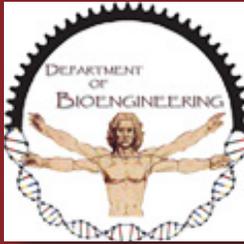


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# BE connected

## Chair's message

**Dr. Ayman El-Baz,**  
Professor and Chairperson  
for the Dept. of  
Bioengineering



I am excited to share with you some of the activities of our faculty, students, and alumni in this inaugural issue of *BEconnected*. Our department is experiencing phenomenal growth in both undergraduate and graduate admissions. We welcomed our first batch of Doctoral students this year. Our faculty secured \$14.8 M in extramural funding and published 2 books, 53 peer-reviewed journal articles, 22 conference publications, 13 book chapters, and 22 patents and patent disclosures last year. We are delighted to report the addition of Dr. Thomas Roussel and Dr. Jonathan Kopechek to our faculty.

Our students made a real difference in the community by using 3D printing to create a prosthetic hand for a 6-year-old Louisville boy with symbrachydactyly. BMES students repaired medical equipment for shipment to other countries in need. We are very grateful for the support of our donors and alumni. Your contributions have been vital to the success of our students and faculty. We look forward to your continued support and invite you to visit us and see firsthand all the exciting changes in our department. We would love to receive updates from you! Please send your updates to Nancy Hansford at [nahans01@louisville.edu](mailto:nahans01@louisville.edu).

## Student Successes

### NCAA Women's Enhancement Program Postgraduate Scholarship

Katie Nord has been awarded a NCAA Women's Enhancement Program Postgraduate Scholarship for Careers in Athletics worth \$7,500. She was one of 13 women chosen to receive this scholarship. Katie has been admitted to Northwestern University to pursue a Doctorate in Physical Therapy.

*Bioengineering Advisor: Dr. P. Soucy*



### Whitaker International Fellow

Young Choi is conducting research on the redesign of a minimally invasive right ventricular assist device (VAD) for the treatment of right-sided heart failure at RWTH Aachen University's Helmholtz Institute of Applied Medical Engineering (Germany) through a Whitaker International Fellows Award. He holds a Bachelor's and Master's degree in bioengineering from the J.B. Speed School of Engineering. Through UofL bioengineering internships, Young has worked on the pre-clinical and clinical testing and development of medical devices for which he holds 7 peer-reviewed publications and a pending patent application.

*Bioengineering Advisor: Dr. S. Koenig*



### NCAA Championship Team

Alex Sellers (BE undergraduate student) was part of the 4x100 freestyle relay that placed 4th at the ACC championships. She was selected

to be an alternate swimmer of the 2016 NCAA Championship team (March 16-19). In the 4x100 freestyle event, Alex and her three teammates qualified 6th in the morning preliminaries, and placed 7th in the finals with a time of 3:13.21, the fastest in program history, and received NCAA All-America honors. Overall, her team was placed 8th at the championships, which marks the second consecutive year UofL Women's Swimming & Diving has placed in the Top 10 of the NCAA.



### John M. Houchens Prize Winner

Ehsan Hosseini-Asl, holds a Ph.D. in Electrical and Computer Engineering at J.B. Speed School of Engineering, and received the John M. Houchens Prize for the most outstanding dissertation. During his Ph.D., he focused on leveraging machine learning techniques using deep learning for 2D and 3D medical image analysis, in image segmentation, tissue classification and disease diagnosis. He developed an automatic and accurate Computer-Aided Diagnosis system for Alzheimer's disease using 3D Brain MRI scans. He authored and co-authored six conference papers published in the proceedings and had two papers published in prestigious journals including IEEE Transactions on Neural Networks and Learning Systems and IEEE Transactions on Biomedical Engineering.

*BE Advisor, Ayman El-Baz & ECE Advisor, Jacek M. Zurada*



## Johns Hopkins University Applied Physics Lab- Scholar Program (Fall 2016)

**Danyal Bhutto**, a sophomore in Bioengineering, is currently participating in a fully paid research program at Johns Hopkins Applied Physics Laboratory during this Fall semester. He will work in the Force Projection Sector with the Systems Analysis Group. He has been working with Dr. El-Baz in the bio-imaging research lab since 2015. Using Photoshop, Danyal has helped segment various MRI images of eye nerves and the brain. The overall goal of the project is to write a software program that can automate the process of diagnosing various diseases through analyses of MRI images.



BE Advisor, Ayman El-Baz

## BE Students Create Prosthetic for 6 year-old (pictured at top of cover page)

Students learning about disability challenges in Dr. Gina Bertocci's graduate Rehab Engineering course were tasked with creating a prosthetic hand for a boy born with *symbrachyductly*, a condition causing limb anomalies in his hand. Using open-source software and a 3-D printer, they were able to create several prosthetic prototypes. Within minutes of receiving the prosthetic hand the young boy was able to pick up a ball and begin interacting with fellow students in a game of "catch". View the video of the announcement on YouTube.

[https://www.youtube.com/watch?v=3AK5P9\\_dZiE](https://www.youtube.com/watch?v=3AK5P9_dZiE)

"For us, having the boy with a smile on his face and being able to interact with his classmates — that really makes our day," Dr. Bertocci said.



## Doctoral Program in Translational Bioengineering

The Department of Bioengineering, in conjunction with School of Interdisciplinary Graduate Studies is pleased to offer a doctoral program in translational bioengineering beginning from 2016. The Ph.D. program is designed to train graduate students with a focus on clinical and translational research as part of a multidisciplinary team in a fast-paced, interdisciplinary research environment. The interdisciplinary program involves Schools of Engineering, Medicine, Dentistry and Business and students specialize in one of the following tracks: traditional bioengineering research, clinical translational research and advancing bioengineering technologies through entrepreneurship. Additional information is available at:

<https://louisville.edu/translational-bioengineering>



## Bioengineering Seminar Series



The Department of Bioengineering is excited to host a weekly seminar series which began in Spring 2016. The hour-long seminars feature distinguished speakers in engineering, science and medicine and provides an ideal opportunity to expose BE students to new ideas and contemporary research. Seminars will be held on Wednesdays from 12:00-1:30PM on the Belknap Campus during the Spring 2017 semester. Seminar information and videos from past seminars are posted at:

<https://louisville.edu/speed/bioengineering/seminars>

## Alumni spotlights

### Carrie Benzinger, Class of '12

Near the completion of my Master's degree, I received two prestigious awards; a Whitaker International Fellows Scholarship and Fulbright Research Scholarship. The opportunities I experienced from these scholarships transformed my engineering career. These scholarships allowed me to travel to Germany and complete research at the Helmholtz Institute of RWTH Aachen University. As part of the total artificial heart project, I assisted in CAD design, observed open heart surgery, and supported animal trials for a new cardiovascular device. I worked with an international team of researchers and gained an appreciation of the worldwide community of bioengineers. I returned to the US in late 2013, and began working at Medtronic Spinal and Biologics in Memphis, TN. I am a product development engineer and work on the design and development of posterior spinal implants. I also serve as the Chair of Medtronic Spinal and Biologics Internal Society of Women Engineers Network, and am a mentor to middle school students for Lego Robotics. My bioengineering Bachelor's and Master's degrees from J.B. Speed School provided me with amazing opportunities to see the world and continue to guide me in my career as an engineer in the medical device industry. I will be using all of these experiences to help guide me as continue in my career as an engineer in the medical device industry.



### Joel Graham, Class of '10

I was a freshman with an undecided major when I came across a flyer announcing a new degree in Bioengineering. I attended an introductory meeting and became hooked. I enrolled in the new program my sophomore year, becoming a member of the first graduating class. Early in the program I became interested in bio-devices. I volunteered and worked in Dr. Koenig's and Dr. Giridharan's research labs and learned about cardiovascular monitoring systems and devices. This experience led to an internship co-op at Advocate Christ Medical Center under Dr. Slaughter, a cardiovascular surgeon Mr. Michael Sobieski, a perfusionist in the mechanical circulatory support program. The hospital experience and patient interactions instilled in me a passion for the field that I still carry today. Following graduation, I was able to immediately secure a job based on the



## News / Announcements

### BE Welcomes Newest Faculty Members, Dr. Jonathan Kopechek & Dr. Tommy Roussel

**Dr. Jonathan Kopechek** joined the Bioengineering department as a n assistant professor at UofL beginning April 1st. He received an NIH F32 postdoctoral fellowship at the University of Pittsburgh to develop a therapeutic platform utilizing ultrasound and microbubble-targeted delivery of a microRNA inhibitor to the heart for suppression of cardiac hypertrophy. He plans to build on this work at the University of Louisville by developing novel ultrasound-responsive carriers for targeted delivery of molecular therapeutics.



**Dr. Tommy Roussel** joined the BE department as a tenure-track assistant professor in July 2015 after holding a term assistant professor position for one year in the department. His current research includes the development of Lab-on-a-Chip systems related to miniaturization of electrochemical analysis techniques, custom instrumentation and control electronics to support the study of wound irrigation in low gravity environments, and the development of locomotor training systems for pediatric patients with spinal cord injuries. He is a founding member of three startup companies created to commercialize technology developed at UofL including Assenti (Glaucoma), Ultra Trace Detection (explosives detection), and CoulSense (remote heavy metal sensing).



experiences and contacts I made throughout my studies and co-ops. I am now a Sr. Clinical Engineer at HeartWare Inc., working in the advanced product development team based in Miami, Florida. I was awarded the Outstanding Young Engineer in Bioengineering Award in 2013.

## BMES spotlight

### University of Louisville Chapter of the BioMedical Engineering Society

The UofL Biomedical Engineering Society (BMES) was created to generate interest in the biomedical engineering program and to foster academic, community, and industry relations. Our mission is to provide undergraduate students with the academic and professional resources needed to succeed. The social, professional and volunteer events held by the society are aimed to help bridge the gap between engineering students, medical students, and the BME faculty at University of Louisville while providing an exceptional college experience. In the past two years, the UofL BMES has held many successful events in order to encourage the relationship between undergraduates, graduates and faculty.

BMES paired with a local non-profit organiza-



tion called Supplies Over Seas so that members can volunteer and acquire hands-on engineering experience. Students are also given the opportunity to learn and seek guidance from the National Quality Manager for Clinical Engineering at Catholic Health Initiatives. Students were given medical devices to repair and perform safety checks so that the equipment can be shipped to countries in need. During one particular visit, students were told that a hospital in Africa had two premature babies but had only one Neonatal Intensive Care Unit (NICU) and were tasked with repairing an urgently needed NICU so that both infants could receive the care they needed. See more on this story on YouTube <https://youtube.com/watch?v=T5GF0MYs4Eg>.

A mentor and mentee program was implemented to help freshmen transition into their college career. Interested students were paired

with upperclassmen so that they could receive one-on-one advice about both academic and social interests. Students interested in pursuing a medical degree were also put in contact with current medical students who graduated from the biomedical engineering program. BMES organized MedTech Talks in conjunction with the Engineering in Medicine society at the UofL Medical School to introduce medical students to faculty members at their campus and to give them opportunities to network. The primary objective of this seminar series is the development of medical students' understanding of how engineering is directly applied in a clinical setting by partnering a physician and



an engineer to present these seminars.

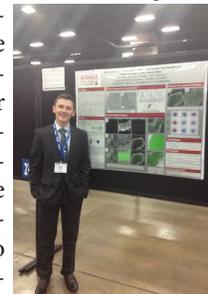
Social events such as Student vs. Faculty basketball and volleyball games are organized each year to give students a chance to compete in a friendly competition against the Bioengineering department and to develop professional relationships outside of a classroom setting. Student-Faculty luncheons and a Research Showcase are organized annually to give students a chance to network with professors, graduate students and to learn about the biomedical engineering research currently being conducted at the University of Louisville. Each year, the BMES encourages students and faculty to display their research posters at the showcase to promote interest and excitement of ongoing research within the department. Additionally, a Keynote Speaker is invited each year, in order to give students a chance to ask questions about research, academia and industry.

BMES also takes part in the Engineering Exposition held annually by the Speed School of Engineering Student Council (SSSC). Each year a hands-on activity such as a strawberry DNA extraction is performed for visitors to participate in. Over one hundred K-12 students visited the BMES table at the Spring 2016 Engineering Expo to learn about the biomedical engineering department at the University of Louisville, the Student Chapter of Biomedical Engineering and the positive change that a Bioengineer can bring to the world!

In order to raise money for these events, BMES conducts a pie-in-the-face raffle fundraiser at the annual student-faculty volleyball game. Funding for events is also obtained from University programs such as Club Programming Committee (CPC) and Partnership for Retention Improvement in Mathemat-



ics, Engineering and Science (PRIMES). BMES was able to send a group of four students to the National BMES Conference in 2014 and 2015 by obtaining PRIMES funding and the UofL Student Government Association (SGA). Both faculty and select students were chosen to present their research in a seminar or a poster presentation at the conference. Students are encouraged to become members of the local and national chapter to gain access to events, career development, networking and research discoveries. Becoming a member of the local chapter will allow students to interact with their peers and earn opportunities to help grow the chapter! Monthly meetings are held each semester in addition to special events to inform members of ongoing changes and activities within the University.



If you are interested in joining UofL BMES, please contact us at [bmesatuofl@gmail.com](mailto:bmesatuofl@gmail.com). If you wish to learn more about the National Chapter, please visit [www.bmes.org](http://www.bmes.org).

## BE grants

*The following BE faculty received grants and industry contracts totalling \$14.8 M in 2015.*

1. G. Bertocci - 3 grants (NIJ, Uofl-IRG Foundation), \$422K.
2. K. Bertocci - 1 grant (Helmsley Trust), \$1.5M
3. A. El-Baz - 3 grants (EXCITE, Coulter), \$434K
4. H. Frieboes - 5 grants (NIH, NSF, KSEF Coulter), \$90K.
5. G. Giridharan - 4 grants (Coulter, KSTC, AHA, IC), \$ 2.1 M.
6. R. Keynton - 2 grants (EXCITE, NSF), \$3.3M
7. S. Koenig - 6 grants (KSTC, AHA, IC, NIH), \$4.1M
8. M. O'Toole - 3 grants (EXCITE, KCF, Coulter), \$458K
9. T. Roussel - 2 grants (NASA, Coulter), \$363K
10. K. Soucy - 2 grants (AHA, IC), \$544K
11. P. Soucy - 1 grant (IRIG), \$5K
12. M. Voor - 3 grants (NIAMS, Coulter), \$4.3M

## Donate

Your continued support is vital to the success of our department. You may designate your support towards the BE department, student awards, or to support a specific research lab. For more information about how your donations can help transform the BE Department, please contact Chris Day at [chris.day@louisville.edu](mailto:chris.day@louisville.edu), or call (502)852-1541.

**Bioengineering Graduates at UofL**

*The Bioengineering Department of the University of Louisville is proud to present our graduates of the Bachelor of Science and Master of Bioengineering programs by their years of graduation.*

**BACHELOR OF SCIENCE****Spring 2009**

Ayers	Christina	
Bachman	Daniel	
Badder	Mark	
Cox	Emily	
Graham	Joel	
King	Benjamin	
Mulic Shekhovtsov		Ines
Spencer	Megan	
Strotman	Lindsay	
Wells	Erica	

**Summer 2009**

Nitzken	Matthew
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**Fall 2009**

Horrell	Timothy
King	Kenny
Rangi	Harkina

**Spring 2010**

Elliott	Holly
Grossman	Samuel
Hoblitzell	Patrick
Ising	Mickey
Kumar	Adwait
Osborne	Christopher
Scherzer	Christopher
Warren	Sean
White	Joshua

**Summer 2010**

Burkhead	Thomas
Mindel	Thomas
Muench	Edward
Patel	Dhruvinkumar

**Fall 2010**

Canfield	Nicholas
Clarkson	Cortney
Henry	Benjamin

**Spring 2011**

Allen	Lauren
Bajaj	Nihit
Baumann	Daniel
Benzinger	Carrie
Donaldson	Katherine
Fligor	Ruthie
Gross	Eric
Hillard	Brent
Mann	Megan
McElhaney Jr.	Patrick
Sandoval	Melissa
Schworer	Adam
Seibt	Erik
Stephens	Dennis
Stewart	Daniel
Tran	Phuong
Walsh	Meredith

**Summer 2011**

Anderson	Mark
Awadallah	Ahmed
Brun	Grace
Hamilton	Mary
Khosravi	Farhad
Wooley	Chase
Young	Caitlin

**Fall 2011**

Clemans	Zachary
Guenthner	Jacob
Owens	Kirsten
Stratton	Jacob
Thompson	Adam
Wilkey	Shannon

**Spring 2012**

Abel	Danielle
Ansert	Andrew
Buller	Mitchell
Chandel	Sahiba
Clark	Michael
Cummings	Jaclyn
Faulkner	Britt
Holley	Kevin
Humphrey	Morgan
Jacobs	Michael
James	Kurtis

Nalley	Brittany
Page	Amanda
Phillips	Jeremy
Priest	Thomas
Russell	Zachary
Scarsella	Adam
Smith	Erin
Smith	Kristyn
Woodruff	DeVonnah
Zimmerman	Sally

**Summer 2012**

Chea	Timothy
Christian	Marci
Goderwis	Nathan

**Fall 2012**

Bell	Alexander
Goderwis	Joshua
Niehaus	Aaron
Zoeller	Keith

**Spring 2013**

Brann	Tyler
Bugg	Amy
Das	Evan
Howell	Justin
Jain	Ishita
McClure	Patrick
Miles	Stephanie
Rostovsky	Rea
Ryan	Olivia
Sievers	Laura
Speaker	Lauren
Tran	Minh Nhut
Venard	Matthew

**Summer 2013**

Alston	David
Gettler	Brian
Gosnell	Eric
Hensley	Marie
Hufford	Troy
Knapp	Nicole
Scherzer	Michael

**Fall 2013**

Clauson	Laura
Hough	Steven
Johnson	Billie
Prevette	Blossom
Rosenbauer	Erin

**Spring 2014**

Baumann	Bryan
Hagan	David
LaMunyon	Tristen
Landgrave	John
Leadingham	Caleb
Manning	Samantha
Miles	Eric
Morris	Brandon
Smith	Benjamin
States	Gregory
Tennill	Thomas

**Summer 2014**

Lancaster	Kevin
McCollam	William
Roettgers	Allison
Shields	Garrett
Spalding	Thomas
Stapp	Chad
Turner	Prudence
Usher	Clayton

**Spring 2015**

Ackermann III	Richard
Allen	Nicholas
Buchanan	Matthew
Deis	John
Dillery	Melissa
Goessling	Holly
Harrell	Lauren
Jeffries	Marcus
Johnson	Timothy
Martin	Emily
McKinsey	Keyonna
McQuaide	Jessica
Phillips	Dustin

Pitcock	Meagan
Rapson	Kaitlin
Rauch	Winston
Wimmer	Chelsea
Zegarra	Daniel

**Summer 2015**

Black	Kaitlyn
Carnahan	Stephen
Hoepfer	Alyssa
Kinney	Kelsey
Leezer (Straub)	Heather
Montgomery	Christopher
Schreiber	Katelyn
Sliter	Eric
Tapolsky	Nathalie
Valladao	Laura

**Fall 2015**

Curtis	Louis
Gebru	Yitzhak
Stone	Owen

**Spring 2016**

Bailer	Ryan
Coyle	Sean
DeCarlo	Alexandra
Fuqua	Joshua
Gann	Michael
Kelecy	Matthew
Keynton	Robert
King	Nicholas
Lents	Gordon
Mahlbacher	Grace
Mitchell	William
Murphy	Ryan
Nassar	Elias
Nord	Kathlene
Raque	Samuel
Shell	Bryce
Tran	Kevin
Waldecker	Dakota
Wintring	Allison

**Summer 2016**

Wade	Abigail
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**MASTER OF ENGINEERING****Spring 2010**

Grossman	Samuel
Horrell	Timothy
Strotman	Lindsay
Wells	Erica

**Summer 2010**

Nitzken	Matthew
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**Fall 2010**

Cox	Emily
Graham	Joel

**Spring 2011**

Ayers	Christina
Elliott	Holly
Mindel	Thomas

**Summer 2011**

Henry	Benjamin
Ising	Mickey
King	Kenny
Kumar	Adwait
Scherzer	Christopher
Warren	Sean

**Fall 2011**

Fligor	Ruth
Mulic Shekhovtsov	Ines

**Spring 2012**

Abel	Danielle
Benzinger	Carrie
Cummings	Jaclyn
Gross	Eric
Hillard	Brent
McElhaney Jr.	Patrick
Stewart	Daniel
Walsh	Meredith

**Summer 2012**

Anderson	Mark
Bajaj	Nihit
Baumann	Daniel
Burkhead	Thomas
Hamilton	Mary
Hoblitzell	Patrick
Khosravi	Farhad
King	Benjamin
Muench	Edward

Owens	Kirsten
Sandoval	Melissa
Wooley	Chase

**Fall 2012**

Faulkner	Britt
Nalley	Brittany
Page	Amanda
Patel	Dhruvinkumar
Smith	Kristyn
Tran	Phuong
Young	Caitlin

**Spring 2013**

Ansert	Andrew
Bell	Alexander
Howell	Justin
James	Kurtis
Priest	Thomas
Seibt	Erik

**Summer 2013**

Bugg	Amy
Buller	Mitchell
Clark	Michael
Goderwis	Joshua
Phillips	Jeremy
Russell	Zachary
Smith	Erin
Tran	Minh Nhut
Zimmerman	Sally

**Fall 2013**

Clemans	Zachary
Goderwis	Nathan
Holley	Kevin
Scarsella	Adam
Stratton	Jacob
White	Joshua
Zoeller	Keith

**Spring 2014**

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Humphrey	Morgan
Jacobs	Michael
Jain	Ishita
LaMunyon	Tristen
Osborne	Christopher
Ryan	Olivia
Speaker	Lauren
Venard	Matthew

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Hensley	Marie
Sievers	Laura

**Fall 2014**

Clauson	Laura
Gettler	Brian

**Spring 2015**

Johnson	Billie
Miller	Camden
Rosenbauer	Erin

**Summer 2015**

Morris	Brandon
Scherzer	Michael
Schworer	Adam
Wainwright	Grace

**Fall 2015**

Lancaster	Kevin
Scott III	Stuart
Shields	Garrett

**Spring 2016**

Carnahan	Stephen
Choi	Young
Curtis	Louis
Goessling	Holly
Knapp	Nicole
McQuade	Jessica
Phillips	Dustin
Rapson	Kaitlin
States	Gregory
Tennill	Thomas

**Summer 2016**

Allen	Nicholas
Martin	Emily
Stone	Owen