

Biomedical Science Undergraduate Major Annual Report 2014

Biomedical Science Seniors Apply Classroom Concepts to Real-World Problems

In December 2013, ten Biomedical Science (BMS) seniors participated in a once-in-a-lifetime service-learning trip to Malawi, Africa. The trip was the culmination of a semester-long course titled *Special Topics in Biomedical Science I: Immunology and Infectious Disease*. This course is part of the BMS senior year curriculum. Students spend the first half of the course studying tuberculosis and the second half learning about HIV. Though the service-learning component of the course is optional, most students take advantage of the unique opportunity, one of only a select few options for immersive disease-based learning at Ohio State.

Jesse Kwiek, PhD, Associate Professor in the Department of Microbial Infection and Immunity, teaches the course alongside Jordi Torrelles, PhD, Assistant Professor in the Department of Microbial Infection and Immunity. The pair teaches the course with the goal of getting students involved in both lectures and a more interactive learning environment.

"In the traditional classroom setting, students are consumers of knowledge," Kwiek said. "This class and the service-learning try to transition students into being the producers of knowledge. It makes the class more active learning."

That trip included working at a rural Malawian hospital, participating in a cultural exchange with students in the HIV/AIDS club at the Malowa Community Day Secondary School, and visiting Malawi Children's Village. Students gained a global perspective of the effects of tuberculosis and HIV, while also leaving something tangible for their Malawian hosts.

Tyler Siekmann, now an MD student in Ohio State's College of Medicine, went on the Malawi trip. He said it changed the way he views tuberculosis and HIV in heavily affected areas like Malawi.

"It is one thing to learn about the impact of these diseases on paper, but it is something entirely more powerful to meet the people who deal with these realities every day," Siekmann said. "One thing I really took away from this trip is that the people of Malawi do not let HIV or TB define them. Life goes on in the midst of these crises and communities simply learn how to adapt."



Siekmann also enjoyed the chance to put what he had been learning over the course of the semester into practice.

"One of the coolest experiences was getting to go out in the villages to speak with the chiefs about the work we were doing," he said. "For months we had been working on ways to collect and present data on these villages back in the United States, so it was incredible to be able to actually travel to those villages and meet the people we were trying to help. In the villages, we also had the privilege of playing soccer and chatting with the local kids, which is something I'll never forget."

To read Alison Scott's complete article about the BMS service-learning trip to Malawi, go to lsn.osu.edu.

December 2014

Biomedical Science (BMS) Major

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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!

Nicholas Berry Muskego, WI Muskego High School	Alexander Lacey Dublin, OH Dublin Coffman High School	Maria Riley Sunbury, OH St. Frances DeSales High School
Nicholas Bishop Sykesville, MD Liberty High School	Neil Makhijani Dayton, OH Centerville High School	Stephen Rudolph Cranberry Township, PA Seneca Valley High School
Audrey Dahill Rocky River, OH Magnificat High School	Molly McNamara Dublin, OH Dublin Coffman High School	Hanna Schlaack Cincinnati, OH Ursuline Academy
Anjali Doshi New Albany, OH New Albany High School	Karan Naik Dayton, OH Centerville High School	Clinton Stamper Ashville, OH Teays Valley High School
Bradley Eichar Wooster, OH Smithville High School	Christina Namakydoost Powell, OH Olentangy Liberty High School	Katharine Thomas Lancaster, OH Lancaster High School
Mason Fisher Columbus, OH Bishop Watterson High School	Komal Paradkar Mason, OH William Mason High School	Ziyue Wang Columbus, OH Upper Arlington High School
Maria Guerrero Dublin, OH Dublin Coffman High School	Remy Powell Columbus, OH St. Charles Preparatory School	Alexander Weiss New Albany, OH Metro High School
Syeda Kenza Kamal Dublin, OH Dublin Jerome High School	Abigail Rieger Cincinnati, OH Mother of Mercy High School	Jonathan Zins Powell, OH St. Charles Preparatory School
Holden Kelley Cincinnati, OH Elder High School		

Autumn 2014 BMS Freshman Admission

Total Applicants: 148 (This is a 22.3% increase from 2013.)

- Interviewed: 51
 - Enrolled: 25
 - Average ACT: 32.5
 - Average SAT: 1400 (Critical Reading and Math)
 - Average High School GPA (unweighted): 3.92

Merit-based Scholarships

Eminence (full cost of education): 1
 Excellence (full in-state tuition): 4
 Joyce (full cost of education): 1
 Maximus (\$6,000 per year): 10
 National Buckeye (\$12,000 per year): 3
 Provost (\$3,000 per year): 9



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.

Autumn 2014 Enrollment at The Ohio State University

Total Enrollment: 64,868
 Columbus Campus: 58,322
 Undergraduate (Columbus): 44,741
 Freshmen (Columbus): 7,024
 Average ACT: 28.8

Average SAT (Critical Reading and Math): 1269

For additional information on enrollment at Ohio State, go to enrollmentservices.osu.edu.

Congratulations, BMS Class of 2014!



**Members of the Class of 2014
(hometown and post-graduation pursuits)**

Elizabeth Butler Bay Village, OH PA – Baylor University	Andrew O’Neil Lewis Center, OH MD – Indiana University
Alexandra Butz Canton, OH MD – University of Cincinnati	Mark Rudolph Toledo, OH Research Assistant I – The Ohio State University
Jordan Chambers Hawthorn Woods, IL PhD (Biomedical Sciences) – Boston University	Tyler Siekmann Mason, OH MD – The Ohio State University
Rachel D’Amico Wyoming, OH MD – The Ohio State University	Katherine Stanfill Powell, OH MPH – Emory University
Callie Drohan Hudson, OH MD – University of Pittsburgh	Radhika Tampi Pickerington, OH MHS – Johns Hopkins University
Christine Fung Beavercreek, OH JET Program; MD – Pursuing admission for autumn 2015	Chelsea Torres Cape Coral, FL MD – University of South Florida
Brian Hurwitz Cincinnati, OH MD/PhD – Cornell University	Clem John Wegman III North Bend, OH MD – The Ohio State University
Matthew Koerbel Maineville, OH Entering workforce	Jennifer Wisel Hilliard, OH Entering workforce

Degree Awarded: Bachelor of Science in Health and Rehabilitation Sciences

Latin Honors: 13

- Cum laude (3.500-3.699): 3
- Magna cum laude (3.700-3.899): 7
- Summa cum laude (3.900-4.000): 3

Honors in the School of Health and Rehabilitation Sciences (SHRS): 13

- With Honors (completed SHRS Honors Program): 7
- With Honors Research Distinction (completed SHRS Honors Program and Thesis): 6

➤ This is the highest honor bestowed upon an undergraduate student.

Thank you to the thesis advisors: Drs. Susan Cole, A. Courtney Devries, Balveen Kaur, Sarmila Majumder, Jill Rafael-Fortney, and Amanda Toland.

BMS Curriculum

The BMS curriculum follows a lockstep model, and students advance through the curriculum as a cohort. The learning objectives of the BMS curriculum are as follows:

- Provide students with a strong science background
- Develop students' oral and written communication skills, particularly in the sciences
- Develop students' abilities to work in teams and lead teams
- Develop students' abilities to review peers
- Develop students' critical and analytical thinking skills

Freshman

- **Biomedical Science Survey** (autumn semester)
Instructors: Steven Mousetes, MEd, MLS; Stephanie Schulte, MLIS
- **Mastering the Biomedical Literature I** (spring semester)
Instructors: Jonathan Godbout, PhD; Stephanie Schulte, MLIS

Sophomore

- **Mastering the Biomedical Literature II** (autumn semester)
Instructor: John Gunn, PhD
- **Biomedical Science Laboratory Techniques** (spring semester)
Instructors: Samir Acharya, PhD; John Gunn, PhD; Mariko Nakano, PhD; W. James Waldman, PhD

Junior

- **Biomedical Science Research Experience I** (autumn semester)
Instructors: Anthony Brown, PhD; Andrew Fischer, PhD; Traci Wilgus, PhD
- **Biomedical Science Research Experience II** (spring semester)
Instructors: Gregory Lesinski, PhD; Amanda Toland, PhD

Senior

- **Concepts in Healthcare I: Humanistic and Social Issues in Medicine and Biomedical Science** (autumn semester)
Instructors: Daniel Clinchot, MD; John Davis, MD, PhD
- **Concepts in Healthcare II: Introduction to Health Policy and Leadership in Healthcare** (spring semester)
Instructor: Andrew Thomas, MD, MBA
- **Special Topics in Biomedical Science I: Immunology and Infectious Disease** (autumn semester)
Instructors: Jesse Kwiek, PhD; Jordi Torrelles, PhD
- **Special Topics in Biomedical Science II: Genetics and Neurological Disease** (spring semester)
Instructors: Candice Askwith, PhD; Kirk Mykytyn, PhD
- **Special Topics in Biomedical Science III: Cancer Research** (spring semester)
Instructor: Pawan Kumar, PhD

BMS Students Engage in Special Summer Opportunities

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.

BMS Student	Summer Opportunity
Elizabeth Bley	Cincinnati Zoo – Cincinnati, OH (cincinnati.zoo.org)
Daniel Brook	DAAD Research Internships in Science and Engineering (RISE) Program – Germany (daad.org/undergraduates)
Luke Cheng	Chester Summer Scholars Program – Cleveland, OH (metrohealth.org/chester-summer-scholars-program)
Victoria Gosy	Global Health Initiative – Peru (u.osu.edu/globalhealthinitiative)
Brandon Liebaw	Medical Ministry International – Bolivia (medicalministrytrips.org)
Katherine Yates	Center for Excellence in Regulatory Tobacco Science (CERTS) – six Appalachian counties in Ohio (cph.osu.edu/certs)

Research Achievements for 2013-2014

"Undergraduate research experiences in the biomedical sciences at Ohio State's College of Medicine (COM) are key to determining what types of graduate programs, including medical school, students will choose for their career paths. These laboratory-based and clinical research opportunities with COM faculty provide familiarity with how research is conducted and whether discovery-based research is something that each student wishes to continue."

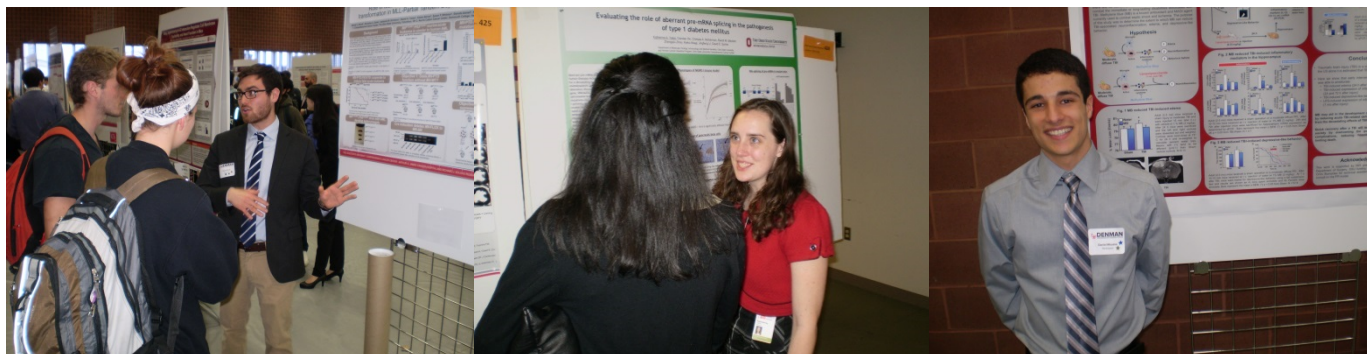
Joanna Groden, PhD
Vice Dean for Research, COM

Research Fora

Forum	BMS Students	Notes
Denman Undergraduate Research Forum March 26, 2014	Total: 22 • Seniors: 7 • Juniors: 13 • Sophomores: 2	Awards: 10 • 2 nd Place: 3 • 3 rd Place: 4 • 4 th Place: 3
National Council on Undergraduate Research April 3-5, 2014	Total: 3 • Juniors: 3	Hosted by the University of Kentucky, the students attended the conference and presented their posters
OSUWMC Trainee Research Day April 10, 2014	Total: 15 • Seniors: 3 • Juniors: 12	Katherine Yates, BMS junior, awarded outstanding research trainee travel grant

Pelotonia Fellows 2013 and 2014

BMS Student	Mentor	Project
Daniel Brook	Michael Caligiuri, MD	The effect of MLL-WT on the development of MLL-PTD+ Acute Myeloid Leukemia
Rachel D'Amico	Susan Cole, PhD	DLL-3 as a potential tumor suppressor via inhibition of Notch-1 signaling in gliomas
Callie Drohan	Robert Baiocchi, MD, PhD	Investigation of direct anti-tumor activity and immune potentiating effects of the drug silvestrol on nasopharyngeal carcinoma
Christine Fung	A. Courtney DeVries, PhD	Role of oxytocin in the activation of macrophages to an M2 phenotype in the tumor microenvironment
Markus Harrigan	Gustavo Leone, PhD	Identifying stromal oncogene-type candidate genes in the KRAS mutant tumor microenvironment
Kaitlin Keenan	Gregory Lesinski, PhD	STAT3 Inhibition in Biliary Cancer
Mark Rudolph	Sarmila Majumder, PhD	Solute carrier family protein SLC-39A6 is a novel target of aberrantly activated Hedgehog signaling pathway in endocrine resistant breast cancer

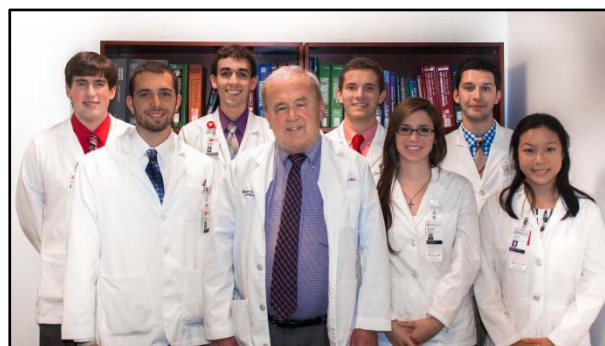


Internal Medicine "Grever" Internship 2014

Each year, Michael Grever, MD, Chair of Internal Medicine, coordinates 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.

Lindsey Jeric, Student Education Program Manager in Internal Medicine, works closely with the interns to provide them with individualized experiences based on their interests. The interns rotated among areas such as general med, oncology, hematology, general cardiology, and acute coronary.

Intern/Student	Mentor
Kyle Atcheson	Jonathan Godbout, PhD
Andrew Branstetter	Naduparambil Jacob, PhD
Lauren Chen	Jill Rafael-Fortney, PhD
Jennifer DeSalvo	Jill Rafael-Fortney, PhD
Markus Harrigan	Gustavo Leone, PhD
Matthew Lordo	Sarmila Majumder, PhD
Ethan Schimmoeller	Candice Askwith, PhD



BMS Bids a Fond Farewell to Lori Martensen and Welcomes Steven Mousetes



Left to right: Steven Mousetes (current Program Manager), Lori Martensen (former Program Manager), and John Gunn (Faculty Director)

In October 2013, Lori Martensen, the Program Manager of the BMS major since its inception, accepted a new position as the Associate Director of the College of Medicine's Clinical Skills Center.

About her tenure in BMS, Martensen stated, "It was an honor to be the Program Manager for the BMS major. The pride and commitment the faculty, students, and alumni have for this program made the work so rewarding for me. While I am no longer involved on a day-to-day basis, I will always consider myself part of the BMS family. I know I will look back someday and consider the time I spent with the major as one of the highlights of my career as well as one of the highlights of my life."

John Gunn, the Faculty Director for BMS, noted, "Lori helped to shape this major and was a devoted mentor to our students. She cared deeply about helping them achieve their goals. When I accepted the position of Director in 2011, a stipulation was that Lori must be retained as the Program Manager. She was the heart and soul of the program."

Steven Mousetes began as the BMS Program Manager in October 2013. Mousetes has worked at Ohio State since 2004 and, most recently, served as the Assistant Director for Honors in the University Honors & Scholars Center.

Gunn is extremely pleased to have Mousetes in this position. He stated, "When Lori decided to accept a new position, Steven was the first thought of both of us as her successor. He had helped us significantly in BMS events and interviews and was highly regarded in his previous position in Honors & Scholars. Steven has easily adapted to the Program Manager position, taking all of the right steps to gain acceptance and respect of administration and students while breathing new life and a wealth of experience into the major."

On his role as Program Manager, Mousetes commented, "While I definitely enjoyed my time in Honors & Scholars, I was ready for a change and new challenges. Since I was already familiar with the BMS major and knew several of the current students, I was able to 'hit the ground running.' The faculty, students, and alumni reached out right away to welcome me. It is truly a professional privilege to be in this role at Ohio State."

Updates on the BMS Class of 2010

The class of 2010 is the second graduating class from the BMS major. Listed below are education/career updates from the members of this class.

Daniel Bain: Graduated from the Moritz College of Law at The Ohio State University; successfully passed the Ohio Bar and Patent Bar; employed at Turner Oil and Gas Properties

Allyn Checovich: Graduated from the College of Medicine at The Ohio State University; completing general surgery residency at St. John Hospital (in Detroit, MI); plans to pursue fellowship in trauma/critical care surgery after residency; published in *Blood*, a hematology journal

Claudia Chou: Graduated from the College of Medicine at The Ohio State University; interning at the Mayo School of Graduate Medical Education (in Rochester, MN)

Madelaine Driskill: Continuing DMD program in the School of Dental Medicine at the University of Pennsylvania

Emily Ginier: Graduated from the School of Library and Information Science at Kent State University; co-authored an article published in *Medical and Reference Services Quarterly*; employed as an informationist at the University of Michigan's Taubman Health Sciences Library

Christine Glendon: Graduated from the School of Medicine at Case Western Reserve University; completing residency in emergency medicine at Carl R. Darnall Army Medical Center (in Fort Hood, TX)

Amanda Harper: Continuing Medical Scientist Training Program in the College of Medicine at The Ohio State University; during summer 2014, published in *PLOS One*

Eric Hill: Continuing PhD program in Life and Biomedical Sciences at Northwestern University

Alex Jaeger: Continuing PhD program in Biomedical Science at Duke University; pursuing academic postdoctoral positions for spring 2015; assisted in establishing an international collaboration at the Abo Akademi in Turku, Finland; during 2014, published three papers

Alex Liber: Graduated from the Rollins School of Public Health at Emory University; during 2014, published seven papers and chapters in monographs on tobacco use; served as a contributing author and managing editor for the book, *The Tobacco Atlas*; employed at the American Cancer Society; pursuing admission to PhD programs focused on health policy

Matthew Magyar: Graduated from the College of Medicine and Life Sciences at The University of Toledo; interning in pediatrics at the University of Illinois at Chicago

Tyler Miller: Continuing Medical Scientist Training Program in the School of Medicine at Case Western Reserve University; awarded NIH F30 Fellowship; co-authored several papers published in four different journals

Kristin Reeve: Graduated from the College of Medicine at The Ohio State University; completing obstetrics and gynecology residency at St. Vincent Hospital (in Indianapolis, IN)

Stephen Roderer: Graduated from the College of Medicine at The Ohio State University; completing residency in internal medicine with primary care track at Ohio State's Wexner Medical Center

Abigail Short: Continuing Medical Scientist Training Program in the Feinberg School of Medicine at Northwestern University; published a review for *Translation Research*; delivered talks at conferences in Hawaii, Washington DC, and Greece

Joshua Stowell: Employed by North American Science Associates as study director for GLP preclinical safety testing of medical devices

Adrienne Strong: Continuing PhD program in Cultural Anthropology at Washington University; conducting field research in Tanzania; awarded a National Science Foundation Doctoral Dissertation Improvement Grant and Fulbright-Hays Doctoral Dissertation Research Abroad Grant to fund dissertation fieldwork; has two publications on maternal mortality slated to be released in 2015

Tarangi Sutaria: Served with AmeriCorps by working as a medical assistant in Northern Virginia; continuing as second year MD student at the Carilion School of Medicine at Virginia Tech

Jennifer (Chou) Weber: Graduated from the College of Medicine at The University of Arizona; completing pediatric residency at the Phoenix Children's Hospital/Maricopa Medical Center (in Phoenix, AZ)

Adrian Zoller: Graduated from the Fisher College of Business (MBA) and College of Public Health (MHA) at The Ohio State University; lead team to first place finish in the 2013 Ohio State University Business Plan Competition; served as a member of Ohio State's first team to complete in the Venture Capital Investment Competition; part of Bjönd (www.bjondinc.com), a startup company