2011 Fellow Reports

Reports of the 2010-11 winners in Tau Beta Pi's 76th Fellowship Program are presented here. They constitute the Fellows' only specific obligation to the Association after their appointment by the Fellowship Board. Their reports were written in April, and the verb tenses may sound wrong when read later. Each of the winners expresses appreciation to advisors and major teachers, to family and helpful friends, and to the Association, donors, and the Fellowship Board for the honor of being named a Tau Beta Pi Fellow.

Of the 28 fellowships awarded a year ago, 15 of the students have been paid cash stipends totaling $150,000. One resigned his fellowship. The other 12 did not need the stipend.

Zachary S. Lamb, AL A '10
Centennial Fellow No. 25

Zachary S. Lamb

Zachary (mechanical engineering, materials engineering) has been working to pursue his master's degree in robotics from Carnegie Mellon University. Intending to graduate in August 2011, he has been working to complete his course requirements from the program, taking classes in topics ranging from computer vision, machine learning, and statistical techniques to kinematics, dynamics, and control and mechanics of manipulation. Interesting projects he has worked on during this time include image-based vehicle localization in urban environments utilizing a particle filter and image description/matching, grass and obstacle identification in segmented images using a Gaussian Naive Bayesian classifier, analysis of the manipulation of objects via pushing over flat surfaces, and generating a wheeled mobile robot simulator that implements simple models of wheel slip.

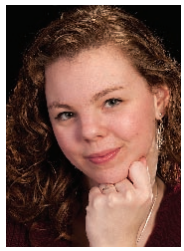
This summer he will continue research in the area of wheeled mobile robot navigation. Being greatly interested in the general models of traction between wheels and ground he intends to continue investigating methods of modeling/estimating wheel slip over different types of terrain. This work will involve both developing simulations and gathering data from field robots to compare results. Upon completion of his research requirements and graduation, he plans to pursue a career in the robotics field. Building upon his undergraduate engineering education he is interested in working on projects that include the design and implementation of intelligent robotic and mechatronic systems.

William P. Cleveland, MS A '10
Fife Fellow No. 131

William P. Cleveland

As an aerospace engineering M.S. student in the cognitive engineering center at Georgia Tech, I have been fascinated by the role humans play in relating to autonomous systems. My research under my advisor, Dr. Amy Pritchett, has been focused on the traffic alert and collision avoidance system in use on commercial aircraft. Pilots rely on this system to avoid mid-air collisions. I have been primarily involved in, among other things, preparing a commercial flight simulator for experiments involving commercial airline pilots. I have become involved with the ΤΒΠ Georgia Alpha Chapter and help by sharing my experiences as President of my chapter at Mississippi State University. With the support of this fellowship, I have also worked towards a private pilot airplane license. This experience has been very beneficial to help me relate to the airline pilots we will be studying. My current future plans include earning a Ph.D. and becoming a professor.

Renee S. Hale, OK Γ '10
Fife Fellow No. 133



Renee S. Hale

This past year I have been attending the University of Cambridge in England to obtain a master's in chemical engineering. My research focuses on developing polymeric heat pipes, but my interests are quite diverse, and I plan to perform research in many different areas during my career. By the end of my year here, I will have profoundly expanded my horizons by traveling to a plethora of countries, including Italy, Germany, Ireland, and France. I particularly want to visit Switzerland, since I love mountains and the chocolate there is sublime. Seeing the deep roots of European culture and history has taught me many things, including the fact that 300 years is not a particularly long time in the eyes of the world! In addition to academics, I have enjoyed participating in the Sidney Sussex Chapel choir even though I am actually a member of Jesus College (Sidney Sussex was short an alto singer, so I seized the opportunity to join). Studying here has broadened my perspectives on life and taught me to think on a global scale, and I am incredibly grateful to ΤΒΠ for supporting my graduate school endeavors. My next step is to attend the University of Texas at Austin for a Ph.D. in chemical engineering so that I can pursue a career in industrial research.

Farshad Madhi, NY Θ '09
Fife Fellow No. 134

This past year I started my graduate studies at University of California, Berkeley. Besides the Tau Beta Pi Fellowship, I was awarded an ocean technology graduate fellowship, which was funded by the American Bureau of Shipping.

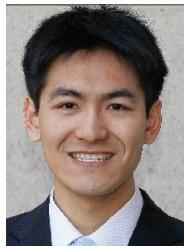
I moved to Berkeley in August 2010 and with Professor Ronald W. Yeung's permission, I was able to help with testing the wave-energy extractor device at the Richmond field station, gaining practical insights about wave energy and his current project. During this academic year, I have fulfilled the course requirements for an M.S. degree. I will be working on a wave energy extraction project this summer, and with this research I hope to obtain my M.S. degree in December 2011. In addition, I will be studying for the preliminary examinations requirement for students planning to continue to their Ph.D.

Farshad Madhi

Salman H. Naqvi

Katherine E. Niehaus

Jacklyn M. Wilkinson



Hao Zou

Sleiman S. Sleiman

My goal when I finish my academic career is to enter academia. I was very fortunate to receive the Tau Beta Pi Fellowship, which is enabling me to realize my dream.

Salman H. Naqvi, NJ Γ '10
Fife Fellow No. 135

Stanford University is my new home as I pursue my master's and Ph.D. in electrical engineering. I plan to specialize in the area of signal processing and electromagnetics. This school offers a unique and uptight learning environment, which offers challenges and inspirations, alongside opportunities. During this first year of graduate studies, I have taken courses focusing mostly on digital signal processing and its applications in medical imaging, control problems in linear systems, and communications. Besides academics, my focus here has been to establish firm roots in the research laboratory of radioscience and telecommunications here. My research involves the study of very-low-frequency electromagnetic waves generated in the Earth's magnetosphere and plasmapause, their interaction with the charged particles in the Earth's radiation belts, their effects on the on-orbit communication satellites, and their propagation issues in the earth's ionosphere into the lower atmosphere. I hope to continue progressing in my area of research while also exploring possibilities to excel at a local research laboratory in the Silicon Valley area. Having loved New York City, as I studied near it at my cherished *alma mater*, New Jersey Institute of Technology, the next big things I thought of were to live in Northern California and to study here. Right now, I am enjoying both.

Katherine E. Niehaus, CA Γ '10
Fife Fellow No. 136

This past year I have been working towards my master's degree in bioengineering at Stanford. My experience has been very rewarding, and I feel incredibly fortunate to have received a ΤΒΠ Fellowship to help me toward my academic goals. While I had some exposure to applying engineering principles towards biological systems in my undergraduate coursework, my courses this year have delved much deeper. The problems we've been challenged to solve have ranged in scale from the single molecule level to entire organs such as the heart. As my focus within bioengineering is on medical devices, I also wanted to improve my ability to prototype physical products. My coursework in this area culminated in my design and creation of a novel muffin tin that has since been featured by my professor as a model project.

More directly related to design for health-related challenges, the highlight of my program has been working with an interdisciplinary team of students on a low-cost device for neonatal jaundice monitoring in India. Having deeply investigated the need for such a device in rural India, we are now developing a prototype and are planning to validate our concept in India this summer.

I actually have enjoyed my graduate classes so much that I feel that I am not quite ready to be done—there is more I would like to learn. As such, after I finish my master's degree in December, I plan to apply for Ph.D. programs to continue my studies.

Jacklyn M. Wilkinson, SC A '10
Fife Fellow No. 137

During my first year of graduate study at Clemson University, I have taken required course work in materials science and engineering as well as beginning research for my master's thesis. My project is on solution-derived chalcogenide glass films for low-loss sensor applications. Chalcogenide glasses are infrared-transparent, making them an excellent candidate for sensing of chemicals with characteristic absorbance peaks in the infrared. I have focused on optimizing glass dissolution and spin-coating techniques in order to produce high quality films with a low surface roughness. My determination of the process parameters to use to produce optimized films will lead to new materials suitable for use in integrated "lab-on-a-chip" devices. These devices will have a broad range of applications including sensing of chemicals used in making weapons, sensing of chemicals that could indicate disease, and sensing environmental hazards.

I am enrolled in a dual master's degree program, so I will spend the next year at the University of Bordeaux, where I will finish my master's thesis. I will graduate with an M.S. in materials science and engineering from Clemson and an M.S. in chemistry from Bordeaux. I plan to pursue a Ph.D. after graduation. After that, I think I would like to work in industry for a while and eventually return to academia. I am excited about the future and thankful to ΤΒΠ for its support!

Hao Zou, CA Γ '08
Fife Fellow No. 138

Last year I have been working concurrently towards my Ph.D. in electrical engineering and M.B.A. degrees at the dept. of electrical engineering and graduate school of business of Stanford University. I have completed my business school curriculum and expect to receive my degree this June. In my Ph.D. program, I worked with Prof. John Cioffi, "father of DSL technology" according to the IEEE, to develop technologies and protocols for the next generation communication systems. My research has been published and presented in various conferences and is being adopted in commercial broadband networks in the U.S. and Europe with tens of millions of users. In May 2011, I will be representing Stanford University at the annual meeting of committees of the American Telecommunication Standards Organization, to work with industry experts on standardizing technologies for next generation commutation systems. Later this year, I will also join in a panel of researchers at the Marconi Society annual symposium to discuss "How Will the Internet Survive the Next 100 Years" and present my research related to this topic. In addition to research on communication technologies, I have also worked with faculty at the business school to research portfolio optimization, derivative securities pricing, and market structures/failures during the financial crises. I hope my research in business and finance would also help improve the society and offer insights for policy makers on reforming the financial system post crises. I would like to thank Tau Beta Pi and its donors for their generous support of my study and multidisciplinary research efforts.

Keane L. Steele, E.I.

Nathan D. Nicholes

Matthew A. Hitt

Aditya M. Kunjapur

Lauren B. Priddy

Julian J.T. Reyes, E.I.

Sleiman S. Sleiman, OH Z '09
Spencer Fellow No. 55

My year as a ΤΒΠ Fellow has been an eventful year. I have been pursuing my masters in Engineering Management at the American University of Beirut with a focus in industrial management. I have been taking classes as of last summer, and have recently started my thesis. I am working with a research group on downstream applications of oil and gas expected in the eastern Mediterranean. I have one more semester of classes and another year of research to go. I expect to graduate in Spring 2012 at the latest. Upon graduation, I plan to move into the strategic consulting sector that is thriving in the Middle East area. That will be the best combination of my chemical engineering and engineering management backgrounds.

The greatest accomplishment during my fellowship year is the amount of awareness and exposure I have brought ΤΒΠ in my new school. The fellowship has been quite an honorable title to hold. There is no pleasure compared to explaining to colleagues what ΤΒΠ is. Through my presence at AUB, I am raising awareness to start a charter that could evolve into ΤΒΠ's first international chapter. Perhaps this idea will see light before I graduate.

Keane L. Steele, E.I., SC Γ '09
King Fellow No. 49

This past year I have had the honor of being a ΤΒΠ Fellow. Since August I have studied in the civil engineering department at Virginia Polytechnic Institute and State University. I am pursuing my master of science degree in the structural engineering and materials program.

Graduate school has been immensely gratifying. It has given me the occasion to meet many gifted young engineers that share my same interests and goals. More importantly, I have gained much more knowledge about the analysis, design, and construction of structures; understanding which I cannot wait to put to practice. My knowledge of structures has grown exponentially since starting graduate school but I feel that the most important ingot learned is that I have so much more yet to acquire. I can only imagine how much more I will learn once I am working as an engineer.

After I finish my degree, later this year, I hope to find employment in a structural engineering position that allows me to gain invaluable design and construction experience while working towards my professional licensure. I look forward to stepping into the structural engineering industry and becoming another great representative of ΤΒΠ in the work force. I hope that I will soon be able to give back to engineering as a profession, my undergraduate and graduate institutions, and ΤΒΠ. Thank you for allowing me the privilege of being a ΤΒΠ Fellow this year.

Nathan D. Nicholes, OK A '10
Sigma Tau Fellow No. 37

I have spent the past year working in the chemical and biomolecular engineering department at Johns Hopkins University in Baltimore, MD. I thoroughly enjoyed the classes that expanded my understanding of interfacial and transport phenomena as well as current topics in bioengineering. After the fall semester, I joined Marc Ostermeier's research group which focuses on applying directed evolution to produce proteins with novel functions. More specifically, I am working on combining a protein-binding domain with beta lactamase so that beta lactamase activity is controlled by a ligand binding to the protein-binding domain. The ultimate goal is to develop a reliable system that can be used to determine the level of specific proteins in live cells.

In addition to conducting research, I have had several opportunities to be involved in community outreach programs. Our department sponsors STEM (Science, Technology, Engineering and Mathematics) outreach programs that seek to engage elementary school students in simple experiments that will encourage them to study and be involved in the sciences. I was also a volunteer for the Ricky Myers day of service during which I helped to convert a vacant lot into a small urban park in a low-income neighborhood in downtown Baltimore.

Following my graduate studies, I am interested in pursuing a career in pharmaceutical research involving the use of both natural and synthetic proteins as therapeutics. I would like to be able to use my current research to advance the development of protein-based pharmaceuticals.

Matthew A. Hitt, AL Δ '10
Stark Fellow No. 33

After starting graduate school, I helped to complete a hot-fire experiment using a liquid oxygen system before fully concentrating on my research project. Due to funding delays, the testing schedule for my project has been delayed; however, I have been able to do preliminary analysis and design for the new LOX facility. The preliminary design work has included component layout, heat transfer to condition the LOX, and design of the heat exchanger. As part of the research project, I have developed some smaller side experiments to test different aspects of the LOX facility. One side experiment is designed to estimate the boiling coefficient of liquid nitrogen on copper tubing to verify the calculations for the heat exchanger. The other side experiment is to estimate the effect of oxygen cleaning on the calibration for pressure transducers.

In addition to my research, I have taken most of my coursework during this year. Along with the standard propulsion and thermodynamics classes, I am taking a selected topics course that focuses on oxygen safety and system design. This class and previous training in oxygen safety has been useful for the development of the LOX system and for the development of one of the side experiments. It has also prepared me to assist with future research projects using LOX at the UAH Propulsion Research Center.

My career plans are to pursue a doctorate in engineering in order to become a professor and teach engineering at either a Christian or a local college.

Aditya M. Kunjapur, TX A '10
Williams Fellow No. 31

I began my graduate school experience in the fall of 2010. In our department, the first semester is extremely coursework-intensive, and we are allowed to commit to an advisor only during the last week of fall classes. Once that time arrived, I opted to join Kris

Prather's lab, which focuses on the design and assembly of recombinant organisms for the production of small molecules. I started research during the last week of January, after I had passed Ph.D. qualifiers (hooray!). I have been investigating whether the use of protein scaffolds in E. coli can increase the overall production of a biofuel compound. These protein scaffolds can be designed to recruit specific pathway enzymes, forming an in vivo complex that can allow a substrate to undergo sequential reactions all in proximity. The co-location of pathway enzymes can be especially useful when undesired byproduct formation is otherwise high or when one of the intermediate compounds is toxic to the cell. In the years ahead, I intend to model the effect of different scaffold designs on pathway flux in an effort to better understand how to increase product yields. The computational model will be calibrated using both in vivo and in vitro experiments relating to a simple pathway, which I am currently trying to identify.

Lauren B. Priddy, MS A '08
Matthews Fellow No. 13

In August 2010, I began my Ph.D. studies in bioengineering at the Georgia Institute of Technology, and I have been awarded the graduate training for rationally designed, integrative biomaterials fellowship and president's fellowship. My research focuses on biomaterial scaffolds such as fibrin for treatment of large bone defects. Fibrin gels offer an attractive option for promoting bone regeneration due to their biocompatibility, controllable degradation and growth factor release rates, and support of cell attachment. Last year, I joined the Orthopaedic Research Society (ORS), and in January, I attended the ORS annual meeting in Long Beach, CA.

Besides conducting research, I have been active in programs benefiting the community. I was involved in "Buzz on Biotechnology," an annual event that invites middle- and high-school students to engage in hands-on science and engineering. This past holiday season, I participated in a canned food drive for the Atlanta Community Food Bank and a toy drive for the Atlanta chapter of Toys for Tots. I currently serve on the bioengineering graduate student advisory committee.

In the future, I hope to inspire students about the exciting world of bioengineering. My career plans are to become a professor, so that I can teach and advise students, as well as conduct research, in the field of tissue engineering and regenerative medicine.

Julian J.T. Reyes, E.I., WA B '10
Nagel Fellow No. 13

During my first year as a Ph.D. student, I have made significant headway regarding my research into integrated modeling linking biogeochemical cycling with hydrology and atmospheric processes. My research interests have shifted to looking at hydrologic models and investigating how a framework of models incorporating Earth system components works. Currently, I am looking at how atmospheric deposition of nitrogen affects the terrestrial biosphere via an eco-hydrologic model. One of my research objectives deals with how nitrogen impacts the Earth system, since it is so ubiquitous in our environment due to fertilizer use and fossil fuel combustion.

I plan on obtaining my Ph.D. from Washington State University because of the interdisciplinary research already being conducted on nitrogen here. Next year, I will be a visiting research scholar at the University of Bonn in Germany on a Fulbright grant. Sponsored through the Department of State, the grant encourages cultural and intellectual exchange. I hope to learn more about crop and grassland systems while in Germany for the year, which will better inform our modeling of terrestrial systems, which include natural grasslands, crop systems, and forested areas. After my Fulbright, I will be part of the NSPIRE (Nitrogen systems: Policy-oriented Integrated Research and Education) IGERT program. I believe these experiences will help me network with scientists around the world regarding nitrogen and also provide an interdisciplinary perspective on nitrogen in the environment.

Alexandra B. Chakeres

Courtney E. Shell

Sharice Q. Handa

Alexandra B. Chakeres, MO Γ '10
Hanley Fellow No. 6

I received this fellowship to research biomass gasification at the National Renewable Energy Laboratory while taking classes towards a master's degree in mechanical engineering at the University of Colorado at Boulder. This year, my team at NREL and I constructed and ran experiments on a continuous multi-reactor tar reformer used to treat the raw biomass-derived synthesis gas from NREL's thermochemical biomass conversion pilot plant. We tested six catalysts that had previously only been used at the bench scale with bottled gases, and we managed to demonstrate continuous tar reforming (conversion of methane to carbon dioxide and hydrogen). We'll continue testing additional catalyst regeneration schemes for the next few months, after which time I plan to begin research for my chemical engineering department, where I'll start a Ph.D. in fall 2011. I plan to continue studying renewable technologies for my Ph.D. project. After graduation, I'd like to work as a process engineer in industry so that I can make an impact on reducing America's use of fossil fuels as soon as possible. I thank ΤΒΠ for believing in me, and for lightening the burden of paying for my own graduate school and living expenses. This fellowship has really enhanced my quality of life. Thank you!

Courtney E. Shell, TX Δ '10
Arm Fellow No. 3

After graduating from Texas A&M University with a degree in biomedical engineering, I began working towards a master of science in mechanical engineering with a focus in biomechanics at the University of Texas at Austin. I joined the neuromuscular biomechanics lab and began a project studying the effects of prosthetic foot stiffness on amputee gait in straight-line walking and turning. I have modified a CAD model of a previously studied prosthetic foot to create versions with different levels of stiffness, created prototypes using rapid manufacturing techniques, and examined the stiffness characteristics of both the prototypes and clinically-used carbon fiber feet in preparation for creating feet that will be tested by amputees in straight-line walking and turning tasks. Through this project I hope to elucidate relationships between foot characteristics and amputee mobility, gather data for future analyses and use in design optimization routines, and improve the ability of clinicians to prescribe feet that provide the best balance of mobility and stability for patients.

Besides beginning work on my thesis project, I have completed half of my coursework, as well as served on two event panels providing information to students interested in graduate school and am organizing two similar future events. Through my studies I plan to gain the depth of experience necessary to develop highly functional, efficient prosthetic limbs. After completing my Ph.D., I plan to continue my work in either industry or academia, seeking significant opportunities for growth, innovation, and improving the lives of amputees and patients with musculoskeletal disorders.

Abhishek Jaiswal

Marsela Jakub-Wood

Toby A. Klein, E.I.

Sharice Q. Handa, CA Σ '10
Tau Beta Pi Fellow No. 772

I decided to stay at my alma mater, the University of California, Santa Barbara, for graduate school. This turned out to be a great choice. I began working in Sumita Pennathur's nanolab on a nanofluidic energy conversion project. Nanofluidic pressure to electrical energy conversion is a possible renewable energy alternative to batteries. The variation of electric potential at a solid-liquid interface is known as the electric double layer (EDL). A pressure gradient in a nanochannel filled with electrolytic solution will transport ions in the EDL creating a streaming current capable of powering an external device. My project will be to create these devices and modify their surface characteristics to improve conversion efficiencies.
While most of my thesis research will take place next year, this year I was kept busy with classes in the emphasis of solid mechanics and MEMS. I was also the teaching assistant for a biomedical devices class, fluids course, and the junior and senior design projects.

I was able to continue my involvement in the California Sigma Chapter of ΤΒΠ. I was elected Secretary at the end of last year and am helping with the planning of events, including the District 16 Conference in Santa Barbara.

After next year I will graduate with my master's in mechanical engineering. I am unsure of my exact plans after graduation but I hope to start working and continue learning. Thank you Tau Beta Pi for your support.

Abhishek Jaiswal, ID B '10
Tau Beta Pi Fellow No. 773

My first year at the department of nuclear, plasma and radiological engineering at the University of Illinois at Urbana-Champaign was focused mostly on coursework. In the fall semester, I completed two core courses on fundamentals of nuclear engineering and nuclear energy systems design and one additional course in quantum mechanics that will assist me with the Ph.D. qualifying exam. I also selected my research advisor during the first semester and decided on a project for master's degree. I am currently working with Dr. Barclay Jones and my research focus will be in understanding of the CRUD deposition in nuclear reactor fuel rods that lead to an axial offset in the power distribution of a reactor core. In the spring semester I have signed up for three core courses in fluid dynamics, radiation interaction with matter, and radiation protection. I started on literature review initially in the semester to familiarize myself with the research topic and attended group meeting regularly. Now, I have begun to work on computer simulations and actual experimental work leading to the understanding of CRUD deposition and power profiles in nuclear reactor. I will continue with my research work in the summer and take additional courses in the areas of corrosion and finite element analysis in the upcoming fall semester. Receiving the ΤΒΠ Fellowship has really helped me in limiting the total work time towards my teaching assistantship and allowed me to focus well in my coursework as well as research.

Marsela Jakub-Wood, LA Δ '10
Tau Beta Pi Fellow No. 774

During my year of the ΤΒΠ Fellowship, I had the opportunity to work on the integrative training in health-assistive smart environments, in which our goal is to provide an assistive environment for elderly people. In doing so, it is our hope that we can extend the time of their independent living. This project allowed me to work with peers from various different backgrounds such as physiology, computer science, physics, nursing, mechanical engineering, and many others.

My work in the project is to identify methods of improving life styles by monitoring energy. Currently, the test home includes many motion sensors, installed to monitor resident's well being. Though this method accomplishes the goal quite well, one drawback is that the use of motion sensors requires cumbersome installation process due to their number. In my study, I will be looking at different non-intrusive methods of accomplishing the same result by monitoring resident's energy consumption.

As a first year graduate student, my work has barely scratched the surface, but I am looking forward to this upcoming summer when I can completely devote my time to my research.

Toby A. Klein, E.I., NY I '10
Tau Beta Pi Fellow No. 775

Toby Klein is a master's student in mechanical engineering at the Massachusetts Institute of Technology, where she is taking graduate-level classes and is performing research in applications of thermal transpiration to microscale energy conversion toward her master's thesis. Thermal transpiration is a small-scale phenomenon associated with wall bounded gases, whereby an externally induced thermal gradient causes the gas to flow from low to high temperatures. Thermal transpiration is negligible in macroscale settings, but becomes appreciable in small-scale environments. This pumping effect can be used to transport gases, or increase the pressure of a gas stream. Under the guidance of her advisor, Professor Nicolas Hadjiconstantinou, she is working on exploring and evaluating alternative concepts and novel applications of Knudsen compressors, which are microscale pumps based on the principle of thermal transpiration. These devices are modeled at the microscopic scale using the low variance deviational simulation Monte Carlo (LVDSMC) method developed by another member of the lab. Ultimately, the goal is to harness solar energy, which would be used to generate the thermal gradient that drives the flow. Toby presented this work at a poster session of the energy conference of the MIT Energy Initiative, where it won the best poster award. After earning her master's degree, she plans to work as a mechanical engineer in industry.


Jaclyn R. Kondratko


Diana K. Ladkany


Karthish Manthiram


Jonathan L. McKinney


Li Tan


Brian J. Thomas

Jaclyn R. Kondratko, IN Δ '10
Tau Beta Pi Fellow No. 776

This year, as a first year graduate student at the University of Wisconsin-Madison, I have made a smooth transition from mechanical engineering into biomedical engineering with a specialty in biomechanics. Joining a lab that focuses much of its research on defining various mechanical properties of ligaments and tendons, I was able to quickly gain knowledge on the subject, including becoming familiar with testing protocols, lab equipment, and dissection techniques. This familiarity helped me determine a direction to go with my research. I am currently in the beginning stages of a project with the goal of determining the time-dependent recovery behavior of ligament and tendon due to mechanical and biological characteristics of the tissue. Many studies done *in vitro* have demonstrated that there is a permanent loss in stiffness after initial loading, and I am looking deeper into this behavior by studying the biological contributions of its long-term recovery in order to understand the behavior from a more physiologic perspective.

In the last seven months, with the help of the ΤΒΠ Fellowship, I have already gained a much greater knowledge in the area of biomedical engineering and have discovered my specific research interests. I am looking forward to continuing my graduate schooling and seeing where my career takes me upon graduation.

Diana K. Ladkany, NY K '10
Tau Beta Pi Fellow No. 777

In the past year, I have been incredibly busy as a first-year medical student at the University of Rochester, school of medicine and dentistry. Although learning about anatomy, histology, physiology, genetics, biochemistry, and infectious diseases has been the true focus of my year, I have done much more than that. I have also been active in many forms of early clinical experiences in emergency medicine, pediatrics, and internal medicine. By far, the most influential events in the past year were in human anatomy lab.

My days are usually split between class, clinical experiences, studying, and some volunteering on the side. As for volunteering, I spend one night a week cooking dinner for families of patients with chronic illness at a community lodge, weekend activities with my "little sister" who is afflicted with sickle cell anemia, and playing with pediatric in-patients on Friday afternoons. I love finding new ways to reach out to the local community.

For the next year, I will continue studying the subjects presented to me in class and in my clinical experiences as I begin preparing for the USMLE board exam at the end of my second year, which will be important for me as I continue in my pursuit of a medical degree. The third and fourth years of medical school will be preoccupied with clinical experiences in many different specialties. I am interested in cardiology, internal medicine, and emergency medicine; however, there is no way of knowing what specialty I will truly enjoy until I have been fully exposed to all of the different options.

Karthish Manthiram, CA Γ '10
Tau Beta Pi Fellow No. 778

My first year of graduate school in chemical engineering at UC, Berkeley, has been a stimulating experience. I joined Professor Alivisatos' lab to study localized surface plasmon resonances (LSPRs) in semiconductor nanocrystals. LSPRs are collective charge carrier excitations induced by light. My research on dynamically tunable LSPRs may lead to improved light harvesting for solar cells and advanced biomedical imaging probes.

Through courses in chemical engineering and solid state physics, I have been excited to find that the same principles that govern the transport of mass, energy, and momentum can be used to develop an advanced understanding of the transport of electrons, holes, and other particles in solid state materials. It has been rewarding to use my chemical engineering perspective to further my research into solid-state materials.

I have also had the opportunity to travel to conferences. I visited Argonne National Lab as part of a DOE office of science graduate fellowship meeting and attended the American Physical Society and Materials Research Society meetings. These events gave me exposure to a broad range of research and allowed me to exchange ideas with other researchers.

My research experiences as an undergraduate at Stanford University and now as a graduate student here have confirmed my desire to become a professor. I am excited about the opportunity to teach the next generation of engineers and do cutting-edge research. I am thankful for the support of the ΤΒΠ Fellowship in helping me work towards my Ph.D. and a career in academia.

Jonathan L. McKinney, MO B '10
Tau Beta Pi Fellow No. 779

During this school year I concentrated mainly on coursework for my master's degree in chemical engineering. Here in the middle of the spring semester I am starting to pick up the pace on research. I plan to continue working hard on research through the end of the summer and into the fall, and then start writing.

The research project involves measuring concentrations profiles of air pollutants in building materials. Inverse solutions to Fick's Law based on the measured profiles may give information (with some uncertainty) about pollutant history in the air of the building. This information cannot be obtained currently unless a site has been monitored over the past. Often health problems due to air pollutants do not show up until long after people were exposed, therefore historical data is not usually available to health scientists. I hope to generate methods that are simple enough and inexpensive enough that health scientists are willing to use them during their studies.

When I finish my master's degree I plan to work as an engineer for a short period of time while I nail down plans for a Ph.D. in physics. I would like to do research on transport phenomena as a career. Also, I would rather have no gap in my schooling, so if I am able to start planning my Ph. D. and secure funding toward the end of my master's in time to start the following year, I will not work for a short period of time first.

Li Tan, OH B '10
Tau Beta Pi Fellow No. 780

I joined the department of chemical engineering at the Massachusetts Institute of Technology in September 2010 as a Ph.D. student. With generous fellowship support from the department, I focused on taking the core classes required for the Ph.D. program to pass the qualifying examination in January this year. After three months of advisor searching process last semester, I decided to join the lab of Professor Allan S. Myerson under co-advisement from Professor Bernhardt Trout. The project I am working on is part of a greater initiative from the Norvatis-MIT center for continuous manufacturing, with the goal to develop flexible continuous processes that can replace traditional batch processing in the pharmaceutical industry. While the goal of the center is to apply the technologies developed for pharmaceutical-production, the project I chose was closely related to fundamental understanding of crystal nucleation (the first step in crystallization). The goal of my project is to manufacture functionalized surfaces with nano-scale patterns that can help accelerate crystallization process and allow control of crystal formation. I think it is a very interesting project with great potential in fundamental understanding and practical application. Right now I am spending the majority of my time on mastering experimental techniques and designing my future experiments. I will keep the TBΠ spirit of *integrity and excellence in engineering* close to heart as I progress along my career.

Brian J. Thomas, IN A '10
Tau Beta Pi Fellow No. 781

During my year as a TBΠ Fellow, I studied robotics and computer science at Brown University. I completed several courses in fields ranging from programming languages to machine learning to robotics. Working with Professor Chad Jenkins, I developed several learning tools for students exploring robots. One such tool, used in our university's own robotics class, enabled students to visualize path planning and localization algorithms, effectively presenting them with the robot's perception of the world. (This and other tools our lab develops are open source and freely available at *http://code.google.com/p/brown-ros-pkg/*.) I am also working with a team to extend MIT's Scratch, a programming tool developed to introduce younger students to programming, with robotic sensing and control capabilities. Currently, I am beginning to research human-robot interaction through robot dialog; particularly, using this dialog, I am investigating developing a highly scalable framework that grounds verbs in physical actions. Looking into the future, I plan on furthering my work in robotics research and education as I continue pursuing my Ph.D.

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