

MD/PhD

A dual degree program of the
**COLLEGE OF GRADUATE STUDIES
AND COLLEGE OF MEDICINE**

UPSTATE

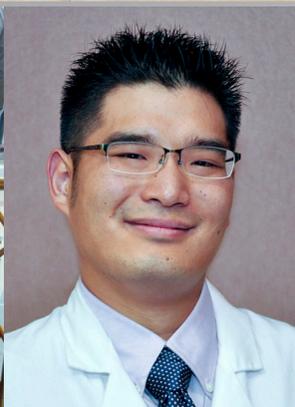
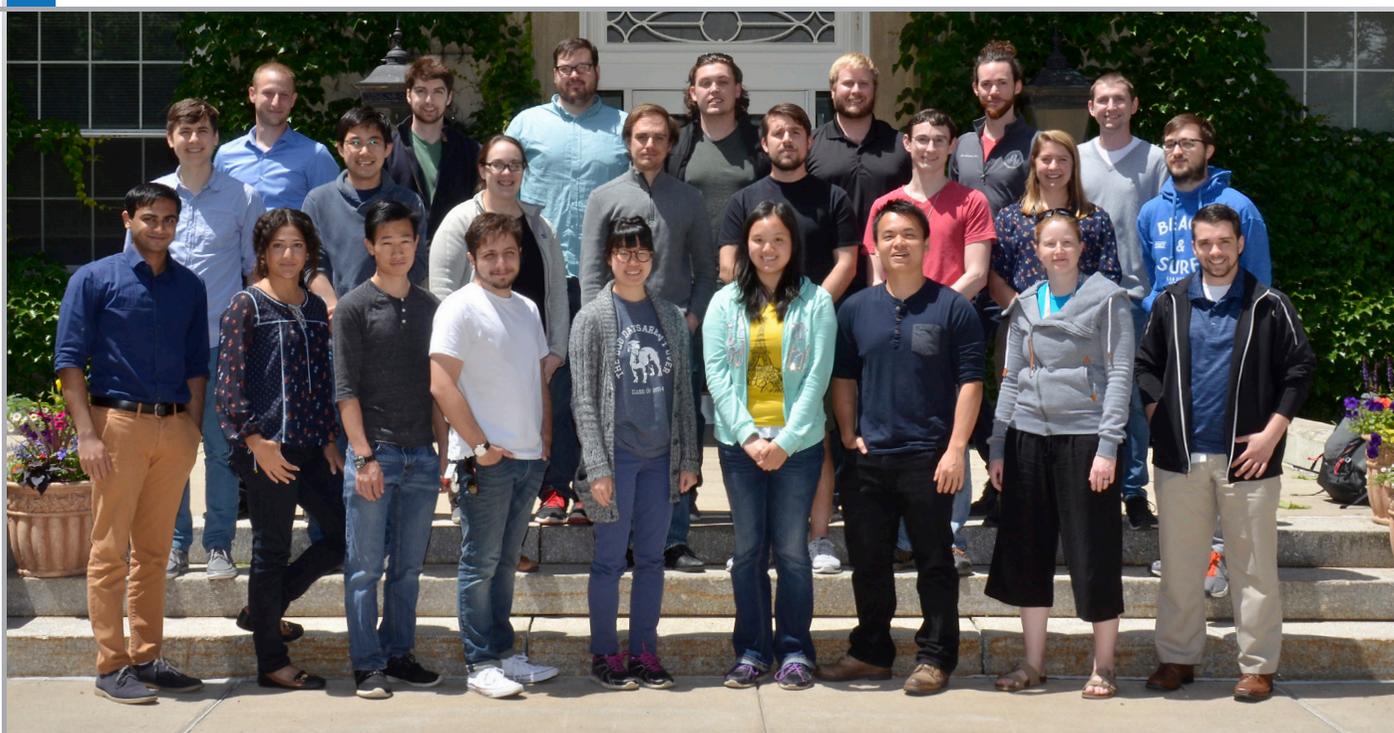
MEDICAL UNIVERSITY

WWW.UPSTATE.EDU/MDPHD

STATE UNIVERSITY OF NEW YORK
SYRACUSE, NY

MISSION STATEMENT

The mission of the MD/PhD Program at SUNY Upstate Medical University is to train future physician scientists who, by combining the practice of medicine in the clinic with biomedical research in the laboratory, are uniquely trained and focused to bring the power of modern science to our understanding and treatment of human disease. The program is committed to recruitment of students with diverse educational and cultural backgrounds who, having a passion for research in the biomedical sciences and clinical care, are dedicated to becoming academic physicians.



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OUR LEADERS

MESSAGE FROM CO-DIRECTORS

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.



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.

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

*– Mark Schmitt, PhD
Dean, College of Graduate Studies*

OUR RESEARCH

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

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, clinical trials and much more. Our basic science 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.

In addition, we have strong collaborative relationships with our neighboring institutions, Syracuse University, SUNY College of Environmental Science and Forestry and Syracuse VA through the Hill Collaboration and Institute for Environmental Health and 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



Upstate Golisano Children's Hospital

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

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.

STUDENT SUCCESS

Our MD/PhD students have an excellent track record of obtaining extramural funding. Grant writing is a focus of their integrated training. These MD/PhD students have recently received multi-year F30 research grants from the National Institutes of Health totaling more than \$400,000.



ADAM BLANDEN

Adam received a three-year, \$116,782 grant for his project, "Restoring the Missing Zinc: A quantitative investigation of p53 hotspot mutant reactivation by synthetic metallochaperones for cancer chemotherapy."

Adam is a student in the lab of Stewart Loh,

PhD, professor of Biochemistry and Molecular Biology. Dr. Loh's lab focuses on mutations in the protein p53 – a tumor suppressor that, when mutated, is implicated in about half of human cancers.

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."

SCOTT MINCHENBERG



Scott's three-year award of nearly \$131,000 supports his research in the laboratory of Professor Paul Massa, PhD.

Scott is investigating the role of the protein SHP-1 in multiple sclerosis, a debilitating disease affecting the central nervous system.

The disease is characterized by the

destruction of myelin, the insulating layer or sheath of proteins and fat around nerves. The damaged myelin forms scar tissue (sclerosis), which affects signals to the brain and spinal cord.

"This could have important implications for unraveling the pathogenesis of MS," Scott said. "I'm very grateful that the NIH awarded me this fellowship, and that I have the opportunity to advance this exciting project."

KAREN CYNDARI (HOWARD)



Karen's four-year, \$165,000 award funds her research into a cause of loosening in total knee replacements. She works with research advisors Kenneth Mann, PhD, and Megan Oest, PhD, and clinical mentor Timothy Damron, MD.

Karen used a very rare model of postmortem retrievals to

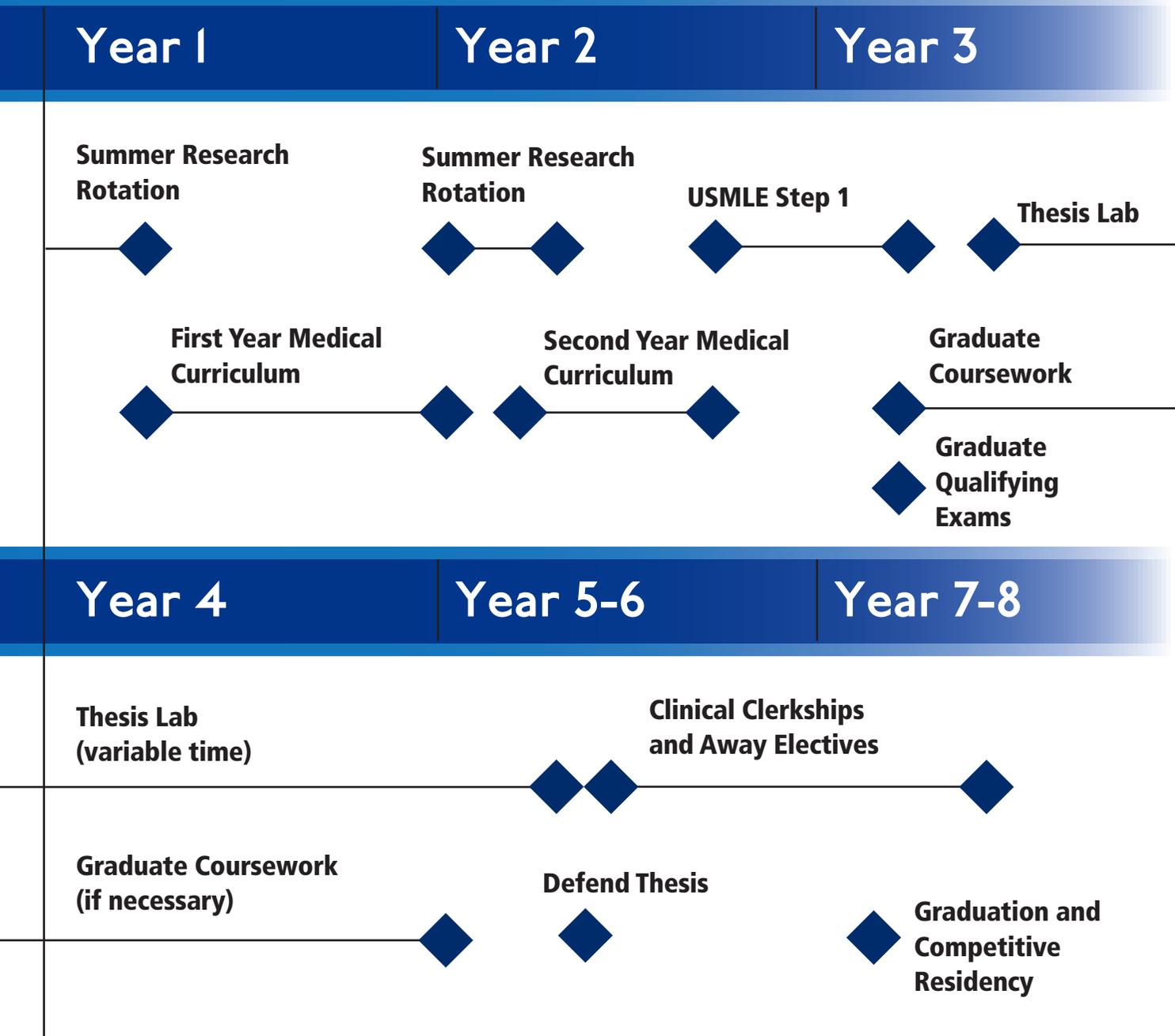
examine successful, intact total knee replacements.

"My work examines how well these knee replacements remain integrated into the human body after surgery, and factors that may cause early failure of the replacements," she said.

One goal of total knee replacements is to avoid replacing the device with another surgery years later. When the device wears down or loosens, patients may get a revision surgery, but the outcomes aren't as favorable the second time.

"It is important to determine what causes these devices to fail, improve the device lifespan in the human body, prolong time to revision surgery, and decrease health care costs," Karen said.

OUR CURRICULUM



Integration: SUNY Upstate Medical University MD/PhD students keep one foot in medicine, one foot in research through the integrative MD/PhD Grand Rounds Course. The bi-weekly course requires students in their clinical years to be up to date with the latest discoveries in biomedical science through assignments and class presentations. Students in their research years shadow at least one day each month and present a clinical case with discussion of a research paper of the cutting edge treatments and findings.

ALUMNI SUCCESS

MD/PHD ALUMNUS LEADS NOVEL CONCUSSION STUDY

Dr. Steve Hicks, a 2012 graduate of the MD/PhD program, is lead author of a groundbreaking study that has identified a novel biomarker in saliva that identifies concussion in children and predicts the length of recovery.

Hicks, MD, PhD, an assistant professor in pediatrics at Penn State Hershey Medical Center, collaborated with Upstate's Frank Middleton, PhD, associate professor of neuroscience and physiology/biochemistry and molecular biology on the study.

They presented the research at the Pediatric Academic Societies 2017 Meeting in San Francisco.

Drs. Hicks and Middleton focused their attention on small non-coding nucleic acid molecules in the body called microRNAs, which can have an effect on gene expression. These microRNAs have been found in relative abundance in the saliva which, when coupled with their unique epigenetic properties, make them attractive biomarker candidates.

"This study shows that the microRNAs found in saliva may be used to accurately identify mild concussion in children," Dr. Hicks said. "Because these microRNAs may drive some of the symptoms associated with concussion, such as difficulties with concentration and memory, they have exciting diagnosis and therapeutic potential."

More than 2 million children and adolescents experience concussions each year. Despite the prevalence of the injury, there are few clinically valid methods for pediatric concussion diagnosis or prognosis. As a result, there is great value in a biomarker that is not only accurate, but easily collected and measured.

The study, sponsored by Upstate-based Quadrant Biosciences Inc. (formerly Motion Intelligence Inc.), also showed compelling data that this unique biomarker may be a better predictor of symptom duration than current standard concussion assessments.



Steve Hicks, MD, PhD, an alumnus of our program



Frank Middleton, PhD, associate professor at Upstate

OUR GRADUATES

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

ADMISSIONS

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.

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

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 US 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 (3 hrs)
- Knowledge of mathematics (preferably statistics or calculus)
- Medical College Admission Test (MCAT)

ADMISSIONS ADVISING

Pre-advisement appointments are available in person or by phone to help you apply to any of our programs. E-mail biosci@upstate.edu to set up an appointment.

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.

FUNDING

All MD/PhD students receive a full tuition waiver and a competitive 12-month stipend as part of the Graduate Student Employee Union (GSEU). Please visit our website at www.upstate.edu/mdphd for up to date costs and fees.

MD/PhD PROGRAM OFFICE

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