

## Biomedical Science Undergraduate Major Annual Report 2015

### Inside Ohio State's Biomedical Science Major: A Student View

Matt Davis and Daniel Moussa are two students in the Biomedical Science (BMS) major who have taken full advantage of the special opportunities associated with the major to conduct biomedical research as undergraduates, while they prepare for careers in their chosen fields.

Matt Davis, a junior, has a passion for public health. More specifically, he is interested in influenza, which significantly affects global public health and economics. Using techniques like confocal microscopy and mutagenesis, Matt has been researching innate immunology under Jacob Yount, PhD. They are particularly interested in the protein IFITM3 and its effects on the influenza virus infection.

After graduation, Matt plans on pursuing an MD-MHA. "My ultimate goal in medicine is to run one of the largest private medical groups in the country. I want to help people live their best and most fulfilling lives," he says. "To do so, they must be healthy, mentally and physically. I want to create an environment to facilitate that."

The BMS major has served as a monumental stepping stone for Matt in his journey toward achieving that goal. For Matt, the most rewarding part about being a BMS student, he says, has been having the opportunity to collaborate and "interact with the best and brightest students at The Ohio State University on a daily basis." He notes that the collaboration and competition among his peers serve as the motivation that drives them all to perform at their highest levels, both inside and outside of the classroom.



antioxidant and antidepressant, affect the treatment of depressive-like behavior and the lack of motor coordination associated with a secondary insult (such as an infection) following a TBI.

As he reflects on his time in the BMS major, Daniel says that it has provided him with every resource he could have wanted and needed in order to pursue his professional goals. "From an incredible group of self-motivated, highly successful, and mindful classmates; to excellent professors and learning materials; to research and educational opportunities that are unique to the BMS major; I always found myself interested, challenged, and enjoying my time," Daniel says. "I have conducted research abroad, interacted with standardized patients, and traveled to Guatemala to work with underserved populations on HIV education, diagnosis, and treatment."

Ultimately, Daniel hopes to take his experience and knowledge gained from the BMS major to positively impact the lives of those in need. "As a physician, I want to be able to look at a person holistically, analyzing both the disease processes and societal influences," he says, "and then make the efforts to improve their quality of life."

To read Christina Wilkerson's (Communications Student Intern) complete article on the BMS major, go to [medicine.osu.edu](http://medicine.osu.edu).

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*The BMS annual report highlights and celebrates the accomplishments of BMS students and alumni. Previous annual reports are available on the BMS website.*



THE OHIO STATE UNIVERSITY

COLLEGE OF MEDICINE

## Welcome, BMS Freshmen!

<b>Madison Allen</b> Aurora, OH Aurora High School	<b>Alicia Bao</b> Dublin, OH Dublin Jerome High School	<b>Traci Blue</b> Overland Park, KS Olathe North High School
<b>Olivia Carter</b> Reynoldsburg, OH Charles School-Ohio Dominican	<b>Ashlee Chadwick</b> Okeana, OH Ross Senior High School	<b>Karthik Chakravarthy</b> Beavercreek, OH Beavercreek High School
<b>Kyle Deistler</b> Lewis Center, OH Olentangy High School	<b>Andrew Fernandez</b> Columbus, OH St. Charles Preparatory School	<b>Max Fernandez</b> Columbus, OH St. Charles Preparatory School
<b>Simon Fernandez</b> Columbus, OH St. Charles Preparatory School	<b>Jacob Grimmer</b> Parma, OH Padua Franciscan High School	<b>Browning Haynes</b> Shaker Heights, OH Shaker Heights High School
<b>Andrew Hu</b> Grand Forks, ND Red River Senior High School	<b>Austin Keller</b> Lake Zurich, IL Lake Zurich Senior High School	<b>Heather Kneip</b> Morrow, OH Little Miami High School
<b>Victoria Kocsuta</b> Coraopolis, PA Montour High School	<b>Megan Kruze</b> North Royalton, OH Brecksville High School	<b>Kathryn Lane</b> Kendallville, IN East Noble High School
<b>Eun-Ju "Joyce" Lee</b> Columbus, OH Dublin Scioto High School	<b>Alexandria Lenyo</b> Huron, OH Huron High School	<b>Claudia Lewis</b> South Russell, OH Chagrin Falls High School
<b>Sophia Maharry</b> Columbus, OH Metro High School	<b>Nicholas Pappa</b> Columbus, OH St. Charles Preparatory School	<b>Ayush Peddireddi</b> Dayton, OH Centerville High School
<b>Aman Prasad</b> Dublin, OH Dublin Jerome High School	<b>Peter Sankovic</b> Brecksville, OH Brecksville High School	<b>Olivia Schmenk</b> Kalida, OH Kalida High School

### Autumn 2015 Freshman Admission

Total Applicants: 113

Interviewed: 48

Enrolled: 27

- Average ACT: 32.7
- Average SAT: 1420 (Critical Reading and Math)
- Average High School GPA (unweighted): 3.89

### Merit-based Scholarships

Academic Achievement (\$1,000 per year): 1

Battelle (full in-state tuition): 1

Eminence (full cost of education): 1

Excellence (full in-state tuition): 3

Joyce (full cost of education): 1

Maximus (\$6,000 per year): 14

National Buckeye (\$12,000 per year): 4

Prominence (full out-of-state tuition): 1

Provost (\$3,000 per year): 6

*Based on their academic excellence in high school and ACT/SAT scores, all BMS freshmen were awarded at least one merit-based scholarship. For details about Ohio State's merit-based scholarships, go to [meritawards.osu.edu](http://meritawards.osu.edu).*



### Autumn 2015 Enrollment at The Ohio State University

Total Enrollment: 65,184

Columbus Campus: 58,663

Undergraduate (Columbus): 45,289

Freshmen (Columbus): 6,978

Average ACT: 28.9

Average SAT (Critical Reading and Math): 1266

*For additional information on enrollment at Ohio State, go to [enrollmentservices.osu.edu](http://enrollmentservices.osu.edu).*

## Congratulations, BMS Class of 2015!



**Members of the Class of 2015  
(hometown and post-graduation pursuits)**

<b>Kyle Atcheson</b> Louisville, KY MD: University of Pittsburgh	<b>Elizabeth Bley</b> Cleves, OH MD: The Ohio State University
<b>Daniel Brook</b> Cincinnati, OH MD: The Ohio State University	<b>Luke Cheng</b> Strongsville, OH Consultant: Strategy&
<b>Jennifer DeSalvo</b> Westlake, OH MD: The Ohio State University	<b>Markus Harrigan</b> North Canton, OH MD-PhD: The Ohio State University
<b>Kaitlin Keenan</b> Rochester, MI MD: Cleveland Clinic Lerner College of Medicine	<b>Anjella Manoharan</b> Crystal Lake, IL MS (in Medical Physiology): Loyola University
<b>Michael Neiger</b> Worthington, OH MD: The Ohio State University	<b>Amanda Selhorst</b> Bowling Green, OH MS (in PA Studies): Ohio Dominican University
<b>Jeremiah Shaw</b> Yellow Springs, OH MD: The Ohio State University	<b>Evan Sommer</b> Portsmouth, OH MD-MBA: Wright State University
<b>Edward Sundin</b> Fairmont, WV MD: Northeast Ohio Medical University	<b>Poornima Venigalla</b> Manchester, MO Health Coach: AmeriCorps
<b>Emaline Wise</b> Troy, OH Patient Relations Coordinator: Bing Cancer Center	<b>Katherine Yates</b> Galena, OH MD: Harvard University

**Degree Awarded:** Bachelor of Science in Health and Rehabilitation Sciences

**Latin Honors: 14**

- Cum laude (3.500-3.699): 5
- Magna cum laude (3.700-3.899): 6
- Summa cum laude (3.900-4.000): 3

**Honors in the School of Health and Rehabilitation Sciences (SHRS): 14**

- With Honors (completed SHRS Honors Program): 3
- With Honors Research Distinction (completed SHRS Honors Program and Thesis): 11
  - This is the highest honor bestowed upon an undergraduate student.

*Thank you to the thesis advisors: Drs. Michael Caligiuri, Jonathan Godbout, John Gunn, Jill Heathcock, Gustavo Leone, Gregory Lesinski, Tatiana Oberyshyn, Amy Lovett-Racke, Kirk Mykytyn, Jill Rafael-Fortney, and Noah Weisleder.*

## Summer 2015 Experiences

During the summer, many BMS students remain on campus to work in their research labs and/or take courses. However, some BMS students take advantage of special opportunities to conduct research, provide service, or serve as interns, both domestically and abroad.

### Andrew Branstetter: DAAD RISE Program – Germany



“I participated in an eight-week research internship in Germany through the DAAD RISE program. My summer began with a two-week German language course in Berlin, during which I stayed with a host family. I then conducted research with a German PhD student in a neurology lab studying the molecular basis for fibromyalgia, a disorder characterized by chronic pain of the skeletomuscular system. Working about 30 hours per week, I was able to get a glimpse into the structure of the global scientific community beyond the United States and also gain

experience working in translational research. This helped connect the research done in the lab with the patients who ultimately benefit from the experiments. Every weekend, I took advantage of my free time and traveled to surrounding cities and countries with other DAAD RISE interns. This allowed me to make friendships with students from across the United States, Canada, and the United Kingdom. The DAAD RISE internship was truly an unforgettable opportunity, and I highly recommend it.”



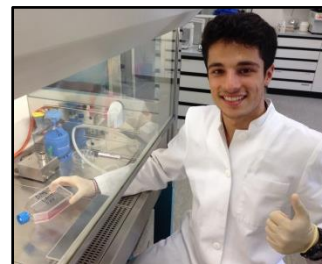
### Lauren Chen: Taiwan Tech Trek Program – Taiwan

“The Taiwan Tech Trek Internship is an eight-week program funded by the Ministry of Science and Technology that offers Taiwanese/Chinese American undergraduates the opportunity to explore the breadth of Taiwan’s industries, national laboratories, and universities. Over the summer, I worked in Dr. Ian Liao’s photonics lab at National Chiao Tung University to shed light on cardiovascular diseases. We assessed the effects of anti-cancer drugs on whole heart function in zebrafish using confocal imaging. While living in Taiwan, I was also able to visit my relatives, network with students from across the world, and improve upon my Chinese speaking and reading skills. During the weekends, a group of interns and I hiked the Sandiaoling Waterfall Trail, rode bicycles along the Taiwan Strait, lit

sky lanterns at Pingxi Station, and explored the night markets in Taipei.”

### Daniel Moussa: DAAD RISE Program – Germany

“The DAAD RISE Program is a summer research internship in Germany. I was able to spend eight weeks at the University of Freiburg thanks to funding provided by Ohio State through the Biomedical Science major, the Office of Diversity and Inclusion, and the Undergraduate Student Government, as well as funding from the DAAD RISE. In Freiburg, I investigated microglia and TGF-beta in the context of neurodegenerative diseases at the Institute of Anatomy and Cell Biology, Department of Molecular Embryology, under the mentorship of Dr. Bjorn Spittau. While I have conducted neuroimmunology research at Ohio State for nearly three years, the experience of conducting research in a new country and surrounded by international graduate students was incredible. I learned so much at the University of Freiburg. I attended weekly journal clubs and a few thesis defenses, became more knowledgeable about new techniques, was introduced to different analysis practices, learned how to prepare basic German cuisine, and discovered some favorite dishes in Freiburg. The department was very hospitable; we ate in mensens (cafeterias) together, had weekend cookouts, and took excursions around the region. I was welcomed to an entirely new culture; one that I plan on visiting again, as a scholar or tourist.”



### Jared Pradarelli: YMCA of Honolulu – Hawaii

“During the summer, I worked at YMCA Camp Erdman on the North Shore of O’ahu, Hawaii as a sports director and camp counselor. Camp Erdman is a residential summer camp for kids aged 7-14, arriving from all over the world (e.g., Hawaiian islands, Japan, China, mainland USA, etc.). I was responsible for a cabin of kids in addition to creating and implementing a sports program run daily for every age group. This job challenged me up to a breaking point; thereafter, I found myself surpassing my limits for patience and stamina to continue making every day an energized day for every kid’s experience. On my weekly day off, our staff would take trips all over the island to various beaches, sights, or towns. This involved beach-bumming, surfing, swimming in waterfalls, snorkeling, or walking the town eating local food and shave ice. (Man, how I miss shave ice!) This summer gave me a perspective that I needed, allowing me to realize what I will value most in my lifestyle ahead. It was an unreal experience filled with stress and rewards, and I’m more than ecstatic to have lived it.”



## Summer 2015 Experiences

### Mayuran Ravindran: Worthington Industries – Ohio

“This summer I worked 40 hours per week as a health administration intern at Worthington Industries Medical Center. I had a wonderful experience with the internship program, and I completed three projects throughout the summer. My first project was to determine how Worthington Industries could expand the medical services that it provides to its employees. I designed a high-level telemedicine implementation strategy that could save the company \$100,000/year in five years. My second project was to analyze the company’s national drug testing data from January 2014 to June 2015. I found that Worthington Industries had lower drug usage rates compared to the 2014 U.S. workforce. Additionally, I broke down these drug testing results to analyze variables due to location, time, and population environment. My third project was to perform a physical and informational risk assessment of the Medical Center. I found that our largest concerns were internet-based security breaches, and I submitted suggestions to help minimize such risks. I am very thankful that I had the opportunity to be a summer intern at Worthington Industries Medical Center. I will definitely use the skills and knowledge I acquired as I move forward.”



### Rebecca Rings: Nike – Oregon



“This summer, I had the opportunity to work as an intern for Nike, Inc. at their world headquarters in Beaverton, Oregon. I interned in the global sales department, where I assisted with updating a product education website used by Nike retailers. I also worked with interns from other areas of the company on a cross-functional project which we presented at the conclusion of our internship. After working in a research lab the past couple summers, this experience was quite different for me. It was challenging being so far out of my comfort zone in terms of both work experience and location; however, it was refreshing and allowed me to learn a lot very quickly. I feel this internship really helped to improve my interpersonal and communication skills, which will definitely benefit me in my future medical career. One of the highlights of the summer was getting to meet my favorite professional runner at a track meet in which she was competing. Overall, I enjoyed being surrounded by many hardworking

people who shared my passion for athletics. I had a really great experience and can’t wait to go back to the Pacific Northwest!”

## Updates on the BMS Class of 2011

The class of 2011 is the third graduating class from the BMS major. Listed below are education/career updates from the member of this class.

**Sean Boone:** Completing final year of MD program at Washington University; pursuing residency in orthopedics

**Sarada Eleswarpu:** Graduated from the College of Medicine at The Ohio State University; completing anesthesiology residency at Vanderbilt University Medical Center

**Braxton Forde:** Graduated from the College of Medicine at The Ohio State University; completing OB/GYN residency at Johns Hopkins Medicine

**Qi Fu:** Continuing PhD program in Cell and Molecular Biology at the University of Pennsylvania

**Dustin Gable:** Continuing MD-PhD program at Johns Hopkins University; researching telomeres and the genetics of age-related disease; during 2015, published in *International Journal of Radiation Oncology*

**Saamia Hossain:** Graduated from the College of Medicine and Life Sciences at the University of Toledo; completing internal medicine residency at Robert Wood John Medical School

**Michael Mbagwu:** Completing final year of MD program at Northwestern University; applying to ophthalmology internships; published in *American Medical Informatics Association Summit in Translational Bioinformatics Proceedings*, *BMC Bioinformatics*, *Journal of Biomedical Informatics*, *Journal of Clinical Rheumatology*, and *Ocular Oncology and Pathology*

**Nicole Naiman:** Continuing MD-PhD program at the University of Washington

**Jason Pradarelli:** Completing final year of MD program at The University of Michigan; earned MS in Clinical Research; published in *Annals of Surgery*, *JAMA*, *JAMA Surgery*, *Journal for Surgical Research*, *Surgery*, and *Surgery for Obesity and Related Diseases*

**Hanna Sorg:** Graduated from Kettering College with Master of Physician Assistant Studies; employed at EM Specialists

**Nicholas Sutton:** Graduated from the College of Medicine at The Ohio State University; completing residency at the University of Tennessee Medical Center

**J. Katherina Timmer:** Completing final year of MD program at The Ohio State University; in July 2016, beginning general surgery internship at Naval Medical Center Portsmouth

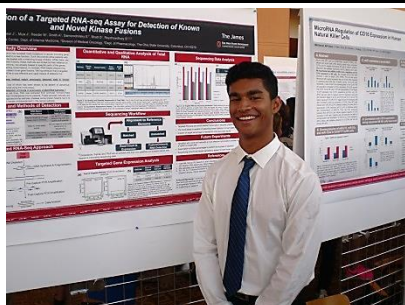
**Joseph Vogelgesang:** Completing final year of DO program at Ohio University Heritage College of Osteopathic Medicine; pursuing residency in family medicine; published in *American Journal of Managed Care* and *Journal of Genetic Counseling*

**Kara Zang:** Continuing PhD program in the Neuroscience Institute at New York University School of Medicine; awarded funding from the National Institutes of Health

## Research Achievements for 2014-2015

### On-campus Research Fora

Forum	Students	Notes
Fall Student Poster Forum September 18, 2014 (undergraduateresearch.osu.edu)	Total: 15 • Seniors: 8 • Juniors: 7	This poster forum highlights the research conducted by undergraduate students during the summer.
Denman Undergraduate Research Forum March 25, 2015 (denman.osu.edu)	Total: 22 • Seniors: 12 • Juniors: 10	Awards: 5 • 2 <sup>nd</sup> Place: 1 • 3 <sup>rd</sup> Place: 1 • 4 <sup>th</sup> Place: 3
OSUWMC Trainee Research Day April 15-16, 2015 (researchday.osu.edu)	Total: 18 • Seniors: 6 • Juniors: 7 • Sophomores: 5	<ul style="list-style-type: none"> <li>• Mayuran Ravindran, BMS junior, was awarded an outstanding research trainee travel grant.</li> <li>• Amanda Selhorst, BMS senior, was selected as the sole undergraduate student to present her research as part of the Allan Yates Memorial Trainee Speaker Series.</li> </ul>



### 2015 Pelotonia Fellows

Student	Research Mentor	Project
Daniel Maxwell Banaszak	Don Benson, MD, PhD	The Effect of Extracellular Vesicle-associated HLA-E on Natural Killer Cells in Multiple Myeloma
George Koutras	Balveen Kaur, PhD	Increasing Potency and Safety of Oncolytic Viral Therapy for Glioblastoma
Matthew Lordo	Sarmila Majumder, PhD	Elucidating the Role of UbE2K in the Post-Translational Regulation of PTEN in Breast Cancer
Sophia Maharry	Albert de la Chapelle, MD, PhD	Elucidating the Impact of the Novel Aggressive NRAS Isoform 5 in Acute Myeloid Leukemia

### Internal Medicine "Grever" Internship 2015

Each year, Dr. Michael Grever, Chair of Internal Medicine, runs an intensive shadowing program for seven selected BMS students (rising juniors and seniors). For a six week period (May-June), the interns divide their days between participating in rounds at the Wexner Medical Center and Nationwide Children's Hospital and conducting research in their labs. This enables them to fully compare and contrast the clinical and research components of medicine. The Grever Internship began in 2006 and, to date, 57 BMS student have participated.



Intern/Student	Research Mentor
Margaret Grau	Samantha King, PhD
Langston Hughes	Peter Mohler, PhD
Sohom Manna	Kay Huebner, PhD
Daniel Moussa	Jonathan Godbout, PhD
Bryce Ringwald	Ginny Bumgardner, MD, PhD
Lilianna Suarez	Andrew Fischer, PhD
Sonia Tandon	Kalpana Ghoshal, PhD