biomechanics for his paper titled, “Prevention of Cartilage Degeneration by Intracellular Treatment with Lubricin-Mimetics in the Rat Following Anterior Cruciate Ligament Transection.”

**Outstanding Graduate Student Research Award**

Jorge Mogica-Santiago, a second year Ph.D. student in the Bonassar lab, won second place at the 2nd International Spine Research Symposium in Philadelphia, PA.