



Alpha Eta Mu Beta

NATIONAL BIOMEDICAL ENGINEERING HONOR SOCIETY

Fall 2014
Vol. 12 No.2

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Rachel Hanks
Rupak Dua

National News Letters

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Alpha Eta Mu Beta

1304 W. Springfield Avenue,
M/C 278
Urbana, IL 61801

Please visit us on the web at
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MESSAGE FROM THE NATIONAL PRESIDENT

As I approach the end of my tenure as the National President I look back at the changes in the Society in these 4 years. We adopted a new constitution and are on the verge of finally establishing our new Board of Directors and a new National Treasurer position to compliment the National Vice President position that was added two years ago. The Society has grown in the number of new chapters and in the exposure and stature of the Society. We became a member of the Association of College Honor Societies and have had great success with attendance and exposure at the Biomedical Engineering Society meetings each year. I want to thank all of the officers, board members, individual chapters, and faculty advisors that have spent so much time and energy in continuing to build the Society. We are becoming more and more recognized each year. I want to especially thank Dominic Nathan, PhD, Past National Student President and Current National Vice President for his tireless efforts in planning the AEMB National meetings and putting together this newsletter. I can honestly say that if not for him, we would not have been able to accomplish what we have over the past four years and I would not be able to appear as though I have done a good job. I also want to especially thank Rupak Dua, PhD, current National Student President and past president of the Florida International University Chapter and Marcia Pool, PhD, current Executive Director for their terrific efforts. While there are several projects that are still ongoing I am sure the next administration will be able to bring them completion. We have a terrific program planned for the upcoming National Convention at BMES in San Antonio that you will learn more about in this newsletter and on our website. I look forward to seeing everyone at the conference in October.

Anthony McGoron, PhD

National President
Fall 2014

ADVISOR FOCUS

Name : Arthur B. Ritter
Distinguished Service
Position : Professor and Director of
Biomedical Engineering Program
Stevens Institute of
Technology
Education : **BS** Chemical Engineering, City University of
New York
PhD Chemical Engineering, University of
Rochester



A Distinguished Service Professor of Biomedical Engineering, Dr. Arthur Ritter contributes a very rich and diverse background in pioneering engineering at The US Navy Propellant Plant, United Aircraft, The Dupont Co. and the Mixing Equipment Co.

His passion for the field of biomedical engineering saw Dr. Ritter pursue research in the areas of microcirculatory and cardio-respiratory physiology, in addition to collaborative research in pulmonary transport and metabolism *in-vivo*. Dr. Ritter has extensive experience in research and teaching in the area of cardiovascular and respiratory physiology and physical chemistry. His biomedical engineering research at The Departments of Medicine and Physiology at The New Jersey Medical School has been funded by NSF, NIH, AHA, and New Jersey Commission on Science and Technology.

Dr. Ritter is the founding director of the biomedical engineering program (ABET accredited in 2009) at Stevens Institute of Technology. It was during this time that Dr. Ritter, together with a group of dedicated students established the Alpha Eta Mu Beta chapter at Stevens. Dr. Ritter has served as a tremendous role model for new students in the biomedical engineering field and also to new AEMB inductees. He has been instrumental in ensuring that the chapter is active and is well represented at the national conventions.

Dr. Ritter has mentored 14 PhD and over 45 Masters students in Biomedical Engineering. He is the co-author of over 40 publications in peer reviewed journals and numerous abstracts and presentations. He is the primary author of a recent undergraduate textbook in Biomedical Engineering (*Biomedical Engineering Principles*, 2nd Ed., 2011). In 2010, he was elected to the College of Fellows of the American Institute for Medical and Biological Engineering.

Dr. Ritter's current research interests are in mathematical modeling of physiological systems, can a bipedal robot climb stairs?, gait analysis (3-D motion capture), brain-computer interface, cardio-respiratory dynamics, scale-up in physiological systems and haptics in robotic surgery.

UNDERGRAD STUDENT FOCUS

Name : Lisa N. Miller
BS Biomedical Engineering
Education : (anticipated graduation
May 2015)
School : Ohio State University



Lisa Miller is currently a senior in biomedical engineering at The Ohio State University in Columbus, Ohio. As a student at OSU, Lisa has maintained an excellent track record in both academics and co-curricular activities. Lisa has been a Maximus scholarship recipient since 2011. This is a highly competitive, merit based scholarship. In addition, she has also been on the College of Engineering Dean's list since 2011 and is a recipient of the Kettering Biomedical Engineering Scholarship since 2013.

Apart from academics, Lisa has been an active member of the Alpha Eta Mu Beta chapter at OSU since 2013. Since her junior year, Lisa has served as the secretary of OSU's BMES chapter and Engineering Council (E-Council) Representative, where she worked on organizing volunteer opportunities for AEMB members and worked on securing funding from E-Council for these activities. At present, Lisa is the president of the OSU AEMB chapter, and she has worked hard to grow the chapter through various initiatives such as regular meetings, chapter activities, and programs. One of the corner stone's of Lisa's office is having established a contract with The Princeton Review to provide chapter members with free graduate school and medical school preparation materials and study tools.

During her time at OSU, Lisa has also been actively involved in research through various roles from volunteer to research assistant and research intern in various labs ranging from bioinformatics to nanotechnology. She has also served as a teaching assistant for the anatomy and physiology course.

Lisa's long-term goals are to attend graduate school to pursue a doctorate in neuroscience. Her specific interests are the applications of adult neurogenesis to treat neurodegenerative diseases and mood disorders. Ultimately, Lisa hopes to focus her career on biomedical research.

GRADUATE STUDENT FOCUS

Name : Emily Growney Kalaf
BE Biomedical Engineering,
Catholic University of America

Education : MS Biomedical Engineering,
St. Louis University
PhD (in progress) St. Louis
University



Emily received her BE in Biomedical Engineering from the Catholic University of America. Following her passion for the field, Emily moved to St. Louis to pursue a Masters degree in biomedical engineering, which she successfully completed in 2013 under the mentorship of Dr. Gary Bledsoe. At present, Emily is pursuing her doctorate degree under the guidance of Drs. Scott Sell and Gary Bledsoe. Emily's research is focused on studying intervertebral disc degeneration and specifically the regeneration of a degenerated disc with an injectable tissue-engineered construct.

Emily is the department research technician, a position which entails not only maintaining the faculty lab equipment, but also running the atomic force microscope and the scanning electron microscope. In addition, Emily also actively teaches two laboratory courses to undergraduate students.

With the help of Dr. Scott Sell, Emily's Principal Investigator and doctoral mentor, she co-founded the Saint Louis University chapter of AEMB, a process which started in early 2013 and ended in an officially awarded charter in the fall of 2013. Emily remains the elected chapter president to this day. She actively works with her fellow officers to make the St. Louis University's AEMB chapter strong and vibrant group on campus and in the local community through multiple mentoring and volunteering activities.

In addition to AEMB, Emily is also an active member of BMES, Alpha Epsilon Lambda, and the Society of Women Engineers. Furthermore, Emily has received several awards such as Parks College Graduate Fellowship for the 2014 - 2015 academic year and a certificate of Achievement in Research Excellence for her paper presented at the Graduate Research Symposium in April 2014.

ALUMNI FOCUS

Name : Christopher Flounders
BS Biomedical Engineering

Education : (concentration in neuroengineering)
Drexel University

Employer : High Point Solutions



Fun, charismatic and energetic, are three words that best describe Christopher Flounders. Christopher joined AEMB in 2012 and subsequently held the positions of secretary and IT manager in 2013. As secretary, he designed the Drexel chapter's website and created/maintained the chapter's Twitter and Facebook pages. In 2014, Christopher was elected as president and under his leadership the chapter doubled its size and grew into a well recognized organization on campus and in the local community. Together with his fellow officers, the AEMB chapter at Drexel University led several other student organizations to host the first ever Biomedical Engineering Week with themes of startup companies and translational research which was attended by over 300 people.

Apart from his strong leadership qualities, Christopher successfully completed his BS in biomedical engineering with a concentration in neuroengineering. His passion for the field saw him perform two co-ops; the first was in the capacity of research scientist at Lankenau Institute of Medical Research where he studied the effects of zinc on gastrointestinal epithelial permeability with his work culminating in a publication in the Journal of Clinical Nutrition. His second co-op was at Depuy Synthes in the role of R&D scientist where he explored novel indications for bacterial nanocellulose and assisted in process validations.

At present, Christopher is working at Highpoint Solutions as a junior consultant. As a highly motivated individual who is also a visionary, never afraid to dream, and to dream big, Christopher has plans to go to medical school and begin his own life science company within 3 - 4 years. His diverse personal interests range from music (especially Bob Dylan) to poetry, art, real estate investment, biology, chemistry, and entrepreneurship.

Dos and Don'ts for the Academic Job Search: Letters of Recommendation

It's the most arduous time of the year--academic job market season. If you're a grad student actively seeking academic employment now, you will need to secure those ever-important letters of recommendation in the next few weeks. For some folks, this is a terrifying prospect. It often feels like an imposition, a distraction or a drag on the time of a very busy, very important person. It's important to remember that while it is by no means easy, writing letters of recommendation is a routine task for professors and advisors, and most consider it part of their jobs. Here are some tips to make the process less scary and stressful.

THE Dos

DO ask ahead of time (way ahead of time). Letters of recommendation are difficult to write; they are a genre unto themselves and they require lots of effort and time. Giving your recommender plenty of notice will ensure that they can give your request his or her full attention, and will keep you on his or her good side.

DO offer the recommender a sense of why you're asking them, or what you'd like them to address in their letter. So, why do you want this recommender to write for you? If he or she is your dissertation chair or a member of your committee, you're most likely going to ask them to speak to your ability to do research, but don't assume that they'll know that. Same goes for someone who's observed your teaching, or has supervised you in some other capacity. Politely state your reason for asking: "I wanted to ask if you would be willing to write a letter speaking directly to my abilities as researcher/teacher/graduate assistant. I believe that due to your past position as my research/teaching mentor you have a unique and valuable insight into how I research/teach."

DO supply supplemental materials with the request. No matter who you ask or how recently/closely you've worked with them, make sure your request comes with your CV at least, and perhaps a copy of your job letter. You might also ask your recommender if they'd like to see your dissertation abstract or a statement of research purpose, or even a copy of the job ad you're planning to respond to. All of this will help your recommender write a stronger, more detailed letter.

DO get an Interfolio account. Interfolio is dossier service specifically tailored to the needs of academics, who often must apply for hundreds of jobs, each requiring confidential letters of recommendation. Your recommenders can electronically submit your letters to Interfolio, and when you apply for jobs, you can choose which letters go out to which institutions. This service isn't free, but it's quickly becoming the standard dossier service for academics.

DO keep a good record of who you've asked, and do follow up. It's not unheard of for your list of potential recommenders can get into the double-digits--I myself have asked for seven letters for this year's academic job search. Spare yourself the embarrassment of sending duplicate emails and keep a log of who you've asked and when, and schedule follow-ups on your calendar. When following up, politely ask your recommenders if they need any additional information.

DO express your gratitude in some way. It's not necessary to give gifts to your recommenders, but at least send each recommender a handwritten card or note expressing your thanks for their time and consideration.

THE DON'Ts

DON'T ask hurriedly, or in passing. Don't IM the request, don't text it, don't tweet it, don't Facebook it. Always write a formal, polite email informing the potential recommender that you are about to go on the academic job market and that you value their opinion about your scholarship and teaching.

DON'T ask those who don't know you well enough. Professor Big Shot's name might look awesome in your dossier, but if you've never worked with, or even taken a class with, Professor Big Shot, you're not likely to get a decent letter of recommendation from him or her. Letters of recommendation generally come from those who know you very well--your dissertation committee, your teaching mentors, your supervisors in your graduate assistantships. These are the folks that will write you the most useful letters.

DON'T ask a person who'd be forced to write something less-than-flattering. Maybe you didn't do so well in a particular class, or goofed up a panel presentation you were on, or butted heads in an assistantship position. At any rate, your performance for a particular professor was just not up to par. It might not be a good idea to ask that professor to recommend you, no matter what their relationship to you as a scholar is.

DON'T demand, and don't push if the person balks at your request. If a recommender declines your request, he or she more than likely has a good reason for it. Just respond with a polite note saying that you understand and that you appreciate their consideration. That's all.

Remember that your recommenders were once grad students themselves and went through the same process you're going through. Don't be scared; let your recommenders do their jobs of praising your awesomeness.

This is an original article written by Dr. Julie Platt (20 September, 2012), for Inside Higher Ed. Read more: <https://www.insidehighered.com/blogs/gradhacker/dos-and-donts-academic-job-search-letters-recommendation> Inside Higher Ed. Article is copyrighted to Higher Ed. All rights reserved, used with permission.

CHAPTER FOCUS



Alpha Eta Mu Beta at Drexel University

A dedicated group of students led by Poonam Sharma laid the ground work for establishing the Drexel University AEMB chapter, and in 2011 a charter was granted at the national convention in Hartford, Connecticut. Since then, the Drexel Chapter has continued to grow and flourish, and has established itself as a leader on the Drexel campus and in the local community.

The success of the Drexel chapter lies in the leadership of the chapter, especially chapter president Christopher Flounders and the strong bond between students, their faculty advisor, and department chair. All these individuals share a common goal of cultivating an environment in which students can learn and grow personally and professionally through a number of rich and diverse activities that span the areas of community service, development, networking, and social events. Events such as the Cultural Dinner created an opportunity for Drexel students to gain an international experience and included speakers from four different departments. In addition, this event provided attendees with a platform for discussions to foster a deeper understanding of biomedical engineering, engineering challenges, and evolution within the field from a global perspective.

The Drexel chapter has also strived to encourage its members to give back to the community, to Drexel and to the Biomedical Engineering Department. They have been actively involved with several volunteering events at the People's Emergency Center, Uhuru Furniture, and the Gift of Life Donor Program.

One of the biggest projects the Drexel AEMB chapter led and established was the Inaugural Biomedical Engineering Week at Drexel University. The Drexel AEMB chapter led other student organizations and successfully planned several events including: (1) guest lectures on companies and translational research, (2) a public health and startup-specific Career Expo during which startup companies discussed their ideas with Drexel students, (3) research and design showcase, (4) biomedical engineering faculty Jeopardy, and (5) alumni networking happy hour. For the event, the Drexel AEMB chapter successfully raised over \$2,000, and the event was very well attended.



ABOVE: Research and Design Showcase with students presenting their posters.



ABOVE: Startup Career Expo where vendors are showing and explaining their inventions. This event was very well attended with over 300 visitors.

BELOW: Biomedical Engineering Faculty Jeopardy that was very well attended by students and faculty.



A closer look at the heart

Normal cardiac function depends on the ability of the heart to respond to complex environmental stimuli (e.g. biomechanical/chemical stress, changes in pH, temperature, etc.). At the cellular level, evolved pathways facilitate the transduction of an extracellular stimulus into electrical and/or chemical signals and subsequent regulation of a wide range of processes including proliferation and growth, apoptosis, electrical impulse generation and transmission, and contraction. Central to this process are local signaling domains that exert tight spatial and temporal control over the post-translational modification (e.g. phosphorylation, oxidation, glycosylation) of target proteins. Despite recent discoveries of the link between disorganization of local signaling domains and human cardiovascular disease, very little is known regarding the mechanisms underlying the biogenesis or regulation of these critical membrane compartments. Understanding the cellular pathways responsible for regulation of ion channels and transporters at specific subcellular domains, therefore, represents an emerging area with great potential for generating new insight into human cardiac electrical disturbances (arrhythmia) and sudden death as well as other human excitable cell diseases (e.g. diabetes, epilepsy).

Research in the Hund lab addresses the molecular pathways that coordinate local signaling domains for regulation of cell excitability and heart function. Studies in the lab span computational biology and mathematical modeling to molecular and cell biology to small animal physiology to identify novel pathways for regulation of cell excitability. Through this integrative approach, we have identified a critical role for the cytoskeletal protein β_{IV} -spectrin in organizing a macromolecular complex for regulation of cardiomyocyte cell membrane excitability by the multifunctional serine/threonine kinase Ca^{2+} /calmodulin-dependent protein kinase II. Furthermore, we have demonstrated that defects in this spectrin-based signaling complex promote arrhythmias and dysfunction in the setting of both congenital and acquired cardiovascular disease. In parallel, we have developed new mathematical models of the Ca^{2+} /calmodulin-dependent protein kinase II signaling pathway, which we have incorporated into detailed models of cardiomyocyte electrical activity to generate new insight into the link between aberrant signaling and arrhythmias in the intact cell and tissue. We have applied a similar modeling approach to understand the pathways responsible for regulation of cardiac pacemaking. Ongoing studies in the lab address the link between defects in members of the spectrin-based signaling complex and human cardiovascular disease with the overall goal of identifying new therapeutic targets.

This article was contributed by Dr. Thomas J. Hund, PhD who is an Assistant Professor in the Department of Biomedical Engineering and the Department of Internal Medicine at the Davis Heart and Lung Research Institute at the Ohio State University.

AWARDS

Do you know of an Alpha Eta Mu Beta event that caught your attention or made an impact on your campus? Is there a committee member who has truly impressed you by their involvement in your chapter? It is time to complete the Alpha Eta Mu Beta awards. The following are the awards and their details:

MOST IMPROVED CHAPTER

This award is given to the chapter that has shown the most improvement in terms of membership, activities, funds, and involvement on campus. An official report of the past and present is needed from the officers regarding the above mentioned activities, current status of the chapter, and future plans. This report must also be signed by the chapter advisor.

MOST ACTIVE CHAPTER

This award is given to the chapter that has shown remarkable involvement in the department, on campus, and within the community. An official report of all activities to be considered for this award is required from the officers, and this report must also be signed by the chapter advisor.

OUTSTANDING CHAPTER OFFICER

This award recognizes a chapter officer who has given his/her utmost dedication and support toward advancing the goals and status of the chapter while maintaining strong leadership, academics, and character. A formal letter for nomination shall be written by the chapter advisor highlighting the above mentioned traits and contributions of the respective chapter officer.

OUTSTANDING CHAPTER ADVISOR

This award recognizes a chapter advisor who has strived to be a strong mentor, given his/her utmost dedication, and support while advancing the goals and status of the chapter and being instrumental growing and developing the chapter and its members. A formal letter for nomination should be written by the chapter president highlighting the above mentioned requirements and subsequently signed by all the chapter officers.

OUTSTANDING CHAPTER MEMBER

This award recognizes an AEMB chapter member who has had good involvement in chapter activities and events and has served as a positive role model within the chapter and the department. A formal letter for nomination shall be written by the chapter president that highlights the above mentioned traits, and the letter is subsequently signed by the chapter advisor.

OUTSTANDING CHAPTER ACTIVITY

This award recognizes an AEMB chapter that has presented a creative activity that maximizes the development and growth of its members. A formal letter for nomination shall be written by the chapter officers reporting on the activity, its objectives, outcomes, and participation, and subsequently signed by the chapter advisor.

BEST WEBSITE

This award recognizes an AEMB chapter that has the most informative and updated website that balances utility and appearance. A formal letter for nomination shall be written by the chapter president highlighting the above mentioned traits. The letter should be signed by all officers and the chapter advisor.

BEST COMMUNITY SERVICE EVENT

This award recognizes an AEMB chapter that has been actively involved in their department, school, or community through a significant event that brings about positive change and contribution to their community. A formal letter for nomination shall be written by the chapter president reporting on the activity, its objectives, outcomes, and participation. The letter is to be signed by all the officers and the chapter advisor.

PLEASE DO NOT DELAY !

Please send in all documents no later than **the 3rd of October 2014** to the National staff via email at aemb@alphaetamubeta.org. If you have any questions or concerns, please do not hesitate to contact the national staff at aemb@alphaetamubeta.org. Awards and new charters will be presented at the National AEMB Reception in conjunction with the BMES conference (October 23rd) at the Republic of Texas Restaurant in San Antonio, TX.

Just for Fun

SCIENTIST CIPHER Each letter in the cryptogram stands for another, spelling out a quotation by a famous scientist. TODAY'S CLUE: U equals R

“TMB^RU DKOM^RUT JW
 ZUR^RCT, GBD JD'W HMD
 ZUR^RCT OHMBYK DM GO
 DUBO.”
 -HJOLW GMK^RU

BME PROBLEM SOLVING

On her flight to a research symposium, a BME grad student finds herself stranded on an island covered in forest. One day, when the wind is blowing from the west, lightning strikes the west end of the island and sets fire to the forest. The fire is violent, burning everything in its path, and without intervention, the fire will burn the entire island. The island is surrounded by cliffs so the BME student cannot jump off. How can she survive the fire? (There are no buckets or any other means to put out the fire.)

BME Problem Solving: She picks up a piece of wood and lights it from the fire on the west end of the island. Then she quickly carries it near the east end of the island and starts a new fire. The wind will cause that fire to burn out the eastern end and she can then shelter in the burnt area.

SOLUTIONS
Scientist Cipher:
 “Your theory is crazy, but it’s not crazy enough to be true.” – Niels Bohr



Would you like to contribute an article to any of our sections?

Please feel free to contact the Editor-in-Chief Dominic E. Nathan, PhD via email dominic.nathan@alphaetamubeta.org
 We are always looking for articles for each of the focus columns and also the main content.



Do you have a question or concern about AEMB?

Please feel free to contact the National Executive Director, Marcia A. Pool, PhD via email marcia.pool@alphaetamubeta.org
 Our response is a promise.

REMEMBER TO CHECK THE WEBSITE !

Please remember to check the national website www.alphaetamubeta.org for important information relating to award applications, upcoming AEMB Events and other important topics.