2007 Fellow Reports

Reports of the 2006-07 winners in Tau Beta Pi's 73rd 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 35 fellowships awarded a year ago, 18 of the students have been paid cash stipends totaling $180,000. The others did not need the stipend.

D. Jason Owens

Cressel D. Anderson

Blake M. Andrews

D. Jason Owens, SC B '06
Centennial Fellow No. 21

My first year in the department of chemical engineering and materials science at the University of Minnesota has been devoted primarily to coursework. The chemical engineering degree requirements include four core courses and a number of major and elective courses. During the fall semester, I completed three core courses (fluid dynamics, linear analysis, and statistical mechanics) and an elective graduate course in bioethics. Advisors are also selected in the first semester: my major advisor is Wei-Shou Hu of CEMS, and I will be co-advised by Catherine Verfaillie in the stem cell institute. My thesis will focus on investigation of multipotent adult progenitor cells to help better understand and utilize the potential of adult stem cells.

This spring, my coursework includes thermodynamics (the fourth core), biochemical engineering, and advanced developmental biology. I have begun a literature search to familiarize myself with my research topic and regularly attended group meetings. At the conclusion of the semester, I will begin research in the laboratory for the duration of the summer. This fall, I will split time between research and completion of my coursework.

Cressel D. Anderson, NC Δ '06
Fife Fellow No. 81

I am truly grateful for the Fellowship from ΤΒΠ. It has enabled me the flexibility to relocate my family and find a research advisor. This year, I have been able to broaden my awareness of emerging technology through involvement in many robotics seminars and events as well as research in mobile manipulation. In addition, I have been able to focus my plans for future research, and I am excited about the opportunities that are present in human-robot interaction. This summer I will be researching robotics at the health aystems institute at Georgia Tech. Over the next several years, I anticipate making significant contributions to the field of engineering by conducting research that changes the way humans interact with robots.

Blake M. Andrews, OH Δ '06
Fife Fellow No. 82

As a ΤΒΠ Fellow, I have accomplished much in my first year of graduate study at the University of Illinois at Urbana-Champaign. My coursework covered a balanced mix of advanced topics in structural engineering, including analysis, design, and experimentation. In addition, I expect to take one or two classes in geotechnical engineering. My research interests involve earthquake engineering in building and bridge structures. Specifically, I am investigating the behavior of a relatively new type of bracing system that performs well during earthquakes, in hope of making discoveries that lead to improved design practices. I will write a thesis report summarizing my research results.

Though my current plans are to graduate with a master of science degree, I still remain open to the possibility of pursuing a doctorate. The decision will hinge upon my research experience during the next year. In either case, after I graduate I will proceed to practice and pursue a professional engineering license. A mix of investigation and design work most interests me. As a practicing engineer, I wish to tackle challenging structural engineering problems—those that require a high degree of research and thinking independent of the structural codes—and to design exciting or even iconic structures. Regardless of my technical specialization, I will endeavor to become a leader in both my organization and in the field. Possibly, later in my career, I may pursue teaching engineering at the college level.

Justin T. Brown, MO Γ '06
Fife Fellow No. 83

I am working on a program that finds motifs in DNA sequences. Motifs are patterns that reoccur throughout the genome that have biological significance. The goal is to identify these biologically significant regions so that they can be further analyzed. The program works by comparing a species's DNA to the DNA of related species in order to cut down on the signal-to-noise ratio and distinguish between real patterns and those that occur by chance. My next step is to create a hardware implementation of the program, so that it will run fast and be a useful tool for the genetics community.

Jeremy B. Dreiling, KS Γ '07
Fife Fellow No. 84

This year, I began working on my master's degree in architectural engineering at Kansas State University. Being a dual-degree program, my graduate study for the year focused on technical electives designed to assist with my upcoming research.

Due to the vital importance of indoor-air quality for occupants of healthcare facilities, the focus of my research will be evaluating the effectiveness of various air-cleaning techniques, advantages


Justin T. Brown


Jeremy B. Dreiling


Kyle A. Frazier


C.A. Guidry


Joseph A. Harper


M.L. Kocoloski

and disadvantages, as well as the impact of each on the overall building systems. Particular emphasis will be placed on the implementation of ultraviolet germicidal irradiation lamps paired with HEPA filters in HVAC applications. My objective is to publish the research and educate engineers and owners of the opportunities and consequences of these infection-control techniques.

Furthermore, my graduate studies have given me the opportunity to pursue my interest in law and ethics. These diverse courses will truly benefit my success as a consulting engineer in the years ahead. Upon graduation, I plan to become a mechanical engineer designing building systems in the healthcare industry. It is my desire to return to Kansas State as a professor after earning my professional license and having a rewarding career.

I sincerely thank ΤΒΠ for the continued support in pursuing my master's degree!

Kyle A. Frazier, MS A '06
Fife Fellow No. 85

I have spent my ΤΒΠ Fellowship year at the Massachusetts Institute of Technology as a master's degree candidate in the technology and policy program, a branch of the engineering systems division, studying issues at the interface of engineering and public policy. For instance, I was a member of a student team last fall that conducted a semester-long project analyzing technological options for mitigating the effects of a sustained, severe oil import disruption on the American light-duty vehicle transportation sector. The experience was an invaluable, hands-on introduction to the challenges of operating in an environment where decisions are constrained by inter-related technical, economic, and political limitations.

As a research assistant affiliated with the technology and development program, I work with Fred Moavenzadeh, a professor of civil and environmental engineering and engineering systems, on topics related to civil infrastructure development and effects of globalization on the engineering and construction industry. While I have not yet defined a specific thesis topic, I hope to address ways in which public-private partnerships can be used to improve the quality of civil infrastructure delivered to society.

I plan to finish my work here by February 2008 and will spend the following year as a Rotary ambassadorial scholar at the University of Adelaide in South Australia, where I hope to obtain a postgraduate diploma in economics. While I hesitate to speculate about specific career options several years in advance, I do hope to use my education and experience to facilitate communication between engineers and policy-makers seeking to overcome problems of developing and delivering infrastructure services to the global community.

Christopher A. Guidry, LA Γ '06
Fife Fellow No. 86

I have been attending the University of Texas school of medicine in San Antonio and have completed my first year of medical school. So far, I have been learning normal structure and function of the human body through gross anatomy, microscopic anatomy, microbiology, physiology, biochemistry, and neuroscience. We have also been introduced to non-scientific courses on medical ethics and human behavior. A large portion of my time here has been dedicated to learning and implementing basic clinical examination skills in order to distinguish between normal and abnormal findings.

The experience I gained as a biomedical engineering student at Louisiana Tech University has allowed me not to simply memorize facts and figures about the human body and how it works, but rather to put together seemingly disparate pieces of information into a cohesive and functional understanding of the way the body operates. Facts without a functional knowledge of the whole can lead to inaccurate diagnoses and inadequate care. The way that engineering has taught me to think—to analyze and visualize an entire system—will enable me to be a better doctor with more accurate and broader-reaching diagnoses.

Thank you, ΤΒΠ, for generously funding my studies so that I can focus on my studies instead of worrying about my finances.

Joseph A. Harper, KY B '06
Fife Fellow No. 87

The last year has been a productive one for me, as I've been able to successfully complete most of my master's degree in computer engineering. In addition to coursework, I began work on my thesis project (which is focused on solving public transportation issues in Louisville, KY), and I held the office of president of the engineering student body. My career plans began in early May, when I accepted a position with Humana, Inc., where I will be an applications developer for its data warehouse.

Matthew L. Kocoloski, OH Θ '06
Fife Fellow No. 88

During my first year of graduate study, my coursework and research activities have helped prepare me for a career as a quantitative policy analyst, conducting analyses that are both technically sound and accessible to policy makers who may lack a strong technical background. My research activities during my first year have involved investigating the potential for ethanol to provide transportation energy in the United States.

First, I was involved in conducting a hybrid life-cycle assessment of ethanol produced from Brazilian sugarcane. The analysis incorporated both process and input-output elements and focused primarily on the energy used and greenhouse gases emitted during the production and transportation of both sugarcane and ethanol. Preliminary results indicate that the net energy balance of ethanol made from Brazilian sugarcane compares favorably to that of ethanol produced domestically from corn, even with the increased energy costs of transporting the fuel to the U.S.

Currently, I am researching ways to use principles of graph theory and other mathematical optimization techniques to minimize the costs of biomass transportation and ethanol distribution infrastructure in regions of the United States. If these costs are minimized, ethanol can become more economically competitive and help reduce our nation's dependence on foreign oil and our emissions of greenhouse gases. I hope to continue to research alternative forms of energy following my years as a graduate student, working either for a university, private firm, or public agency.


Francis D. Lagor Jr.


Siu-Ting D. Mak


Evan R. Neal


Michael D. Sadowitz


Jason J. Hallman


Rachel S. Marullo

Francis D. Lagor Jr., PA Θ '06
Fife Fellow No. 89

During my term as a Fellow, I studied in my first year of graduate studies at the University of Pennsylvania. Working in the nanoscale engineering laboratory under Dr. Jennifer R. Lukes, I began a project to investigate the feasibility of nano-textured surface design for boiling heat-transfer applications. The project examines how the lotus-leaf effect can reduce the wetability of a silicon to FC-72 interface that is common in immersion cooling of electronics. Preliminary molecular dynamics simulations were developed, and the modeling of the silicon surface structure was begun. This project will help to conquer the enormous challenges that are faced in the further development of high-heat-flux electronics.

My plans include the pursuit of a Ph.D. in mechanical engineering and an academic career that incorporates engineering education and cutting-edge research. My accomplishments would not have been possible without the generous support of ΤΒΠ.

Siu-Ting D. Mak, CA A '06
Fife Fellow No. 90

This past year of graduate studies at the department of civil and environmental engineering, University of California, Berkeley has been an exciting experience. With an exceptionally diverse and reputable faculty, the structural engineering, mechanics and materials program has attracted excellent students from over the world. Together they form the ideal team for me to learn about structural engineering, in which I developed zealous interests during my undergraduate years.

Since this was my first year of graduate studies, my focus was in the foundation of structural engineering theories and basic structural-design guidelines. Although I was not involved in any particular research projects, my professors have demonstrated to me all sorts of interesting projects on which they are now working. Many of these projects are at the frontier of academic research and technology development. They showed me how far and extensive structural engineering can develop.

I am going to obtain my M.S. degree in the summer. I wish to work for a Ph.D. in the future, but I would allow myself to first gain real-world experience and locate the research area that would interest me most. I am going to work for Arup, an engineering consulting firm, at its San Francisco office starting in August.

Evan R. Neal, UT A '06
Fife Fellow No. 91

The Fellowship I received has been a tremendous help in subsidizing my living and school expenses in this affluent city of Palo Alto. I began graduate school at Stanford University as a Ph.D. candidate in January 2007. I was originally supposed to start in late September, but became extremely sick and had to delay enrollment. I have recently completed my first quarter and am just beginning my second quarter. I am interested in circuits and biological applications and intend to do research under a potential doctoral advisor during the summer quarter. I am anticipating five more years of graduate study in order to earn my Ph.D. After graduation, I plan on working in industry here in Silicon Valley.

Michael D. Sadowitz, NV B '06
Fife Fellow No. 92

My year as a ΤΒΠ Fellow is marked not by what I have accomplished, but by what I have decided to accomplish. The financial stability afforded by the Fellowship provided me with solid ground from which I could take a giant leap toward my revised goals. In short, I have decided to pursue a career in law.

This is not to say that my year has gone without accomplishment. By the end of the academic year, I will have completed half of my coursework toward an M.S.E.E. degree. I have conducted research on how the dimensions of nanoporous alumina change the color of refracted light. I have also pursued work on a patent for my undergraduate senior design project.

Why have I decided to leave behind the largely black-and-white world of engineering to enter the hazy gray realm of law? In part, it is because I became fascinated with the patent process. It is also because I simply miss writing—I mean, really writing. My point is this: these thoughts would not have even crossed my mind were it not for the freedom granted by my Fellowship. There were no financial ties tethering me to a particular path. As a result, I was able to make a choice based not on what I felt that I had to do, but what I really wanted to do. I am truly grateful to the financial support provided by ΤΒΠ.

Jason J. Hallman, IN Δ '06
Spencer Fellow No. 51

My first year pursuing a Ph.D. in biomedical engineering at Marquette University has proven to be quite rewarding, in partial thanks to my ΤΒΠ Fellowship. This fellowship greatly reduced the financial strain of my graduate education, freeing me to commence full-time research pursuits directly after my graduation from Valparaiso University in May 2006. As a research assistant in the neuroscience-biomechanics laboratory, a collaboration between the Medical College of Wisconsin, Zablocki VA Medical Center, and Marquette, I contributed to research of human-body injuries in automotive crashes and other traumatic impacts. This research has included front and side-car impacts, military aviation ejection-seat accelerations, governmental safety regulations (the NHTSA star rating system), and airbag protection systems.

During my tenure as a ΤΒΠ Fellow, I have also begun preliminary research studies for my dissertation topic using MADYMO®, a dynamic system-modeling environment used frequently in the design and simulation of automobile safety devices. In familiarizing myself with this tool, I was able to successfully submit an abstract to the 2007 ASME Summer Bioengineering Conference, where I will present my research of thoracic side-impact airbags at the Ph.D. student session.

I am grateful to the financial contributors to the ΤΒΠ Fellowship Program who have made this award possible. Their generosity has bridged the financial gap between the completion of my undergraduate education and my support from my recently-awarded NSF graduate research fellowship.

Rachel S. Marullo, MA E '06
King Fellow No. 45

I am in the third quarter of my first year in the graduate chemical engineering program at the University of California, Santa Barbara. Core graduate-level chemical engineering classes were heavily emphasized the first quarter. In January while continuing to take classes, I joined Dr. Matt Tirrell's research group. Several members of our group work with amphiphilic biomolecules. I am performing experiments to determine the fundamental properties of some of these molecules and how they self-assemble in solution, and also learning how to characterize their size, shape, and structure. We also work on relating the fundamental properties of these molecules to their activity, and investigate their use in applications such as tumor targeting and stabilization of atherosclerotic plaques. I am aiming to earn a Ph.D. and would like to work in industry; however my career path may change after spending more time in an academic research environment.

Jennifer A. Pazour, SD A '06
Sigma Tau Fellow No. 33

After graduating from South Dakota School of Mines & Technology with a bachelor's degree in industrial engineering, I started a new endeavor at the University of Arkansas. I am currently a doctoral student in industrial engineering focusing on operations research. This university is an exciting place to continue my education as I am continually learning new concepts, challenging my mind, and making great friends.

I am conducting research with my advisor, Dr. Russell Meller, on magnetically levitated propelled vehicles, more commonly known as Maglev trains. We are working on modeling what a nationwide high-speed rail network would look like specifically for freight distribution. My other research interests are in logistics and network modeling. Ultimately with my aspirations to teach at the collegiate level, I would like to obtain my Ph.D. I look forward to all the challenges and rewards on this path. Thank you to ΤΒΠ for honoring me as a Fellow.

Michael S. McDonald, MI Γ '06
Stark Fellow No. 29

My goodness, the past year has been intense! My first year of graduate study has been a blur of coursework in applied physics and aerospace engineering, plus an introduction to research while working with my lab group at the University of Michigan's plasmadynamics and electric propulsion laboratory. I am excited and looking forward to the freedom to focus my efforts and dive into my research this summer without the demanding responsibilities of classwork.

My research focus is on anomalous cross-field transport in Hall thrusters. A Hall thruster is a space propulsion device that uses energetic electrons en route from a cathode to an anode to ionize neutral propellant atoms, which are then accelerated through crossed electric and magnetic fields. However, the mechanism of the electron transport across the magnetic-field lines in their path is still a mystery, even after 40 years of Hall thruster operation. Understanding the phenomena will permit more powerful thruster designs, opening up new space missions far beyond the capabilities of conventional chemical rockets.

I am also happy to report that I have received a National Science Foundation fellowship for the coming three years, which will see me through nearly to the end of my graduate career. Upon graduation I expect to pursue a career in the plasma sciences focusing on space propulsion, though whether in industry or academia is still unclear. I have been honored to be a ΤΒΠ Fellow this past year, and I deeply thank the Association for its support and recognition.

Jennifer A. Pazour

Michael S. McDonald

Marissa A. Miracolo

Marissa A. Miracolo, NY I '06
Williams Fellow No. 27

My first year as a graduate student at Carnegie Mellon University has been both a challenging and rewarding experience. During my first semester as a mechanical engineering Ph.D. student, I took a variety of courses that focused on thermal-fluids engineering. Outside the classroom, my interests in energy and environmental studies led me to join the center for atmospheric particles studies, a multi-disciplinary research group that focuses on understanding air quality and atmospheric chemistry. I am excited to pursue research on the complex behavior of particulate matter in the atmosphere and investigate how this behavior relates to climate change and human health.

In particular, I have recently begun research on understanding the effects of widespread adoption of biofuels on air quality. My research combines emissions measurements from engines operating on biofuels with regional air-quality modeling to help answer the question of how air quality will change with the use of alternative fuels. Understanding these changes will help society make informed choices to effectively develop air-pollution and global climate change policies. The ΤΒΠ Fellowship Program has provided me with the opportunity to continue my studies toward a doctoral degree while pursuing my research interests. I am extremely grateful for the honor of receiving a ΤΒΠ Fellowship. Thank you!

Jasmine R. Galjour, LA Δ '06
Deuchler Fellow No. 27

The research I have been conducting during the past academic year at the University of Texas at Austin is focused on a project titled "In-situ Remediation of Contaminated Sediments for Control of Contamination and Erosion through Active Capping." As the title states, we are focused on using capping as a method for sequestering contaminants found in sediments. This method is being employed with the idea that active capping (versus passive capping) will potentially stabilize/neutralize the contaminants instead of merely isolating them. We hope to be able to select a combination of capping materials that best stabilizes the inorganic and organic compounds of interest (metals, PAHs, PCBs) as well as providing resistance to erosion.

We are beginning by evaluating the effectiveness of materials such as apatite, organoclays, and biopolymer cross-link products on contaminant mobility and bioavailability. My tasks have included measuring partitioning coefficients and sorption/desorption kinetics of various capping amendments contaminated with PAHs. As these studies are completed, we will move toward column testing on the amendments.

At the conclusion of my master's degree, I plan to obtain a position with a civil engineering consulting firm, which will help me achieve my ultimate goal of obtaining my P.E. license.


Jasmine R. Galjour


Lisa J. Lindquist


David C. Gomez


Justin L.R. Langlois


Michelle L. Bash


Tondra De

Lisa J. Lindquist, OH I '06
Matthews Fellow No. 9

The past year has been both challenging and rewarding. As a first year graduate student at Georgia Tech, I have been focusing on core classwork and exploring future options in my field of structural engineering. At the end of the first year, I have completed all the required classes for a master's degree and have started a research project. My research is in conjunction with the Georgia Department of Transportation investigating a material and structural issue found in many highway bridges throughout the state. As a result of this research, a new specification for design and construction of anchor bolts in bridges will be submitted.

Looking back over the experiences of the year, I have found that my true interests lie in the field of construction materials, specifically in the areas of sustainability in new construction and in rehabilitation of existing structures. As the infrastructure in this country is continually degrading, the demand in these fields is increasing. Upon completion of my master's degree, I envision my career following a path to satisfy this demand for sustainable and more environmentally conscious structures.

David C. Gomez, LA Δ '05
Nagel Fellow No. 9

Because of unsuccessful results on the attempts to stabilize heavy foam for deep-water drilling, my research changed toward the study of a problem that is affecting well design. Casing wear is one of the issues drilling engineers have to face when subjecting casing sections to many rotating hours. The contact between the drilling pipe and the casing results in wearing away of the casing, which results in a change in the properties of the casing (especially burst and collapse strength). Thus, if casing wear is not considered, then the design may not satisfy maximum-load concepts, which are the base for casing selection.

Casing wear becomes a great problem on well trajectories like build-and-hold and build-hold-and drop (or "S" shape), and this is where my research focuses. Drilling engineers find it difficult to determine which wells have potential to have casing-wear problems. By gathering data on wells that have had these problems and studying the drilling history of these wells, I have been able to find which wells have some risk of having casing-wear problems. In addition, I have recommended drilling practices that will help minimizing casing wear using the technology available. This will help drilling engineers because adjustments can be made to the well design and drilling operations if casing wear is expected.

In changing direction on my research topic, I had to change my schedule. I will finish my research in July. In September, I will start my job as a drilling engineer with Chevron Corporation in the Gulf of Mexico business unit located in Lafayette, LA, which I obtained by successfully finishing an internship program last summer. In my first three years I will work on a 14/14 schedule as a drill-site manager in jack-up rigs in the Gulf, where I will be able to learn drilling operations. Then I will begin working in an office designing wells. I will also pursue an M.B.A. so that I can start leaning my career towards the managerial side. Then, I will be ready to go on an overseas assignment and start applying all my skills.

Justin L.R. Langlois, MD Γ '06
Astronaut Fellow No. 6

During my year at Michigan I have been pursuing an M.S.E. in aerospace engineering. My focus has been on dynamics and control, which consisted of classes in astrodynamics, electric propulsion, linear control, and feedback control. I also have been working with the space-systems program on developing a spacecraft design for a low-Earth orbit LIDAR mission with the primary objective of measuring tropospheric winds in the Gulf of Mexico to increase hurricane-forecasting accuracy. My individual research projects include the study a Stirling space nuclear-power system and the further definition of how a satellite's groundtrack geometries change with alterations in the satellites orbital parameters. In my spare time I have been volunteering at the local Veterans Affairs hospital. I will be finished with my program at the end of June and will be moving to Coronado, CA, for my next assignment with the U.S. Navy.

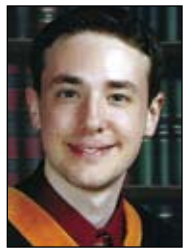
Michelle L. Bash, OH I '06
Anderson Fellow No. 2

Michelle received her B.S.E.E. from Ohio Northern University, and she is currently working on her master's degree in electrical engineering at Purdue University. Her main area of interest is energy sources and systems, and she is excited to be conducting research related to this area. The goal of her research project is to make residential compressors more efficient without significantly increasing cost. A major part of this effort lies in redesigning and optimizing the electric motor-drive system. Michelle is also working on a smaller project which involves reducing the noise produced by a switched reluctance machine acting as a generator. In addition to coursework and research, she was recently inducted into Eta Kappa Nu, and she enjoys participating in the many activities offered. After completing her graduate studies, she will pursue a career in industry where she can apply her newfound knowledge of electric machines and power-electronic systems.


Amit Y. Desai


Ryan G. Dobie


Hoda M. Eydgahi


David L. Henann


Rachel L. Husfeld


Krenar Komoni

Tondra De, NV B '05
Tau Beta Pi Fellow No. 734

This June marks the end of my first year of doctoral study in science education at the University of California, Los Angeles. Having taken a year off to work after earning my bachelor's degree, I really enjoyed being back in the academic environment. I kept myself busy throughout the terms and accomplished all of the goals I had set at the beginning of the school year.

Because this was the first year of my program, my main focus was to complete as much of the required educational research methodology coursework as possible. I chose an emphasis on advanced quantitative methods and took several classes on statistical analysis. Some of my graduate coursework, however, was considerably different from what I encountered as an undergraduate electrical engineering and math student. In several classes, I found myself spending a considerable amount of time reading texts and journal articles, writing papers, and preparing class presentations. Within the structure of all my coursework, though, I have had the opportunity to explore my long-term research interests concerning women in science and engineering. I also participated in a number of activities outside the classroom. For instance, as a member of my advisor's research group, I am working on a project related to mathematics teaching and learning at the elementary-school level.

Overall, this year has been a wonderful experience. Having successfully completed my first year of graduate study, I know that I made the right choice in deciding to pursue my Ph.D. in science education. I am very thankful for the honor of having been designated as a ΤΒΠ Fellow. My affiliation with ΤΒΠ will have a positive impact on me throughout the rest of my career.

Amit Y. Desai, NC A '06
Tau Beta Pi Fellow No. 735

Amit spent his 2006-07 academic year pursuing an M.Phil. degree in physics at Trinity College, University of Cambridge. His research focused on fabricating and characterizing thin-film coatings for use on orthopedic implants. These coatings are made of hydroxyapatite, an inorganic materials similar to bone mineral. Characterization included a study of film thickness and composition. Various heat treatments allowed the crystallinity of the films to be examined by X-ray diffraction. The rate at which elements from within the film dissolve was also studied. Additional work will be carried out to observe the response of osteoblast (bone-forming) cells in the presence of these coatings. Amit's work won first prize in the "Presenting Science to the Public" poster competition during the Cambridge Science Festival.

During the past year, Amit volunteered in the area by teaching math at a primary school. He also demonstrated science experiments to teach students about light and materials properties. He was elected by graduate students in his college to serve as their first-year representative on the college graduate committee. He also served as vice president of sponsorship for a student society that organizes a local annual venture-capital conference. He will return to the U.S. in the fall to begin his Ph.D. in materials science and engineering at Stanford University. He intends to pursue a career of teaching and research.

Ryan G. Dobie, MD Γ '06
Tau Beta Pi Fellow No. 736

When I arrived in Philadelphia last fall to attend the University of Pennsylvania, I was a little unsure of what to expect. After moving from the U.S. Naval Academy to a civilian college, I was shocked when I didn't have to be in class until nine o'clock on some days and when I didn't have class at all on other days. Despite this change, I have remained busy. I have volunteered with a youth ministry team at a Catholic church in South Philly where I helped plan and organize events for a youth group that meets each week. I am taking a Japanese class in preparation for my trip to Japan in September to serve onboard a naval destroyer as a division officer. I played on a tennis team that competed weekly, and I practiced several times a week as well. And last but not least, I am working on my master's in systems engineering. I am set to finish my degree by the end of the summer. Although some of the classes have been very difficult, I have enjoyed my time here. I have enjoyed living downtown. I have enjoyed meeting new people and taking new classes, but I am also ready to get back to my service after this year. The experience has been one that I will not forget, and I know that I will be in contact with people that I have met here for years to come.

Hoda M. Eydgahi, VA E '06
Tau Beta Pi Fellow No. 737

It has been noted that increases in heart rate and skin conductance occur when abstinent cocaine users experience a craving. As a first-year electrical engineering graduate student at the Massachusetts Institute of Technology, I have focused on developing iCalm™. This device is a novel wireless wristwatch aimed toward the treatment of cocaine addiction that could essentially change the future of behavioral-science research. The device will integrate sensor technology, wireless communication, and computational methods to provide the addict with real-time measurement of drug craving and immediate intervention at the moment of risk. It will do so by using a heart-rate monitor, skin conductance monitor, accelerometer, and global-positioning-system to evaluate dynamic behavioral, environmental, and physiological processes in a natural environment. When a craving is detected, intervention will be delivered in the form of personalized relapse-prevention messages. Other initial applications of the wireless sensor platform developed for iCalm™ include: (1) mood-triggered music selection in iPods; and (2) personal monitors for understanding the influence of autonomic arousal in autism. The device can be further integrated into fitness products or in health monitoring of outpatients or the elderly.

As for my future career plans, I may develop a start-up company based around iCalm™ or enter academia. I have also considered attending medical school, but am still quite unclear as to what I imagine myself doing in 10, even five years. I hope that the next few years here will help me focus on a particular career path.

Matthew R.Y. Loh

Jessy J. Mouannes

S.F. Moussavia-Harami

G.M. Oxberry, E.I.

Himani Suhag

David L. Henann, NY T '06
Tau Beta Pi Fellow No. 738

My first year of graduate study has been one of intense research and discovery in an exciting and vibrant environment. At MIT, I have begun researching the manufacture of microstructures from bulk metallic glasses. Metallic glasses are amorphous metals that fail to reach their equilibrium crystalline microstructure during solidification. The current generation of bulk metallic glasses is believed to have many potential applications resulting from their unique properties, such as superior tensile strength and high yield strain. Their intrinsic homogeneity to the nanoscale because of the absence of grain boundaries, coupled with their unique mechanical properties make them ideal materials for fabricating micro/nanometer scale components or high-aspect-ratio micro/nano-patterned surfaces for a variety of applications, such as data-storage technologies, optical and medical devices, and micro-electromechanical systems.

During my Fellowship year, I have begun to investigate the mechanical behavior of this emerging class of materials in the temperature range relevant to manufacture of nanoscale devices through systematic experimentation. Additionally, I have begun building and implementing a continuum based model for predicting the large deformation mechanical behavior of these materials.

My plans are to continue this line of research, working towards completing my Ph.D., followed by a career in academia as a professor or researcher with a focus in solid mechanics and materials. I extend my sincere thanks to ΤΒΠ for its support and recognition.

Rachel L. Husfeld, IN Δ '06
Tau Beta Pi Fellow No. 739

In her first year as a graduate student in structural engineering at Texas A&M University, Rachel began by performing a comprehensive literature review on confined masonry construction, finite-element modeling, and passive isolation techniques for seismic applications. Her first goal of the research is to use finite-element modeling to evaluate the performance of a typical Chilean low-cost housing structure subjected to earthquakes of various magnitudes and intensities. The second goal is to determine the impact of various passive isolation devices and techniques on the seismic performance of the structure.

Rachel traveled to Santiago, Chile, in December 2006 to meet with an engineer from the Chilean ministry of housing. They discussed the design of low-cost housing units and visited a neighborhood of low-cost houses under construction.

Throughout the 2006-07 academic year, she has gained experience using fuzzy logic in Matlab, which she uses in modeling the isolation devices, and using ABAQUS and Patran for finite-element modeling. This summer, she will return to Santiago to perform testing on confined masonry walls. The test data gathered will be used to calibrate her finite-element model. The conclusions of he research will be shared with the ministry of housing through direct communication and with the international community through articles and scholarly presentations. She works under the direction of Professor Paul Roschke. She plans to work in industry as a structural engineer after earning a master of science degree in structural engineering.

Krenar Komoni, VT B '06
Tau Beta Pi Fellow No. 740

I was very happy to hear that ΤΒΠ still cares about the Fellows who received the award last year. I am grateful and fortunate. Even though I was not eligible for a stipend, I felt the responsibility and duty that I have as a Fellow to do well in academics and at the same time put effort in developing my character.

For the two semesters I focused on completing the required classes, doing my job as a teaching assistant, and honing in on the idea for my master's thesis. I have completed five credits during the last two semesters, and I have assisted my professors on two other classes. Credits completed are communication systems, introduction to VLSI circuits, microwave engineering, analog and mixed/signal IC design, and advanced controls theory. I assisted in introduction to electrical circuits and introduction to electronics.

I plan to graduate in May 2008. For the upcoming academic year I will focus on my research in the area of analog and mixed-signal IC design. My thesis is concentrated on CMOS camera-on-chip that is used in many devices today. Dr. Sameer Sonkusale, my advisor, is a tremendous teacher and a caring mentor.

This summer I will work as an intern at BitWave Semiconductor, Inc., a start-up company that is developing a chip for the next generation of cellphones. I will also take a course on advanced analog IC design with my advisor. After completing my thesis, I plan to work in the industry for a few years and eventually start and grow my own business in the area of electrical engineering.

Matthew R.Y. Loh, PA E '04
Tau Beta Pi Fellow No. 741

The beginning of my graduate school endeavours at Columbia University was fraught with uncertainty: it was not clear whether I would be released from military service in Singapore in time to start last fall. As a result, I deferred entry until the Spring of 2007 and arrived in January.

My experience has exceeded my expectations—in the diversity of the experience inside and outside the classroom, the challenge of adjusting to New York City, the difficulty of the classes, and the amount that I have learned. The city itself was the first, abrupt and overwhelming impression that struck me—the level of diversity, ethnically, culturally, and professionally, is still astounding to me. The city is saturated with high-achieving, superbly competent people, in all manner of fields, from finance to music, and, of course, engineering. I am privileged to interact with such a challenging and inspiring community. Being in the first year of my M.S./Ph.D, I have been occupied mainly with taking courses. I have also assisted a research project by doing integrated-circuit layout and worked as a teaching assistant, both of which have been valuable learning experiences.

I look forward to starting research into clock-and-data recovery techniques for high-speed interconnects this summer, under the advisement of Prof. Azita Emami of the integrated systems lab. I am grateful for the privilege and honour of being recognized as a ΤΒΠ Fellow, and trust that I will continue to be a proponent and example of its ideals.

Jessy J. Mouannes, IL Z '06
Tau Beta Pi Fellow No. 742

As a TBΠ Fellow for 2006-07, I have started my graduate studies toward a Ph.D. degree in biomedical engineering at Northwestern University (Chicago, IL) with concentration in magnetic resonance imaging. Besides taking classes, I have begun investigating the application of phase-contrast MRI techniques for the measurement of fluid dynamics in cerebral arteries containing aneurysms, for the purpose of obtaining an accurate prognosis for every intracranial aneurysm patient. Although very challenging and demanding at both the engineering and computational levels, the success of this project is expected to have a tremendous impact on the diagnosis and treatment of intracranial aneurysms, because current MRI techniques provide limited information in this respect.

I am looking forward to acquiring, with the assistance of the best MR professors, all the knowledge and experience necessary for an MR physicist/engineer, in order to be capable of designing optimal imaging sequences from which most patients will benefit.

I am motivated and proud of being named a TBΠ Fellow, and I promise to invest all my efforts toward the realization of my educational and professional goals.

S. Farshid Moussavi-Harami, IA B '06
Tau Beta Pi Fellow No. 743

During the past eight months since receiving a TBΠ Fellowship, I have been continuing my research at the orthopaedic biomechanics laboratory, department of orthopaedics and rehabilitation, University of Iowa, under the guidance of Drs. Brown and Pedersen. The goal of my research is to develop an image-processing program to score cartilage histology sections objectively based on a widely used histology scale. Preliminary results comparing the computer program's performance against trained human observers were satisfactory. These results were presented at the 53rd annual meeting of the Orthopaedics Research Society, and further details regarding this algorithm were reported at the 15th Annual Symposium on Computational Methods in Orthopaedic Biomechanics.

In addition to my work, I have been involved in planning for the 2007 college of engineering Scholz Symposium—an annual event organized by the TBΠ Iowa Beta Chapter in memory of former Advisor Paul D. Scholz, *Washington Alpha '60*. This year's symposium on April 19 was titled "Frontiers and Horizons: The Future of Biotechnology and Engineering."

I am completing my requirements for graduation, including my thesis, and hope to receive my master's degree in biomedical engineering this summer. I thank TBΠ for its financial support.

Geoffrey M. Oxberry, E.I., DE A '06
Tau Beta Pi Fellow No. 744

Before starting my graduate program, I was intent on researching how to make sense of the complexity in biology through model reduction. In particular, I wanted to study how to use model-reduction techniques to create meaningful simulations of large-scale gene regulatory networks or large-scale biological reaction networks. However, I had great difficulty finding a professor within my department whose research aims were similar to my own. Fortuitously, I was referred to the one who became my primary advisor, Dr. Bill Green, who uses model-reduction techniques to create meaningful simulations of large-scale reaction networks in combustion.

The methods behind my project turned out to be exactly what I was looking for, and, in many ways, the problem in combustion is much more tractable than the problem in biology, because combustion chemistry has been so well-studied and measurements in combustion systems are easier to perform. As a result, I'm pleased with the direction in which my research is going and am enjoying the chance to learn from my co-advisor, Dr. Paul Barton, about mathematical techniques that can be used to make sense of large systems.

After completing my doctoral research, I hope to continue doing simulation work at one of the national laboratories. This year, I have been fortunate to receive a computational science graduate fellowship from the Department of Energy, which I believe will prove invaluable in pursuing this goal, and I look forward to an internship at a national lab in the summer of 2008.

Himani Suhag, NY Γ '06
Tau Beta Pi Fellow No. 745

Since being proclaimed a TBΠ Fellow for 2006-07, Himani has graduated from Rensselaer Polytechnic Institute with a bachelor of science. She was awarded a dual-degree in electrical, computer and systems engineering. During the summer following commencement, she completed her second internship within the microelectronics division of IBM. As a development engineer, she worked in the development of ASIC arrays, specifically creating and debugging Verilog test benches, researching and presenting on industry-wide SRAM leakage-control practices, and assisting with creation/modification of couple RC-line models.

In the fall of 2007, she will commence her graduate studies in a direct Ph.D. program at the college of nanoscale science and engineering of the University at Albany—the first college in the world dedicated to the research and development of concepts in all areas of nanotechnology, including nanoscience, nanobioscience, nanoeconomics, and nanoengineering. The first year of the program was course-intensive, preparing her to build a solid foundation for her approaching qualifying examinations. After narrowing down her research interest to silicon photonics, she took part in preliminary research to understand the background of this area while learning the protocols for different sample preparation and examination processes. Her goals for the summer include participating in an internship program, focusing on her research, and preparing for the nearing qualifying exams.