

Indicators of student achievement

How does the Graduate School of Biomedical Sciences measure the success of our students? A number of indicators are linked to PhD students' current and future growth and development, and our students earn high marks in all areas.

The first is **graduate placement**. Our graduates consistently attract the interest of outstanding academic institutions. Of our 95 graduates since 2005, 83 have accepted post-doctoral positions in academic settings, and more than half are engaged in research at the Dana-Farber Cancer Institute, Dartmouth College, Duke University, the Fred Hutchinson Cancer Center, Harvard Medical School, Johns Hopkins University, the Joslin Diabetes Center, Massachusetts Institute of Technology, the National Institutes of Health, the University of California system, University of Pennsylvania, Washington University and Yale University. These appointments attest to the quality of our research programs and our graduates, who not only enjoy success in transitioning to post-doctoral study but take pride in informing us that UMMS curricular, research and thesis standards often exceed those of their new institutions. Their message—they recognize how well-prepared they are for a career in science.

The second indicator is **annual completion rate**. The number of students

graduating each year has risen by 20 percent since 2002. This reflects the quality of our students, the commitment of their research faculty mentors and diligent student tracking by school staff and faculty.

Graduation rate also reflects a third indicator—**time to completion**. During the past five years, the mean time to completion has fallen from about seven years to about six. This very significant reduction has not diminished **student publications**, the fourth indicator. Rather, reduced time to completion has been accompanied by a 25 percent *increase* in the number of research articles published by each graduate. Today, a GSBS student publishes three and a half research articles on average en route to graduation. The GSBS student body has published an astonishing 1,346 research articles in the 27 years following admission of the first class and their publication rate continues to climb. We anticipate 140 student publications in 2007. Student publications are not only numerous but high quality, being published in journals such as *Cell*, *Science*, *Nature*, *Genes & Development*,

EMBO Journal, *Development*, *PNAS*, *Neuron*, *Virology* and *Journal of Immunology*. Each is a high impact journal widely read and frequently cited by scientists. Publication in these and other specialized journals indicates that GSBS student work meets the highest standards of peer review and demonstrates that their research is of great interest to the research community at large. Our students are shaping and redefining their fields through compelling, leading-edge research.

The maxim “publish or perish” resonates with graduate students and post-doctoral fellows alike pursuing academic or industrial research careers. A graduate's ability to secure professional employment is influenced by the quality of their mentor's recommendation and by the interest shown by their potential employer. Mentor and future employer enthusiasm are commensurate with the student's research accomplishments, which, in turn, are measured by the quality and volume of their research publications. To succeed, therefore, our students must publish well and often. By any standard, our students are excelling in this goal and we are delighted! ■



GSBS Dean Anthony Carruthers, PhD

Admissions Committee seeking ‘most likely to succeed’

The journey to a doctoral degree in the biomedical sciences can be a long and arduous one—nationally, only about half of all students who enter such programs complete them, and it takes them about six years. The statistics of the Basic & Biomedical Sciences (BBS) division of the Graduate School of Biomedical Sciences (GSBS) mirror those at other comparable institutions nationwide, but the GSBS is working to ensure that students who start the PhD program in the biomedical sciences have not just the ability but the commitment to become GSBS alumni.

The job of deciding who among the applicants is most likely to succeed falls to the BBS Admissions Committee, which comprises faculty representing the eight PhD programs of the BBS division and one BBS student.

“The strength of the GSBS is predicated on our ability to admit talented students with a passion for science,” according to GSBS Dean Anthony Carruthers, PhD.

As the reputation of UMMS has grown with the accumulation of scientific breakthroughs and accolades and the hiring of prominent faculty, the number of applications has also grown dramatically. For the 2007 entering class, the GSBS received more than 600 applications but made offers to just over 150 applicants. An admission rate of

below 25 percent is a substantial drop from five years ago when nearly 50 percent of the applicant pool was admitted. The increase in applications has also been accompanied by an equal increase in the geographic diversity of

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Lucio Castilla, PhD (left), and Anthony Imbalzano, PhD, have a combined 15 years of service on the BBS Admissions Committee.

2007–08 Admissions Committee

Chair: **Lucio Castilla**, PhD, assistant professor of molecular medicine

Vice Chair: **Anthony Imbalzano**, PhD, associate professor of cell biology

Rita Bortell, PhD, associate professor of medicine

Job Dekker, PhD, assistant professor of biochemistry & molecular pharmacology

Duane Jenness, PhD, associate professor of molecular genetics & microbiology

Jack Leonard, PhD, professor of physiology

Brian Lewis, PhD, assistant professor of molecular medicine

Jennifer Saporita, third-year GSBS student in biochemistry & molecular pharmacology

Karl Simin, PhD, assistant professor of cancer biology

Scott Waddell, PhD, assistant professor of neurobiology

Worm people

While the world of academic science can be a competitive field with researchers vying with one another for limited financial resources and publication in prestigious journals, a group of researchers at the University of Massachusetts Medical School has chosen to share resources in a way that is proving collaboration in science is good for researchers and for the advancement of biomedical research. In this collaboration, what the scientists have in common is the model system they all study: *C. elegans*, a non-parasitic roundworm less than one millimeter long.

The monthly Worcester Area Worm Meeting (WAWM) began in 2003 when the labs of Heidi Tissenbaum, PhD, associate professor of molecular medicine; Marian Walhout, PhD, assistant professor of molecular medicine; and Nobel Laureate Craig C. Mello, PhD, Howard Hughes Medical Institute Investigator, the *Blais University Chair in Molecular Medicine* and professor of molecular medicine and cell biology, met so that they could share raw data and ideas in an open forum. At that time, these were the only labs on campus using *C. elegans*.

As all “worm people” know, *C. elegans* is a great research organism because it is made up of only 959 cells, has a 2–3 week lifespan, is simple to maintain and has biological

processes that are easily manipulated using molecular and genetic experimental techniques. “The *C. elegans* community has always been thought of as a friendly, interactive community. This was a great opportunity to share unpublished or in-progress data with a wider audience,” said Dr. Tissenbaum.

There are now seven labs on campus that are conducting *C. elegans* research and all are active in WAWM. An eighth lab will be added in January 2008 when National Academy of Sciences member Victor Ambros, PhD, joins the UMMS faculty.

While all of the labs share a common interest in genetic approaches to understanding basic biology, the fact that each lab brings their own distinct interest related to biological develop-

ment provides great opportunities for significant biomedical and therapeutic breakthroughs.

The collaborative efforts paid off recently for Tissenbaum and Dr. Walhout, who received a four-year grant from the Ellison Medical Foundation for a joint project studying aging. “Having our labs next to one another makes collaboration

ing the hiring process. “When interviewing for jobs, I had resigned myself to the fact that I probably would not find another institution with a similarly strong nucleus of *C. elegans* labs,” said Francis, who did his post-doctoral work at the University of Utah. “I’m pleased to say that I couldn’t have been more wrong. The community here is like no other I’ve been a part of or

“The community here is like no other I’ve been a part of or know about.”

Michael Francis, PhD

ideal,” said Tissenbaum. “We’ve published three manuscripts together already, with another one in review.”

The presence of the worm group and its collaborative nature has also impressed prospective faculty as they consider career opportunities at UMMS. Michael Francis, PhD, assistant professor of neurobiology, who joined UMMS in January, said he was both surprised and pleased when he encountered the WAWM group dur-

ing the hiring process. “When interviewing for jobs, I had resigned myself to the fact that I probably would not find another institution with a similarly strong nucleus of *C. elegans* labs,” said Francis, who did his post-doctoral work at the University of Utah. “I’m pleased to say that I couldn’t have been more wrong. The community here is like no other I’ve been a part of or

know about.” Francis shares some equipment, strains and reagents with Tissenbaum and fellow WAWM member Mark Alkema, PhD, assistant professor of neurobiology, which has dramatically reduced the time and expense involved in setting up a new lab. Other WAWM members include Kirsten Hagstrom, PhD, assistant professor of molecular medicine, and Sean Ryder, PhD, assistant professor of biochemistry & molecular pharmacology. ■

student profile

In this Focus on the GSBS, we feature Jay Sage, a third-year GSBS student in the Biochemistry & Molecular Pharmacology program, who is working in the lab of Professor of Biochemistry & Molecular Pharmacology and GSBS Associate Dean Kendall Knight, PhD. Originally from Michigan, Jay graduated from Michigan State University in 2004 with a degree in biochemistry.



Q: What attracted you to the Graduate School of Biomedical Sciences for graduate study?

When I was looking at potential graduate programs, I was impressed with the range of research areas that were being investigated. While I had a general idea of what types of research interested me, I was reassured by the number and variety of labs at UMMS within which I would find the right fit and project.

Q: What is the focus of your research?

The research in our lab is focused on understanding the molecular roles of proteins associated with homologous recombinational repair of DNA double strand breaks. Recent work has centered on the subcellular localization of these proteins and their trafficking following DNA damage.

Q: What have you enjoyed most about your time at the GSBS so far?

I’ve enjoyed the people that I’ve had the chance to meet and work with. Because the graduate school is large, I was easily able to make a group of friends that made the transition to Massachusetts and graduate school life very smooth.

Q: What are your plans after graduation from the GSBS?

After graduation, I plan to look for a post-doc position where I can continue doing research that relates to DNA repair with an emphasis on how DNA maintenance relates to human diseases such as cancer. I’ve really enjoyed living in Massachusetts, so I’ll likely look for a position somewhere on the East Coast.

Academic success

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applicants, both nationally and internationally.

“I started on the Admissions Committee in the fall of 1997,” said Anthony Imbalzano, PhD, vice chair of the committee, associate professor of cell biology and graduate director for the Program in Cell Biology. “The applicant pool is so much deeper now than it was ten years ago,” he said, adding that the qualifications of today’s top applicants make filling the class much easier.

As a result of this increase in selectivity, the Admissions Committee is now able to look at applicants more critically to determine what makes a successful applicant.

“I want to see a good academic transcript first and then their letters of recommendation,” said Dr. Imbalzano. “Prior lab experience is always helpful because it indicates that the applicant is making an informed choice about entering graduate school.”

Lucio Castilla, PhD, assistant professor of molecular medicine, who is chair of the Admissions Committee and has been a member for five years, said he looks for a balance of quality across all aspects of an application—transcripts, lab experience, personal statement, GRE test

results and recommendations.

Both Drs. Castilla and Imbalzano agree that an applicant must show signs of maturity so that the committee is convinced he or she is making an informed decision. In some cases, this means an applicant has worked professionally in science beyond their undergraduate career, but both committee members say there is no single prescribed path to prepare for graduate study. Castilla noted that sometimes recent college graduates can be looking to continue their education without an understanding of what a life in research entails.

When assessing an applicant group with similarly strong academic backgrounds, Castilla notes that recommendations can be extremely important and it is incumbent upon the Admissions Committee member to see beyond the complimentary language and determine that the recommendation is genuine.

While the Admissions Committee does its best to track past decisions and the success of current students based on the strengths of their applications, both Castilla and Imbalzano concede that it is impossible to translate the process of picking suitable applicants for careers in science into a science itself. ■

Focus on the Graduate School of Biomedical Sciences

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