MD/PhD
A dual degree program of the
COLLEGE OF GRADUATE STUDIES
and COLLEGE OF MEDICINE

Weiskotten Hall is the home for many College of Medicine classes and
the central academic and research facility for the College of Graduate Studies.

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MD/PhD Program Office
3118 Weiskotten Hall
SUNY Upstate Medical University
766 Irving Avenue
Syracuse, New York 13210

315-464-7719
MDPHD@upstate.edu

www.upstate.edu/mdphd
Scott Minchenberg was one of only 18 students selected to give an oral presentation at the 29th annual MD/PhD Student Conference in Keystone, Colo. Scott is in the lab of Professor Paul Massa, PhD, researching the role of a protein in multiple sclerosis, a debilitating disease affecting the central nervous system. The project could eventually lead to therapies for the disease. "We have the potential of better understanding the underlying mechanisms of MS," Scott said.

A highlight of the MD/PhD program, Scott said, is the one-on-one attention from Faculty Research Advisors. "They're approachable, and are always available to offer valuable guidance," he said. "The MD/PhD program is unique. It's such a small group, and it definitely has a family feel."

ON THE COVER:

Bottom: Every two years, Upstate’s MD/PhD program invites a distinguished alumnus or alumna to give a lecture and spend a day on campus to meet with students and faculty. Our 2014 Distinguished Alumni lecturer was Emil Lou, MD PhD, assistant professor of Medicine in the Division of Hematology, Oncology, and Transplantation at the University of Minnesota. He graduated from Upstate in 2004.

Top left: MD/PhD student Karen Howard has been awarded a four-year NIH pre-doctoral fellowship for her research into a cause of loosening in total knee replacements.

Top right: MD/PhD student Ryan O'Dell is first-author of an article chosen for the cover of the Journal of Neuroscience. His research involves the role of a protein, Reelin, in embryonic brain development.

FROM OUR CO-DIRECTORS

“Our MD/PhD Program at SUNY Upstate Medical University is committed to providing exceptional training in both clinical medicine and basic scientific investigation to prepare you for an exciting career as a physician-scientist.”

Andras Perl MD, PhD
Internationally recognized leader in the field of Rheumatology, with a remarkable funding record for his research in autoimmunity and lupus erythematosus.

Dr. Perl is Professor and Chief of Rheumatology in the Department of Medicine, and Professor in the Departments of Microbiology & Immunology and Biochemistry & Molecular Biology. In 2011, he received a SUNY Chancellor’s Award for Excellence in Scholarship and Creative Activities. Dr. Perl has authored over 120 publications and serves on the editorial board for seven journals.

Leszek Kotula MD, PhD
Working with researchers from Harvard University, Dr. Kotula co-authored a study linking the absence of a gene known as WAVE-1 to a lethal form of prostate cancer.

Dr. Kotula is Associate Professor of Urology and Biochemistry & Molecular Biology. The goal of his research is to understand the molecular and cellular processes underlying human cancer. His lab developed a novel preclinical model of prostate cancer in mice to identify the molecular changes associated with the development of prostate cancer.
**OUR RESEARCH FOCUS**

Upstate has strong basic, translational and clinical research portfolios that are concentrated within five basic science departments (basic and translational research) and 13 clinically oriented departments (translational and clinical research).

Collectively, our researchers have diverse expertise with particular strengths in cancer, neuroscience, vision, molecular genetics, genomics, structural biology, infectious disease, diabetes/metabolic disorders, behavior disorders, cardiovascular disease and clinical trials. In addition, we have strong collaborative relationships with our neighboring institutions – Syracuse University, SUNY College of Environmental Science and Forestry, and the Syracuse VA through the Hill Collaboration and Institute for Environmental Health and Environmental Medicine.

As a result, our students have a breadth of opportunities to perform cutting-edge research in a wide range of areas with ready collaborations when new expertise is needed.

**STATE OF THE ART FACILITIES**

Upstate investigators have at their disposal beautiful and highly functional laboratory space that is equipped with advanced instrumentation. The space is located in three dedicated research buildings – Weiskotten Hall, the Institute for Human Performance and our new flagship, the Neuroscience Research Building (NRB). The NRB brings together neuroscience researchers from the departments of Neuroscience and Physiology, Ophthalmology, Psychiatry, Neurosurgery and Anesthesiology to work on important problems in neurodevelopment, neuro-oncology, neuronal stem cells, physiological basis of behavior, psychiatric genetics and vision.

**POWERFUL CORE FACILITIES**

Performing cutting edge research requires access to powerful techniques and instrumentation. For this reason, Upstate has invested in research cores that provide faculty and students with the opportunities to leverage the latest technologies to advance their research programs. Capabilities within our cores include whole genome sequencing and analysis, proteomics and mass-spectrometry, confocal and two-photon imaging, super-resolution microscopy (STED), an 800MHz NMR, cryo-electron microscopy, flow cytometry, and *in vivo* computed tomography.

**RESEARCH OPPORTUNITIES**

It is impossible to summarize in such a short space all of the research opportunities available to our graduate students. Suffice to say no University will put as much emphasis as Upstate on your career development, whether your interests lie in academia, industry or using your degrees to develop a sustainable career in a related field. Upstate trains tomorrow’s scientists by working on today’s biomedical problems, and converting students from consumers of knowledge to producers of knowledge.

**MESSAGE FROM THE DEAN OF THE COLLEGE OF GRADUATE STUDIES AND DEAN OF THE COLLEGE OF MEDICINE**

You are probably reading this brochure because you are interested in a career as a physician-scientist. This is a noble career choice that you will find rewarding for the rest of your life. It will take you to far off locales and place you at the forefront of biomedical research. You will enjoy the excitement of your own novel discoveries and the immense gratitude and thrill that you can translate that discovery to help others.

Upstate Medical University is poised to assist you in starting on this life-long journey. We have a flexible and innovative curriculum combined with world-leading research and clinical faculty to mentor you through the program. We look forward to meeting you on a visit to our campus and watching your career develop in the future.

David Duggan, MD  
Dean of the College of Medicine

Mark Schmitt, PhD  
Dean of the College of Graduate Studies

**STUDENT WINS FELLOWSHIP FOR AUTISM RESEARCH**

Dan Tylee is clear on why he enrolled in Upstate’s MD/PhD program. “I came here because I’m interested in mental health and human development,” he said. “I wanted to be as close to human subjects and applied translational research as possible.”

Dan recently received a two-year, pre-doctoral fellowship from Autism Speaks that carries an annual $30,000 award covering his stipend and additional expenses.

He is a student in the lab of Stephen Glatt, PhD, associate professor of Neuroscience & Physiology, and Psychiatry & Behavioral Sciences.

Dan’s interest in mental health and the link between biology and psychology intensified when he volunteered at a psychiatric clinic near his home on Long Island.

His experience shadowing a psychiatrist, and the questions it raised, brought him to Upstate. “From psychology to biology, should I study it or treat it?” Dan said of his post-graduate path. “I decided to do both if I could.”

The MD/PhD program, which trains students for careers as physician-scientists who blend clinical practice with research, was a perfect fit.

“This is a really cool time to be in psychiatry,” Dan said. “In the next 20 years, I think we will see new treatments that seek to augment the body’s immune and inflammatory responses in ways to improve symptoms and alter the disease course.”

**RESEARCH FACILITIES**

Scientists at Upstate rely on well-established core research facilities and a growing inventory of state-of-the-art resources and equipment, including:

- Proteomics
- Flow Cytometry
- DNA Sequencing
- Microarray
- Musculoskeletal
- Magnetic Resonance Imaging
- Humanized SCID Mouse & Stem Cell Processing
- Confocal and Two-Photon Imaging
- Clinical Research Unit
- In Vivo Computed Tomography
- Center for Research and Evaluation
- X-ray diffraction
- Laboratory Animal Resources
- Bone Densitometry
- 800 MHz Nuclear Magnetic Resonance spectrometer
ART CLUB PROVIDES CREATIVE OUTLET FOR STUDENTS

On any college campus, MD/PhD student Karen Howard says, an art club for students is a must – even at an academic medical university, where the workloads are intense and free time is scarce. “It’s hard to continue a hobby at this level of education,” she said. Karen was pleasantly surprised to find out how much art is being created by Upstate students, so she and some other students started an art club on campus. “The great thing about art is that it’s inclusive,” Karen said. “And you do it on your own time. If you’re serious about it, you make time for it.”

ACADEMIC PROGRAM

Translational Research

Our basic science research shares a common goal: to better understand the human body and disease. Most of the basic science research at SUNY Upstate is conducted through the College of Graduate Studies. Our multi-disciplinary approach targets the illnesses that affect the most people: cancer; infectious disease; diabetes; blinding diseases; cardiovascular disease; and diseases of the nervous system.

MD/PhD students receive their PhD in one of the six degree granting programs in the College of Graduate Studies: Biochemistry and Molecular Biology, Cell and Developmental Biology, Microbiology and Immunology, Neuroscience, Pharmacology, and Physiology. Translational research is strongly supported at our academic medical center as evidenced by the focus areas.

Collaboration

The Institute for Environmental Health and Environmental Medicine brings together faculty from Central New York’s SUNY campuses (Upstate, Environmental Science & Forestry, Oswego and Onondaga Community College) to study important problems at the intersection of environment, human health and infectious disease. Opportunities include remote sensor development, climate modeling, and insect vector study in what will be Upstate’s new BSL3/4 level insectory.

“Upstate is converting students from consumers of knowledge to producers of knowledge.”

— Mark Schmitt, PhD
Dean, College of Graduate Studies

Years One and Two

Incoming MD/PhD students begin a laboratory rotation in a lab of their choosing, the summer prior to the start of Medical School classes. This provides an excellent opportunity to familiarize students with the research climate at SUNY Upstate. Following this first laboratory rotation, they complete the first year of Medical School classes, participate in a laboratory rotation the summer between their first and second year, and then complete year two of medical school. At that time students take the Step 1 portion of the United States Medical Licensure Exam. At that time, students select their mentor and research project and begin their thesis research.

PhD Years

During the PhD portion of the program (typically three to four years), students:

• Design a doctoral-level research project
• Take Research Design for Physician Scientists course
• Pass a qualifying exam demonstrating they have the scholarly and intellectual capabilities signified by the awarding of a PhD degree
• Participate in a Grand Rounds Course to maintain clinical skills
• Complete the necessary lab research

Clinical Years

In the final phase of the program, students complete their last two years of medical school. This includes slightly more than one academic year of required clerkships and 24 weeks of elective credit. MD/PhD students may elect to receive up to 12 weeks of elective credit for time spent conducting dissertation research. These credits are accumulated during the last year in the lab before defending the dissertation and prior to the required clerkships.

All MD/PHD Students

Throughout the course of training, MD/PhD students will take “MD/PhD Grand Rounds: Integrating Clinical Care and the Study of Disease.” This course provides a formalized structure for the integration of the medical and graduate components of the MD/PhD training through an individual clinical experience. Students make one presentation during the year to their fellow MD/PhD students.

2015 MD/PHD GRADUATES

Eric Wohlford, Sam Mackenzie, Adeseye Adekeye

• Prepare, present and defend a dissertation
The College of Graduate Studies transfers 24 credits of Medical School course work towards the didactic credits needed for the PhD degree, thus shortening the time toward completion of the PhD degree.

Recent MD/PhD graduates have gone to:

Barnes-Jewish Hospital
Duke University
Massachusetts General Hospital
Mt. Sinai Medical Center
Ohio State University
Temple University
UC San Francisco
University of Chicago
University of Michigan
University of Pittsburgh
University of Rochester
University of Virginia
Washington University (St. Louis)
Weill Cornell Medical Center
Yale University
A dam  Blanden, a graduate student in the lab of Faculty Research Advisor Stewart Loh, PhD, professor of Biochemistry and Molecular Biology, has been awarded an NIH pre-doctoral fellowship for his project, “Restoring the Missing Zinc: A quantitative investigation of p53 hotspot mutant reactivation by synthetic metallochaperones for cancer chemotherapy.”

Adam works on a unique approach to cancer research in the lab of Faculty Research Advisor Stewart Loh, PhD, professor of Biochemistry and Molecular Biology. Loh’s lab explores mutations in the protein p53 – a tumor suppressor that, when mutated, is implicated in about half of human cancers.

“We work with a particular class of p53 mutations,” Adam said. “There are lots of ways p53 can go wrong, and one way is the loss of zinc.” Adam’s work involves restoring proper zinc binding to several zinc-impaired mutations in p53, including the most common mutation that leads to cancers.

“This is a fundamentally new way to approach the problem,” Adam said. “We’re trying to change the environment of the cell so that even if p53 is defective, it can still function. It’s a complete end-around.”

For decades, cancer researchers have focused on the tissue of origin, such as the breast, lung, brain, skin, etc. “Now we are learning it’s not so much where the cancer comes from, but the mutations that cause each individual to develop cancer, and allow that cancer to progress,” he said.

Adam estimates a treatment that emerges from this research could work for as many as 100,000 cancer patients per year.

“We know from our internal, unpublished work that our pre-clinical data look pretty solid,” he said.

A NEW WAY TO APPROACH CANCER RESEARCH

S UNY Upstate is part of the State University of New York, the largest university system in the world, with 465,000 students on 64 campuses. Upstate’s enrollment has grown to more than 1,600 students.

Amid that growth, we insist that students receive individual attention and support from faculty in an intellectually challenging environment. The success of the MD/PhD and other academic programs is evident in our students’ licensures, residencies and post-doctoral positions.

More than 9,000 people — professors, doctors, nurses, scientists, allied professionals — work at Upstate, the largest employer in the region. We offer many medical services and clinical trials unique to Central New York, and we draw patients from neighboring states and Canada. The university includes Upstate University Hospital; Upstate Golisano Children’s Hospital; Upstate University Hospital’s Community Campus, and many satellite sites.

Upstate researchers focus on developing treatments and cures for the most prevalent and urgent health issues. Our growth and success in research has strengthened our position as a key player in regional, state, national and international collaborations.

A GROWING HEALTH SYSTEM

S UNY Upstate became home to the region’s most comprehensive resource for the diagnosis and treatment of cancer and related disorders when the Upstate Cancer Center opened on campus in 2014. The $74.5 million, 90,000 square-foot facility provides a full range of outpatient care, and serves as a vital complement to the research-focused Upstate Cancer Research Institute, also on campus.
ADMISSIONS

A admission to the MD/PhD program is highly competitive. Students motivated by the love of discovery, dedication to research and desire to improve the human condition are encouraged to apply.

Because the MD/PhD program is offered jointly by Upstate’s College of Medicine and College of Graduate Studies, applicants must satisfy admissions requirements for both colleges. The Admissions Committee considers the following factors when selecting applicants:

- MCAT scores; completion of required courses and other admissions requirements; academic performance; letters of recommendation; motivation, character and communication skills; experience in related fields; personal statement; personal interviews; and potential for investigative research.

Competitive applicants will be invited to the Upstate campus for personal interviews with members of the MD/PhD and College of Medicine admissions committees.

Stipends

All MD/PhD students receive a full tuition waiver and a competitive 12-month stipend of $25,003 (as of 2015-2016) for each year in the program.

By receiving stipends, MD/PhD students become part of the SUNY Graduate Student Employees Union, which provides periodic stipend increases and other benefits including a low-cost health care package.

Costs

Estimated costs for first-year MD/PhD students 2015-2016 (costs will be somewhat lower during the PhD years):

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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<tr>
<td>Activities Fee</td>
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<td>Health Services Fee</td>
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<td>Disability Insurance Premium</td>
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<td>Technology Fee</td>
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<td>Diagnostic Kit</td>
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Fees are subject to change without notice.

Anna Nichols, MD/PhD graduate is a Pediatric Dermatology Resident at Jackson Memorial Hospital in Miami, FL.

David Fernandez, MD/PhD graduate is a Rheumatology Fellow at New York-Presbyterian Hospital/Weill Cornell Medical Center.

How To Apply

Like most U.S. medical schools, Upstate’s College of Medicine participates in the American Medical College Application Service (AMCAS) system. In this system, applicants complete a standard AMCAS application, and send one official transcript from each institution of higher education attended and scores from the Medical College Admission Test (MCAT) to AMCAS. AMCAS then transmits copies of the application, transcripts and scores to medical schools designated by applicants.

MD/PhD applicants must apply through the AMCAS system. For more information on AMCAS, contact: American Medical College Application Service, Association of American Medical Colleges, 2450 N Street NW, Suite 201, Washington, DC 20037-1131 or www.aamc.org.

In addition to the AMCAS application, each MD/PhD applicant must submit the following documents to the Office of Student Admissions, Weiskotten Hall, 766 Irving Avenue, Syracuse, NY 13210:

- College of Medicine Supplemental Application. (This will be sent to you after we receive your verified AMCAS application.) Be sure to check the box marked MD/PhD.
- Three Letters of Recommendation from people familiar with your academic record and potential for investigative research.
- Personal Statement describing your reasons for wanting to enter the MD/PhD program. Include your research interests and plans for the future.

International Students

Applications are accepted from foreign citizens who have completed at least 90 credit hours of course work in the United States or Canada at an accredited institution. All else being equal, priority will be given to candidates who are U.S. citizens or permanent residents. However, non-US residents with a strong record of academic research achievement are encouraged to apply.

Admissions Requirements

- Bachelor’s degree or equivalent
- Completion of the following subjects (all courses except English must include a lab):
  - General Biology I & II
  - General Chemistry I & II
  - Organic Chemistry I
  - Biochemistry
  - General Physics I & II
  - Writing/Composition
  - English elective
  - Statistics (3hrs)
- Knowledge of mathematics (preferably statistics or calculus)
- Medical College Admission Test (MCAT)

Application Deadline

1 AMCAS: The AMCAS application must be submitted by **October 15**.

2 All other application materials including the three letters of recommendation and the Supplemental application are due by **December 1, no exceptions**.