

# Biomedical Science Undergraduate Major Annual Report 2019

## Biomedical Science Seniors Spend Spring Break in Estonia

During spring break 2019, ten Biomedical Science (BMS) seniors participated in BMS Learning Abroad Experience: Estonia. They traveled to Estonia to learn about the country's healthcare system, medical education, history, and culture.

**Kyle Deistler**, BMS class of 2019 and current MD student at The Ohio State University, greatly values his experiences in Estonia: "Traveling to Estonia was a wonderful opportunity to learn more about the country's history and culture and how their healthcare system functions. On top of this, I was able to spend time with the members of my BMS cohort and build memories before we all graduated and spread across the country in pursuit of our graduate and professional degrees."

For **Sophia Maharry**, BMS class of 2019 and current MD-PhD student at the University of North Carolina at Chapel Hill, the learning abroad experience served as an ideal culmination of her final year in BMS: "Our travels in Estonia consisted of beautiful views, endless exploring, delicious food, and sightseeing visits followed by van conversations that spanned from thought-provoking to ridiculously light-hearted. In other words, it was the best way I could imagine to draw four years of BMS with my cohort to a close."

This learning abroad experience was organized and co-led by **Dr. Lorraine Wallace**, Associate Professor, Biomedical Education, and **Mr. Steven Mousetes**, BMS Program Manager. In reflecting on her experiences with the BMS seniors, Dr. Wallace shared, "It was wonderful traveling with fourth-year BMS students to Estonia during spring break. Over the course of our travels, we had the opportunity to explore a very unique country off the

beaten path. As a post-Soviet state, Estonia offered students a glimpse into what life was like prior to the fall of the USSR. Throughout the week, we engaged with students at the University of Tartu (founded in 1632), visited the Embassy of the United States in Tallinn, and explored Tallinn's wonderful Old City."

Funding through the Department of Biomedical Education and Anatomy (the academic department that houses the BMS major) offsets the travel expenses for the students. In addition to Estonia, previous BMS learning abroad experiences have taken place in Malawi and Guatemala. For spring break 2020, the seniors are slated to return to Estonia.

**December 2019**

**Biomedical Science (BMS) Major**

**Mailing Address:**

1080 Graves Hall  
333 West 10<sup>th</sup> Ave.  
Columbus, OH 43210

**Office Location:**

1080 Graves Hall

**Telephone:**

614-247-8060

**Website:**

[medicine.osu.edu/bms](http://medicine.osu.edu/bms)

**Faculty Director:**

John Gunn, PhD  
([gunn.43@osu.edu](mailto:gunn.43@osu.edu))

**Program Manager:**

Steven Mousetes, MEd, MLS  
([mousetes.1@osu.edu](mailto:mousetes.1@osu.edu))

*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>Omar Alghothani</b> Columbus, OH Upper Arlington High School	<b>Abigail Berk</b> Ottawa Hills, OH Ottawa Hills High School	<b>Emma Bolkovac</b> Lewis Center, OH Olentangy High School
<b>Alexis Brengartner</b> Powell, OH Olentangy Liberty High School	<b>Peter Burback</b> Hilliard, OH Hilliard Davidson High School	<b>Prathik Chakravarthy</b> Beavercreek, OH Beavercreek High School
<b>Harrshavasan Congivaram</b> Hudson, OH Hudson High School	<b>Isabella Goncalves</b> Naperville, IL Naperville North High School	<b>Benjamin Hu</b> Grand Forks, ND Red River Senior High School
<b>Shrina Jasani</b> Strongsville, OH Strongsville High School	<b>Pete Jordanides</b> Massillon, OH Jackson High School	<b>Anagh Kulkarni</b> Mason, OH William Mason High School
<b>Elizabeth Merritt</b> Powell, OH Olentangy Liberty High School	<b>Matthew Minick</b> Mason, OH William Mason High School	<b>Anthony Moussa</b> Hilliard, OH Hilliard Darby High School
<b>Rakesh Murugesan</b> Plain City, OH Dublin Jerome High School	<b>Manasi Patel</b> Richland, WA Richland High School	<b>Luke Pepperney</b> Powell, OH Olentangy Liberty High School
<b>Alissa Ray</b> Perrysburg, OH Eastwood High School	<b>Megan Rinehart</b> Canal Winchester, OH Canal Winchester High School	<b>Bridget Rogers</b> Massapequa, NY Massapequa High School
<b>Ethan Schmenk</b> Kalida, OH Kalida High School	<b>Nickolai Seculov</b> Columbus, OH Worthington Kilbourne High School	<b>Jose Segura-Bermudez</b> Columbus, OH Saint Charles Preparatory School
<b>Snehi Shah</b> Seven Hills, OH Padua Franciscan High School	<b>Samuel Speaks</b> Grandview Heights, OH Grandview Heights High School	<b>Heema Vyas</b> Springboro, OH Springboro High School

### Autumn 2019 Freshman Admission

Total Applicants: 215

Interviewed: 50

Enrolled: 27

- Average Calculated ACT: 33.8
- Average High School Class Rank: 97.2 (top 2.8%)

### Merit-based Scholarships

Biomedical Science (\$1,000 per year): 25

Eminence (full cost of education): 2

Excellence (full in-state tuition): 1

Maximus (\$3,000 per year): 16

National Buckeye (\$13,500 per year): 4

Provost (\$2,000 per year): 7

Trustees (\$1,000 per year): 1

*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 2019 Enrollment at The Ohio State University

Total Enrollment: 68,262

Columbus Campus: 61,391

Undergraduate (Columbus): 46,818

Freshmen (Columbus): 7,630

Average ACT: 29.5

Average SAT: 1347

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

## Congratulations, BMS Class of 2019!



**Members of the Class of 2019**  
(hometown and post-graduation pursuits)

<b>Madison Allen</b> <ul style="list-style-type: none"> <li>• Aurora, OH</li> <li>• MPAP: Ohio University</li> </ul>	<b>Alicia Bao</b> <ul style="list-style-type: none"> <li>• Dublin, OH</li> <li>• MD: The Ohio State University</li> </ul>	<b>Traci Blue</b> <ul style="list-style-type: none"> <li>• Overland Park, KS</li> <li>• InTouch Solutions: Planning Intern</li> </ul>
<b>Olivia Carter</b> <ul style="list-style-type: none"> <li>• Reynoldsburg, OH</li> <li>• Gap year</li> <li>• Applying to medical school</li> </ul>	<b>Ashlee Chadwick</b> <ul style="list-style-type: none"> <li>• Cincinnati, OH</li> <li>• Teach For America</li> </ul>	<b>Karthik Chakravarthy</b> <ul style="list-style-type: none"> <li>• Beavercreek, OH</li> <li>• MD-PhD: The Ohio State University</li> </ul>
<b>Kyle Deistler</b> <ul style="list-style-type: none"> <li>• Lewis Center, OH</li> <li>• MD: The Ohio State University</li> </ul>	<b>Andrew Fernandez</b> <ul style="list-style-type: none"> <li>• Columbus, OH</li> <li>• DO: Ohio University</li> </ul>	<b>Max Fernandez</b> <ul style="list-style-type: none"> <li>• Columbus, OH</li> <li>• DVM: The Ohio State University</li> </ul>
<b>Simon Fernandez</b> <ul style="list-style-type: none"> <li>• Columbus, OH</li> <li>• Gap year</li> <li>• Applying to medical school</li> </ul>	<b>Jacob Grimmer</b> <ul style="list-style-type: none"> <li>• Parma, OH</li> <li>• Gap year</li> <li>• Applying to medical school</li> </ul>	<b>Browning Haynes</b> <ul style="list-style-type: none"> <li>• Shaker Heights, OH</li> <li>• MD: Oregon Health &amp; Science University</li> </ul>
<b>Andrew Hu</b> <ul style="list-style-type: none"> <li>• Grand Forks, ND</li> <li>• MD: The Ohio State University</li> </ul>	<b>Austin Keller</b> <ul style="list-style-type: none"> <li>• Lake Zurich, IL</li> <li>• MS: The Ohio State University</li> </ul>	<b>Victoria Kocsuta</b> <ul style="list-style-type: none"> <li>• Pittsburgh, PA</li> <li>• MD: Northwestern University</li> </ul>
<b>Megan Kruze</b> <ul style="list-style-type: none"> <li>• North Royalton, OH</li> <li>• DPT: Cleveland State University</li> </ul>	<b>Kathryn Lane</b> <ul style="list-style-type: none"> <li>• Kendallville, IN</li> <li>• Gap year</li> <li>• Applying to medical school</li> </ul>	<b>Eun-Ju Joyce Lee</b> <ul style="list-style-type: none"> <li>• Dublin, OH</li> <li>• Gap year</li> <li>• Applying to medical school</li> </ul>
<b>Alexandria Lenyo</b> <ul style="list-style-type: none"> <li>• Huron, OH</li> <li>• MD: Washington University</li> </ul>	<b>Sophia Maharry</b> <ul style="list-style-type: none"> <li>• Columbus, OH</li> <li>• MD-PhD: University of North Carolina at Chapel Hill</li> </ul>	<b>Nicholas Pappa</b> <ul style="list-style-type: none"> <li>• Columbus, OH</li> <li>• MD: The Ohio State University</li> </ul>
<b>Aman Prasad</b> <ul style="list-style-type: none"> <li>• Dublin, OH</li> <li>• MD: University of Pennsylvania</li> </ul>		

**Degree Awarded:** Bachelor of Science in Biomedical Science

### Latin Honors: 20

- Cum laude (3.500-3.699): 2
- Magna cum laude (3.700-3.899): 11
- Summa cum laude (3.900-4.000): 7

### Honors in the College of Medicine (COM): 20

- With Honors (completed COM Honors Program): 16
- With Honors Research Distinction (completed COM Honors Program and Thesis): 4

### Minors: 7

- Classics, Global Public Health (2), History, Neuroscience, Russian, Spanish



## Summer 2019 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.

### Naim Abubaker: Cardinal Health

"During summer 2019, I worked at Cardinal Health, a health tech company, as a software engineering intern. During my sophomore year, I was exposed to coding by my peers and became interested in computer science and how it's integrated into the health field. At Cardinal Health, I had the privilege of working on developing a full stack web application that helped pharmacies gain better control of their inventories and spend more time with their patients. Outside of software development, I had the opportunity to see many world-class facilities that Cardinal Health has, such as their distribution center and global headquarters. I also enjoyed talking with high-level executives within the company and learning about their professional journeys. I truly enjoyed my experience with Cardinal Health, as it opened many opportunities for me post-graduation."



### Frances Avila-Soto: Ecuador

"In June 2019, I participated in the 'Child Family Health International: From Rainforest to Coast' program. Child Family Health International is an organization aimed at connecting students with local professionals and community leaders to learn about global health. The program in which I participated was a four-week program where we cycled through different clinics in both urban and rural settings. We shadowed local healthcare providers, joined the Ministry of Public Health on vector control outings (i.e., went mosquito hunting), learned about infectious diseases, and even stayed with an indigenous community in the Amazon for three days to learn about medicinal plants. It was an incredibly transformative experience that furthered my passion for global health."



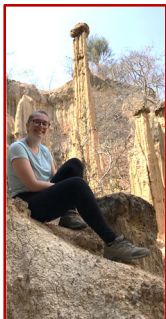
### Jacob Farr: CDC

"During summer 2019, I completed an internship at the U.S. Centers for Disease Control and Prevention (CDC) through the CDC Undergraduate Public Health Scholars (CUPS) program and Morehouse College. For the first two weeks, I participated in intensive classes that ran 8 a.m. to 4 p.m. on the fundamentals of public health. I spent the next two months working with the CDC Center for Global Health to improve their information management and perform a mixed-methods analysis of the Field Epidemiology Training Program's impact on malaria. I summarized my findings in a manuscript I presented to CDC department heads to solicit more funding. I was then selected to present again in a student showcase at CDC headquarters. I loved my internship experience at the CDC for all the diverse opportunities it brought. Working with professionals across the world in three different languages helped me see the practical applications of global public health. Mentorship from the Epidemic Intelligence Service, military, and Public Health Commissioned Corps introduced me to unique career opportunities I otherwise would not have considered. Moving forward, I am excited to combine a medical career with the passion for public health this internship helped cultivate!"



### Abigail Foster: Tanzania

"During July 2019, I traveled to Tanzania through an education abroad program focused on learning how East Africa historically and currently is dealing with the HIV epidemic. While there, I researched how gender inequalities affect healthcare outcomes for HIV positive people in a small town called Iringa. In Iringa, I interviewed clinicians, HIV positive peer mentors, and women's advocacy groups to learn about their experiences with the disease and how this experience has changed over time. We studied how foreign aid affects the Tanzanian healthcare system and how healthcare outcomes are different when HIV-related healthcare is free to all in a nation. We also met with traditional healers, school administrators and teachers, HIV support groups, and religious organizations to learn about the role they play in the fight to end HIV/AIDS. We learned some basic Swahili, so we were able to make friends with the Tanzanian students, who were living in the dorms with us, as well as navigate Iringa's bustling market district. This education abroad experience solidified my interest in researching HIV/AIDS, especially from a public health perspective. I am now more driven than ever to help increase access to HIV treatments and break down barriers to life-saving interventions."



**Daniel Lesman: Broad Institute**

"During summer 2019, I spent fifteen weeks at the Broad Institute in Cambridge, MA, where I worked on developing technologies for basic science research. Besides learning new laboratory techniques, such as second-generation sequencing library preparation, I also learned a lot about data analysis and programming. I worked on two projects over the course of the summer. One was a tool that allows for the continuous diversification of human cells and the other was seeking to develop a new way of visualizing cellular differentiation. I absolutely loved my summer experience. The people I worked with were incredible, and every day I was being challenged and learning new things. This summer furthered my passion for research and learning and taught me about a completely new field of research. In my free time, I would play basketball with my lab mates and spend time with my older brother who lives in the area."



## Updates on the BMS Class of 2015

The class of 2015 is the seventh graduating class from the BMS major.  
Listed below are education/career updates from 15 members of this class.

**Kyle Atcheson:** Graduated from the University of Pittsburgh School of Medicine with MD; completing radiology residency at Wake Forest Baptist Health

**Daniel Brook:** Continuing MD-PhD at The Ohio State University College of Medicine and College of Public Health; published in *BMC Health Services Research*

**Luke Cheng:** Studying computer science; interning as web developer with Connetic Ventures

**Jennifer DeSalvo:** Graduated from The Ohio State University College of Medicine with MD; completing internal medicine-pediatrics residency at The Ohio State University and Nationwide Children's Hospital

**Elizabeth (Bley) Grogan:** Graduated from The Ohio State University College of Medicine with MD; completing pediatrics residency at Nationwide Children's Hospital

**Markus Harrigan:** Continuing MD-PhD at The Ohio State University College of Medicine

**Kaitlin Keenan:** Continuing MD at Cleveland Clinic Lerner College of Medicine

**Anjella Manoharan:** Graduated from Loyola University Chicago with MS in Medical Physiology; continuing MD at University of Illinois at Chicago

**Michael Neiger:** Graduated from The Ohio State University College of Medicine with MD; completing internal medicine-pediatrics residency at The Ohio State University and Nationwide Children's Hospital

**Amanda Selhorst:** Graduated from Ohio Dominican University with MS in Physician Assistant Studies; working as a physician assistant at the Wexner Medical Center

**Jeremiah Shaw:** Graduated from The Ohio State University College of Medicine with MD; completing family medicine residency at the University of Wisconsin School of Medicine and Public Health

**Evan Sommer:** Continuing MD-MBA at Wright State University Boonshoft School of Medicine

**Edward Sundin:** Continuing MD at Northeast Ohio Medical University

**Emma Wise:** Working as the office supervisor for the OhioHealth Genetic Counseling Program

**Katherine Yates:** Graduated from Harvard Medical School with MD; completing internal medicine residency at Vanderbilt University Medical Center; published in *Journal of the American Academy of Psychiatry and the Law*, *The Journal of Rheumatology*, *The Rheumatologist*, *Substance Use and Misuse*, *Tobacco Regulatory Science*, and *Updates in Slow Medicine*

# Please Donate

## Biomedical Science Undergraduate Program Support Fund

This fund provides enrichment grants to BMS students for activities and endeavors such as research, education abroad, internships, conferences, etc.

To donate to the Biomedical Science Undergraduate Program Support Fund, please visit [go.osu.edu/giving](http://go.osu.edu/giving) then click on "Select a specific fund." The fund number is 315983. If you need assistance with making a donation, please contact The Ohio State University Foundation at [gifts@osu.edu](mailto:gifts@osu.edu) or 614-292-2141.

Thank you for your support of the BMS major!

## Research Achievements for 2018-2019

On-campus Research Fora		
Forum	Students	Description
<b>Autumn Undergraduate Research Festival</b> November 1, 2018	Total: 13 Seniors: 2 Juniors: 9 Sophomores: 2	This forum highlights the research conducted by undergraduate students during the summer.
<b>Denman Undergraduate Research Forum</b> February 20, 2019	Total: 3 Seniors: 3	This prestigious forum is exclusively for graduating seniors.
<b>Spring Undergraduate Research Festival</b> March 26, 2019	Total: 9 Juniors: 9	This forum highlights the research conducted by undergraduate students during the 2018-2019 academic year.
<b>OSUWMC Trainee Research Day</b> April 11, 2019	Total: 10 Seniors: 1 Juniors: 8 Sophomores: 1	This annual event features the biomedical research of trainees within the Wexner Medical Center.

## 2019 Pelotonia Fellows

The Pelotonia Fellowship Program trains promising and accomplished Ohio State students at all levels and from any discipline who have the potential to become independent cancer researchers.

Student	Research Mentor	Project
Kriti Agrawal	Thomas Mace, PhD	Lipocalin-2 Expression by Myeloid-Derived Suppressor Cells in the Pancreatic Tumor Microenvironment
Nikhil Pramod	Bhuvaneswari Ramaswamy, MD, and Sarmila Majumder, PhD	Unlocking Her2 as a Target in Invasive Lobular and Endocrine-Resistant Invasive Ductal Carcinoma
Maxwell Wilberding	Sameek Roychowdhury, MD, PhD	Characterizing the Role of OLFM4 in Cholangiocarcinoma

## Biomedical Science “Grever” Internship 2019

Each year, Dr. Michael Grever, Physician and Faculty Emeritus, hosts 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 92 BMS students have participated since its inception.

Intern/Student	Research Mentor
Nicholas Fadell	Jonathan Davis, PhD
Sanjana Kothari	Kalpana Ghoshal, PhD
Evan Neczypor	Loren Wold, PhD
Divya Shankar	Susheela Tridandapani, PhD
Shreya Shaw	Amy Ferketich, PhD
Esteban Trujillo	Candice Askwith, PhD
Zachary Wilson	Mireia Guerau-de-Arellano, PhD

