Contents

Director’s Message
Dr. Donnenberg discusses the state of the program
Page 2

Meet the M1s
We will introduce our new M1 MD/PhDs
Page 3

Faculty Updates
Recently funded faculty members
Page 3

Alumni Updates
Catch up with what our alumni have been up to
Page 4

Student Achievements
We recount Chelsea Cockburn’s experiences at Lindau Nobel Laureate conference, and Susie Turkson’s work with SNMA
Page 5

Student Editorial Section
M1 Augustus White discusses public health and policy as he tackles opioid epidemic and Medicaid expansion
Page 6

Annual Retreat
Overview of the annual MD/PhD retreat at the Lewis Ginter Botanical Garden
Page 6

Student Accomplishments
Recently funded student F30 awards, first author publications and recent dissertations
Page 7
Welcome everyone to Volume 1, Issue 1 of a brand new publication, the newsletter of the Virginia Commonwealth University MD-PhD dual degree program. This circular is the product of our remarkable students, originating in discussions we had in Student Council and born of the efforts of M2 student Anuj Tharakan and G3 student Teja Devarakonda. Their goal is to update our readership with the comings and goings, achievements and honors, progress and growth of the program at VCU. Exactly who comprises our readership? We will find out with time, but we assume you include prospective students, current students, alumni, program faculty, VCU leadership and other interested parties. The editors plan to start with two issues a year. The fall issue will introduce our newest students, while the spring issue will bid farewell to our graduates. Both issues will feature interviews, happenings, and commentary. When asked, I’ll provide an overview of the program’s current status, or whatever else the editors think might be of interest.

To provide a quick glance on where we stand, here are a few numbers. We have 54 current students, with 26 concentrating on their medical school studies and 28 spending most of their effort on their dissertation research. Thirteen of our students have their own NIH F30 grants. All eight of our students who returned to medical school to complete their clinical clerkships this year have defended their dissertation and published at least one first-author manuscript. Five of six alumni who graduated in May matched at either their first or second choice program.

The program has evolved quite a bit in the past couple of years. One of the biggest improvements is the establishment of the aforementioned Student Council, comprised of one student elected by his or her peers from each cohort. Student Council meets monthly, communicating with their constituents, and advising Program Leadership on all matters that affect the program. They have been instrumental in virtually all of the initiatives we have implemented, for example curricular changes and rotation rules. They organize the Annual Retreat, the applicants’ Second Look, the Lunchtime Seminar Series, the Back to M3 Workshop, social events and applicant breakfasts. They update the website and the Student Handbook. They administer the annual Program Evaluation. I really can’t explain how we ever functioned without them!

The biggest recent curricular change was the brainchild of Student Council. As Program Director, I saw a need to better integrate clinical medicine into the graduate research years. Students who entered after 2013 had all completed a 6-8 week mandatory third year clinical clerkship prior to graduate phase, but they rarely continued regular clinical activities and therefore were unable to practice the skills they had gained. The solution offered by Council was to complete the mandatory ambulatory medicine clerkship during the second and third years of graduate school. Instead of a daily 4-week rotation, as happens during the third year of medical school, current students are now attending clinic one half-day every two weeks for seventeen weeks each of two years. This schedule allows them to finish another month of the curriculum, maintain the connection to clinical medicine, practice their clinical skills, increase the flexibility of reentry timing, and minimize the disruption of research activities.

The major recent change affecting research opportunities has been to increase the number of PhD programs available to current students. Agreements with the College of Engineering and with the College of Humanities and Sciences formalized the MD-PhD dual degrees in Biomedical Engineering and Nanoscience and Nanotechnology, respectively. Each of these programs now has a student. Additional programs under development include Oral Health and Chemical Biology, which are each the chosen disciplines of a current student. We also embraced the School of Medicine PhD programs in Healthcare Policy and Research, Social and Behavioral Sciences, Epidemiology, and Biostatistics. These expanded offerings enabled us to recruit into our ranks Gus White (profiled elsewhere in this issue) and Jessica Kiernan, now in her second year. These innovative and non-traditional PhD options highlight strengths of VCU, differentiate us from MD-PhD programs at other medical schools, and may make us attractive to highly qualified applicants who are interested in these fields.

As Program Director, my message is simple. There is a dire need to train physician scientists to make the discoveries that will improve human health. At VCU, we are in an excellent position to meet that challenge and will do so to the best of our ability. We will always strive to improve the training we provide for this critically important task. Stay tuned for more progress in future issues.
Meet the M1s
by Teja Devarakonda, G3 – MD/PhD

As the new academic year rolls around again, we are excited for our newly matriculated M1s within our MD-PhD program. Our M1s class of 2022 has been selected from a diverse pool of talented, creative and enthusiastic students looking forward to embark on their careers as future physician scientists. Marc Kaehlofer, from Lafayette, California, is experienced in working with statistical techniques, public health projects and genomics and epigenomics of psychiatric disorders. He spent his summer research month working with Dr. Javier Gonzalez-Maeso, PhD and Dr. Vladimir Vladimirov, PhD. Anne Skelton, from Albuquerque, New Mexico, performed musculoskeletal research prior to VCU, and rotated with Dr. Jose Eltit, PhD and Dr. Montserrat Samso, PhD in their biophysics labs this summer. Daniel Zhou from Toronto, Canada has previous experience working in psychiatric genetics, and is looking to pursue research along similar lines at VCU. Augustus (Gus) White from Chattanooga, Tennessee is interested in public health policy and behavioral economics in healthcare practice. He spent his summer working with Drs. Andrew Barnes, PhD and Peter Cunningham, PhD, researching the impact of opioid prescriptions on trends in policy, and evaluating the ramifications of Medicaid expansion.

During their first summer in Richmond, our M1s have also taken the time to explore the city and other areas of interest. They visited Virginia Beach, hiked the Old Rag mountain and checked out some of the fine drinking establishments in Richmond. They especially loved the Circuit – the Barcade stocked with nostalgic arcade games from the 90s. Our M1s also describe their experience as they went through the first week of medical school. Marc and Gus recount how they almost missed the roll call! Also during this time, they had their first encounters with standardized patient scenarios. Daniel mentions that the actors did a great job in recreating situations that were meant to put the students right in the middle of the heat. They distinctly recalled the scenario involving the aftermath of a motor vehicle crash and the experience of having to stratify patients based on their injuries and associated risks of further complications.

We are excited to see what else is in store for these M1s as they progress further through the program!

Recently funded PIs

Feb and Mar
- Pin-Lan Li, MD, PhD, Pharmacology and Toxicology, 2R01HL057244-20, “Lysosome Regulation of Exosome Release and Function in Arterial Smooth Muscle”
- Imad Damaj, PhD, Pharmacology and Toxicology, 1R01CA221260-01A1, “Genetic basis of chemotherapy-induced neuropathy in a reduced complexity cross”
- Youngman Oh, PhD, Pathology, 1R21CA221260-01A1, “Therapeutic potential of neutrophil protease inhibitors in colon cancer”
- David Wheeler, PhD, Biostatistics, HHSN261201800225P, “Statistical Modeling of Well Depth and Drinking Water Exposures and Cancer Risk”
- Tomasz Kordula, PhD, Biochemistry and Molecular Biology, 1R21NS102802-01A1, “Ying Yang 1, a master regulator of chronic inflammation in glioblastoma multiforme”
- Roseann Peterson, PhD, Psychiatry, K01, NIMH, “Leveraging sources of heterogeneity to delineate the genetic architecture of major depressive disorder”

April
- Kurt Hauser, PhD, Pharmacology and Toxicology, R01, NIDA, “Selective vulnerability of discrete neural circuits in the striatum to HIV-opiate comorbidity”
- Sannanda Ramamoorthy, PhD, Pharmacology and Toxicology, R01, NIMH, “In Vivo Serotonin Transporter Dysregulation in Psychiatric Disorders”

May
- Jose Huizar, MD, Internal Medicine, R01, NHILB, “Mechanistic Insights of Premature Ventricular Contractions-induced Cardiomyopathy”
- Qinglian Liu, PhD, Physiology and Biophysics, R01, NIGMS, “Structural and Functional Studies of Hsp70 Molecular Chaperones”
- Jeffrey Dupree, PhD, Anatomy and Neurobiology, NINDS, “Microglial neurofascin: a novel mediator of microglia/axon initial segment interactions?”
- Fadi Salloum, PhD, Internal Medicine, R01, NHLBI, “Relaxin Signaling in post-MI Cardiac Inflammation, Adverse Remodeling and Failure”

June and July
- Jason Carlyon, PhD, Microbiology and Immunology, R01, NIAID, “The roles of ceramide and its derivatives in A. phagocytophilum pathogenesis”
- Jennifer Wolstenholme, PhD, Pharmacology and Toxicology, R01, NIAAA, “Histone methylation as a potential mechanism for myelin deficits and behavioral alterations following adolescent binge ethanol”
Alumni Updates

by Anuj Tharakan, M2 – MD/PhD

Woon Chow (‘11) was appointed Assistant Professor of Pathology here at VCU in 2017. His clinical work focuses on neuropathology and ophthalmic pathology. His research program focuses on the development of drug delivery modalities for ophthalmologic conditions. He is also involved in training ophthalmology residents in ophthalmic pathology and currently serves as the Associate Director of Laboratory Information Systems at VCU.

Aaron Clark (’08) was appointed Assistant Professor of Neurosurgery at the University of California – San Francisco in 2015. Clinically, he specializes in minimally invasive spinal surgery and spinal deformity surgery. His research focuses on clinical outcomes following spine surgery. In addition, he serves as an assistant course director for the UCSF pre-clinical neuroscience course.

David Gibb (’12) was appointed Assistant Professor of Pathology at Cedars-Sinai Medical Center in 2018. His clinical specialties include clinical pathology and transfusion medicine. He was recently awarded a K grant from the NHLBI and a Scholar Award from the American Society of Hematology for his research on immune responses to alloantigens in blood transfusions.

Dr. Omar Mian (’11) was appointed assistant professor in the Department of Hematology and Oncology at Case Western Reserve University and a physician scientist at the Cleveland Clinic’s Taussig Cancer Center in the Department of Radiation Oncology. He specializes in the clinical management of prostate and bladder cancer. His research focuses on the genetics and epigenetics of genitourinary tumors. He has received funding from the Department of Defense, VeloSano Foundation, Lerner Research Institute, and Case Comprehensive Cancer Center.

Dr. Paige Fox (’08) was appointed the Ryan-Upson Scholar in Plastic & Reconstructive Surgery at Stanford. Her research focuses on wound healing, disorders of the upper extremity, and surgical biosensors. Her research is funded through her faculty position as well as grants from the Plastic Surgery Foundation in collaboration with the American Society for Reconstructive Microsurgery. She was also recently named the Associate Program Director for the Plastic Surgery Residency at Stanford.
Student achievements
by Susie Turkson, M2, Teja Devarakonda, G3 – MD/PhD

Susie Turkson
The Student National Medical Association (SNMA) is the nation’s oldest and largest independent student-run organization. Our focus is on increasing the number of underrepresented minorities in medicine while targeting health disparities through service, and academic enrichment programs in the community. As the vice president for community service for the VCU SNMA chapter, I coordinate service events and help mobilize volunteers. Last spring, we had the opportunity to talk with elementary school children about different careers in medicine during the Chimborazo Elementary School Career Day. We also participated in “Read Across America” Day at Bellevue Elementary. Some of our more clinical service projects have included glucose and blood pressure screenings at the CapAHEC Community Health and Wellness Block Party, as well as blood pressure screenings at the Chesterfield Foodbank.

Throughout the academic year, SNMA conducts outreach with local undergraduate and high school students to help prepare them for the next steps in their education. Last spring, we hosted a series of panels for premedical students at both VCU and William & Mary, geared towards MCAT prep, medical school applications and gap year options. As the new school year kicks off, we are planning more events to get VCU students out into the community. In addition, this year VCU has been chosen to host SNMA’s Regional Medical Education Conference which will bring together a diverse group of students from medical schools within Virginia, D.C., and Maryland to discuss health policy and other issues affecting our communities.

Chelsea Cockburn
One of our G4 students, Chelsea Cockburn, received the distinguished honor of an invitation to attend the Lindau Nobel laureate meeting this summer. The meeting was held in Lindau, Germany and took place from 24-29 June. Nobel laureates in physiology, medicine, chemistry and even physics (Dr. Steven Chu) were among the invited guests. The morning sessions primarily consisted of individual lectures given by Nobel laureates, and the afternoons involved interactions among students and the laureates. Chelsea went on a science walk with Dr. Randy Schekman - who received the 2013 award for his contributions to our knowledge of cell membrane vesicle trafficking. Chelsea enjoyed meeting with him; he talked about his advocacy and fight against the current system of impact factors attributed to journals, and how detrimental that can be. Since publishers are for-profit agencies, and scientific data is usually generated through grants funded by the tax payers, there is a systemic discrepancy since one has to pay exorbitantly to access journal articles. She also had dinner with Dr. Harold Varmus - who won the Nobel Prize in 1989 for the discovering the cellular origins of retroviral oncogenes. He served as the director of NIH from 1993 to 1999. She also had interesting conversations with Dr. Steven Chu – the Nobel Laureate who served as Secretary of Energy under Barack Obama. He talked about non-traditional career paths for those involved in science, citing his own endeavor as an example.

Chelsea mentions that an overarching theme emerged at the meeting with regards to the future of science and medicine. Many speakers talked about the importance of effective training programs. The current system bogs down interested students and aspirants of research with several administrative tasks that can be counterproductive for someone interested in basic research. Training programs – both MD/PhD and traditional graduate programs – must strive to recruit good future scientists and find means to keep them interested and involved in basic science even after their training is completed.

Dinner with Harold E. Varmus
Chelsea, G4, having dinner with Nobel Laureate Harold Varmus along with other students attending
Editorial - Opioid epidemic and Medicaid Expansion

by Augustus White, M1 – MD/PhD

In the process of considering any new policy, there is often a passionate, public debate over its passage and implementation. However, often lost in these discussions is how we evaluate the effectiveness of a policy once it has been implemented. Not unlike a biomedical scientist studying a new drug or prospective pathway, social scientists are often left to ask and answer these important questions. In that spirit, the VCU Department of Health Behavior and Policy is leading the evaluation of two recent policy changes on some of the most pressing health issues facing Virginia: the opioid epidemic and Medicaid expansion. This past summer I was extremely fortunate to have the opportunity to assist on both projects and found myself excited about the knowledge we were uncovering and the questions we were soon to be answering.

According to the CDC, 115 Americans die every day from opioid overdoses. In terms of combating this public health epidemic, it’s been argued that perhaps limiting the supply of prescription opioids would decrease addiction and abuse. However, with talk of possible community-engagement requirements (sometimes referred to as ‘work requirements’) and/or additional co-payment being part of the expansion, much remains to be decided regarding what expansion will look like when it takes effect January 1, 2019. To prepare for the evaluation of the expansion in whatever form it ultimately takes, this summer we looked at how other states have designed and performed their expansion evaluations. From analyzing claims data, to surveying patients, to conducting focus groups with providers – there are numerous tools and study designs at our disposal that can be utilized in determining whether Medicaid expansion is a ‘success’ in Virginia and the study design process is currently underway. As the first state to expand Medicaid during the Trump administration and potentially one of the first to have a work-requirement for expansion enrollees, there’s no doubt that the findings of Virginia’s expansion will be vitally important in determining the future of the ACA’s Medicaid expansion and are certain to be the focus of much national interest.

Using data provided by the Virginia Department of Medical Assistance Services (DMAS) we’ve been able to analyze opioid prescribing rates to Virginia Medicaid patients between 2012 and 2018, seeing how they’ve changed over time and in response to several relevant policy changes. While the project is not yet complete, preliminary results from this evaluation and others have indicated that recent interventions employed by the Commonwealth are making a dent in the opioid crisis and could prove to be a model for the rest of the country.

On a related note, due in part to the ongoing opioid crisis, the Virginia legislature recently approved a state budget which authorizes an expansion of the Commonwealth’s Medicaid program through the Affordable Care Act (ACA). This expansion will make Virginia the 33rd state to expand and is expected to bring Medicaid coverage to an estimated 400,000 Virginians. However, with talk of possible community-engagement requirements (sometimes referred to as ‘work requirements’) and/or additional co-payment being part of the expansion, much remains to be decided regarding what expansion will look like when it takes effect January 1, 2019. To prepare for the evaluation of the expansion in whatever form it ultimately takes, this summer we looked at how other states have designed and performed their expansion evaluations. From analyzing claims data, to surveying patients, to conducting focus groups with providers – there are numerous tools and study designs at our disposal that can be utilized in determining whether Medicaid expansion is a ‘success’ in Virginia and the study design process is currently underway. As the first state to expand Medicaid during the Trump administration and potentially one of the first to have a work-requirement for expansion enrollees, there’s no doubt that the findings of Virginia’s expansion will be vitally important in determining the future of the ACA’s Medicaid expansion and are certain to be the focus of much national interest.

MD/PhD annual retreat - Lewis Ginter Botanical Garden

by Anuj Tharakan, M2 – MD/PhD

This year’s MD-PhD annual retreat was held at the Lewis Ginter Botanical Gardens on October 6th. The retreat brought together students from all phases of the program and faculty to enjoy scientific seminars, recreational activities, and, of course, the beautiful scenery of the botanical gardens.

Guest speakers at the retreat were VCU MD-PhD alumni Dr. Joseph Contessa (’04) and Dr. Michael Noto (’08). Dr. Contessa discussed his path through his MD-PhD and residency training and offered students advice regarding the skills and attributes he believes are critical to the development of a successful physician scientist. His talk included small group discussions of the qualities that predict success during residency and an illustration of the value of interdisciplinary cooperation by way of an arm-wrestling tournament.

Dr. Noto gave a presentation on his current research at Vanderbilt University Medical Center and spoke about the process of establishing his research program in the early stages of his career. He emphasized the importance of training in programs that best fit a student’s long-term goals and that are committed to research. He described to students how he went about identifying training programs that best suited his career goals.

The retreat also allowed for plenty of time to explore the beautiful scenery of the botanical gardens. Students were able to tour the conservatory and grounds and take in the sights of the wide array of themed gardens featured on the grounds.
Student accomplishments

Recently funded F30s:

Tia Turner, G3, “Development of novel combination treatments for metastatic androgen receptor positive triple-negative breast cancer”

Justin Saunders, G3, “Gut dysbiosis and 5-HT2A dysregulation in a preclinical schizophrenia model”

First-Author Student Publications:

Sarah Kim, G4, “A central role for glial CCR5 in directing the neuropathological interactions of HIV-1 Tat and opiates”

Marc Cantwell, M3, “STAT3 Suppresses Wnt beta-Catenin Signaling During the Induction Phase of Primary Myf5+ Brown Adipogenesis”

Sheela Damle, M4, “B1 Cell IgE Impedes Mast Cell-Mediated Enhancement of Parasite Expulsion through B2 IgE Blockade”

Zach Curry, M3, “Monoacylglycerol lipase inhibitors reverse paclitaxel-induced nociceptive behavior and proinflammatory markers in a mouse model of chemotherapy-induced neuropathy”

Recent Dissertations:

Chelsea Cockburn, G4 – “Acid sphingomyelinase is essential for the vacuolar development of Anaplasma phagocytophilum” – Dec 5, 2018

Joseph Lownik, G4 – “The Role of ADAM10 and ADAM17 in Humoral and Type 2 Immunity” – December 6, 2018

Audra Iness, G4 – “Mechanisms of B-Myb oncogenicity in ovarian cancer” – Dec 7, 2018