DIRECTOR’S WELCOME

UK’s strategic vision recognizes the need for strong efforts in clinical, translational, and basic science, and this has driven an institutional commitment to develop several prominent multidisciplinary centers of research excellence with targeted faculty recruitments to address key research priorities and translate research into clinical application. Developing and maintaining a workforce of physicians and scientists who can lead multidisciplinary research teams continues to be a key cornerstone of UK’s plan to accelerate the pace of discovery for the prevention, detection, diagnosis, and treatment of disease thereby improving the health of Kentucky and the nation. A robust MD/PhD program is a key component to this approach and provides training that will expedite the development of science-based improvement in human health.

Our students excel not just in their scientific achievements, but also in academic records, leadership roles, and community service. Applications for the UK program come from across the US and Canada, and our current students reflect that diversity with undergraduate degrees from the finest schools across the country. The MD/PhD students had another record year for publications – 30 in the last 18 months, including a first author paper in Science repurposing anti-retroviral therapy. Students are gaining visibility by presenting high-caliber science at national and international meetings and with the receipt of local and national awards, with nearly all of our students receiving extramural funding for their work during graduate school. While challenges may lie ahead for healthcare and academic medicine, UK MD/PhD students will be well prepared to meet them and to continue the critical role that physician-scientists have played in the biomedical work force.

Susan Smyth, MD, PhD

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2015 Program Retreat in Gatlinburg, TN
CHARLES COOMER – M1, WESTERN KENTUCKY UNIVERSITY

I was born in Louisville, Kentucky, and graduated from the Honors College at Western Kentucky University (WKU) in 2014 with degrees in biology and chemistry and a minor in music. Whilst studying at WKU, I investigated the utility of bacterial viruses as a sustainable alternative to antibiotic treatment in the biofuel industry—a project that triggered my interests in basic science research. Desiring to focus my research in a medically-relevant field, I completed an internship and fellowship at the National Cancer Institute, addressing questions regarding HIV persistence and drug resistance. Following my undergraduate education, I pursued an MSc in Infection and Immunity at University College London as a Fulbright scholar, expanding my research interests to emerging infectious diseases, particularly how proteins of negative-sense, single-stranded RNA viruses modulate the cell-intrinsic immune response. Outside of the classroom and laboratory I enjoy marathon-running, ultimate Frisbee, and performing chamber music as a violinist. The rapid expansion of University of Kentucky’s research facilities, the warmhearted faculty and students, and the blooming emphasis placed on emerging infectious diseases in the Molecular & Cellular Biochemistry department.

RYAN CLOYD– M1, WABASH COLLEGE

I’m from Indianapolis. I did my undergrad at Wabash College with a major in biochemistry. I’m interested in studying neurodegeneration and spent the summer rotating in Jose Abisambra’s lab. I chose UK because of the overall collaborative nature and positive environment.

BRANDON FARMER – M1, WESTERN KENTUCKY UNIVERSITY

I am a Kentucky native, raised on a farm just outside of Lexington. I attended the Gatton Academy of Mathematics and Science at Western Kentucky University my junior and senior year of high school, and then elected to continue my undergraduate coursework at WKU. I developed a passion for research and travel at WKU, where I studied abroad in Costa Rica, Mexico, and Kenya. I completed an honors thesis on corneal endothelial cell proliferation. I graduated in May 2015 with a BS in Biology, a BS in Chemistry, and a minor in Spanish. Outside of school, I enjoy spending time with my yellow lab Stella, running, and playing tennis. I chose UK for MD/PhD training because of the comfortable program size, the genuinely happy students and personable faculty, and the accessible high-caliber research being conducted.

LAURA KRUEGER – M1, MIAMI UNIVERSITY

I am from Cincinnati, Ohio and graduated from Miami University where I studied Biochemistry and Mathematics. I was also a member of the varsity swim team. During the past two years, I worked at Cincinnati Children’s Hospital investigating genetic eye disorders. I enjoy spending time with my family, cooking, and playing and watching sports. I chose to attend UK because of the how welcoming and friendly everyone was when I visited. For my graduate studies I wanted a supportive and stable environment and the UK MD/PhD program was the perfect fit.

LEON SU – M1, WHEATON COLLEGE

I grew up in Carmel, IN and studied mathematics at Wheaton College in Wheaton, IL. During my undergraduate years I participated in various projects involving biostatistics research. For quite a few years now, my biggest academic interests have been math and medicine. Biostatistics is where these two fields meet, and I hope to be able to pursue both biostatistics and medicine of these in Kentucky’s MD/PhD program. I chose Kentucky because they were one of the few programs I found that was willing to explore the possibility of having an MD/PhD candidate in biostatistics. I also found that the faculty and students that I met during my interview were very warm and welcoming. Several of the people I talked to during my interview shared my enthusiasm for biostatistics, which helped me to see the strong support and resources I would have at UK.
Evan Lynch, G1 - My research is focused on understanding the molecular mechanisms behind poor patient outcomes after the acute treatment of ulcerating illnesses of the intestinal tract. Specifically, I am interested in the direct involvement of oral corticosteroids in preventing durable remission after a flair. It is my belief that steroids are inhibiting mucosal healing by suppressing the activation of a novel intestinal stem cell population through an NF-kB-dependent mechanism. My work utilizes cell lines, animal models and human tissue to interrogate the mechanism. It is our hope that we will be able to use our data to design paradigm-shifting treatment approaches to reduce the need for expensive lifelong medical management, surgical procedures, and hospitalizations associated with inflammatory bowel disease.

Department: Microbiology, Immunology and Molecular Genetics
Mentor: Terrence Barrett, M.D.

Luke Heil, G1 - Our lab studies neonatal host response to Influenza infection. We are interested in why neonatal mice mount weaker immune responses to flu infection and why they have poor immunological memory to flu. I am looking at Regulatory T cells (Tregs) to see what role they fill in neonatal immunity to flu. Tregs are important for shutting down the immune system and preventing autoimmunity, but we have data suggesting that they are paradoxically required for defense against flu infection in neonates. I am working on characterizing Treg function in neonates in an attempt to understand this phenomenon.

Department: Microbiology, Immunology, and Molecular Genetics
Mentor: Beth Garvey, Ph.D.

RESEARCH HIGHLIGHTS: OUR NEWEST PHD GRADUATES REFLECT ON THEIR DISSERTATIONS

Dustin Brown, PhD - My dissertation describes a novel method for plant drug discovery based on mutation and selection of plant cells. Despite the industry focus on chemical synthesis, plants remain a source of potent and complex bioactive metabolites. Many of these have evolved as defensive compounds targeted on key proteins in the CNS of herbivorous insects, for example, the insect dopamine transporter (DAT). Because of homology with the human DAT protein, some of these metabolites have high abuse potential, but others may be valuable in treating drug dependence. This dissertation redirects the evolution of a native Lobelia species toward metabolites with greater activity at this therapeutic target, i.e., the human DAT. This was achieved by expressing the human DAT protein in plant cells and selecting gain of function mutants for survival in a neurotoxin that is accumulated by the human DAT. This created a sub-population of mutants with increased DAT inhibitory activity. Some of the active metabolites in these mutants are novel (i.e., not detectable in wild-type cells). Others are cytoprotective, and also protect DAergic neurons against the neurotoxin. This provides proof of concept for a novel plant drug discovery platform which is applicable to many different therapeutic target proteins and plant species.

Luke Broster, PhD - My dissertation was about how emotion could affect visual memory deficits in mild cognitive impairment. The major take-home finding was that stressful, negative stimuli led to visual memory processing previously linked to Alzheimer’s disease, but calm, positive stimuli led to visual memory similar to that of older adults without cognitive impairment.
CONGRATS TO OUR GRADUATES!

Jason Meyer, MD/PhD – Dermatology, University of California San Francisco

AWARDS

Induction into Alpha Omega Alpha National Honors Society – Dustin Stephens, M4
NIH pre-doctoral F30 Training Fellowship – Edita Klimyte, G4
PAPSCR Conference First Place award for poster presentations – Erin Wolf Horrell, G4
TERPNET Conference First Place Poster Award – Kristin Linscott, G4
NIH pre-doctoral T32 Training Fellowship – Eseosa Ighodaro, G3

Robert Terry Award: Honorary Mention for the Best Paper on Neurodegenerative Diseases – Eseosa Ighodaro, G3
Journal of Neuropathology & Experimental Neurology: Feature Article – Eseosa Ighodaro, G3
Halcomb Fellowship in Engineering and Medicine – Scott Thalman, G2

CCTS TL1 Predoctoral Fellowship – Chris Brown, G2
Clinical and Translational Science T32 Training Fellowship – Evan Lynch, G1

CONFERENCES

PanAmerican Society for Pigment Cell Research Conference – Orange, California 2015 – Erin Wolf Horrell, G4
Society for Cardiovascular Magnetic Resonance – Nice, France 2015 – Greg Wehner, G3
Annual Meeting of International Society for Magnetic Resonance in Medicine – Toronto, Ontario, Canada 2015 – Scott Thalman, G2

THE PERSONALS

Yuan Wen, G3, and his wife Fei Xiong welcomed a baby girl, Ava, in January

Greg Wehner, G3, and his wife Eleni also had their first baby girl, Chrysanthi, May 28, 2015

Chris Brown, G2, and Lisa Thompson will be married this December.

Caitlin (MD/PhD ’13) and David Latimer’s baby girl Ruari

Ava (left) and Chrysanthi (right) our newest MD/PhD munchkins.
RECENT CURRENT STUDENT PUBLICATIONS (2015)


“AN EXPERT IS A PERSON WHO HAS MADE ALL THE MISTAKES THAT CAN BE MADE IN A VERY NARROW FIELD.”

NIELS BOHR