



Master of Science in Biotechnology

The Graduate College at Rush University

 RUSH UNIVERSITY

Discover the Master of Science in Biotechnology Program

The Master of Science in Biotechnology (MSB) is an accelerated nine-month non-thesis research and laboratory training program designed to prepare students for careers in research-related fields, education, and/or graduate or professional school. This flexible degree program is designed for students with earned bachelor’s degrees that are interested in furthering their scientific education and may not want to commit to a traditional two-year MS program. There are three tracks in the Program including:

- 1. Pre-professional
- 2. Research
- 3. Education

The customized curriculum helps students meet their career and professional goals. Students will participate in hands-on laboratory courses designed to cover the common and most important techniques and methods employed in research today.

Why Should I Pursue a Master of Science in Biotechnology?

Biotechnology graduate career options

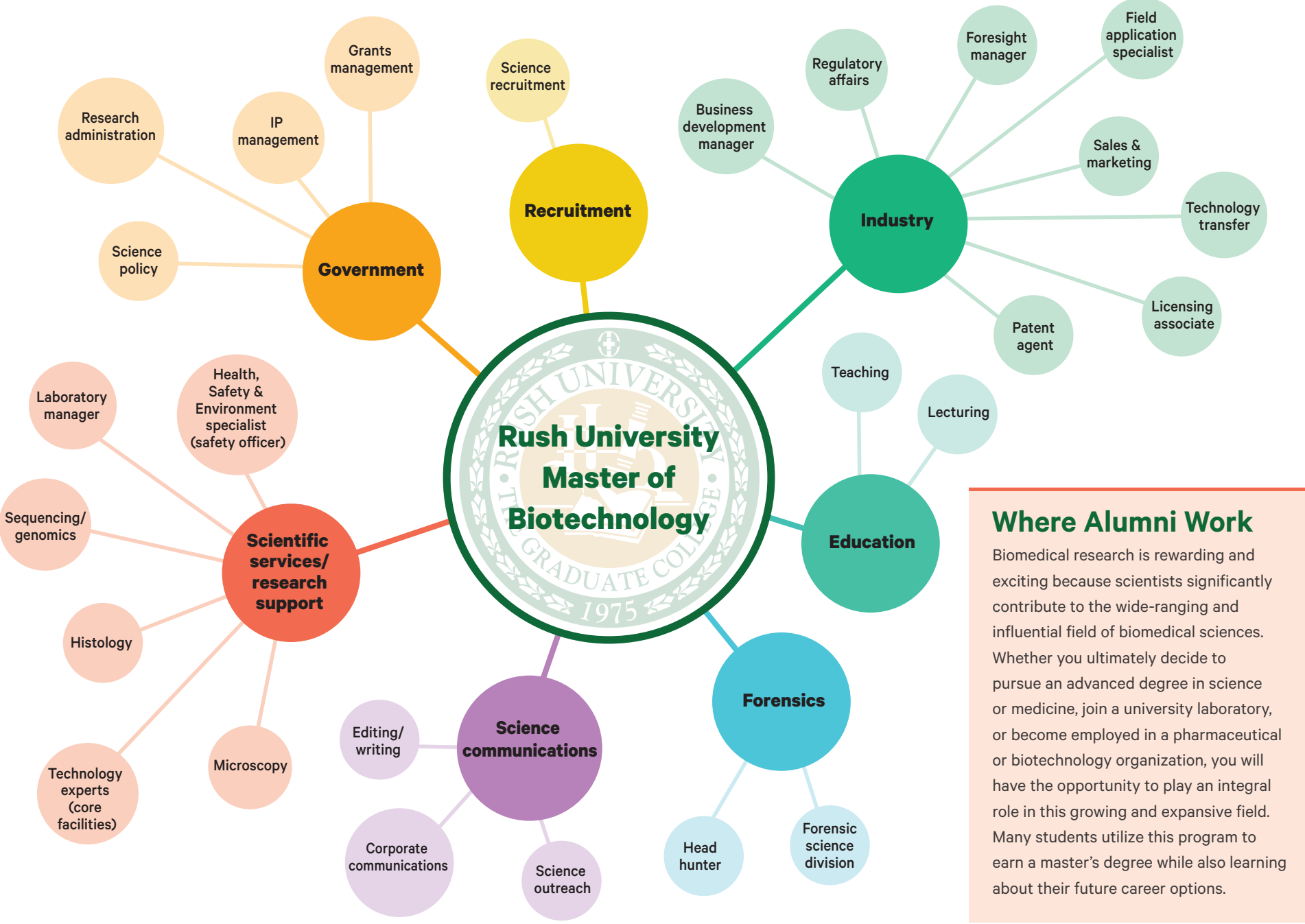
- Employment opportunities for scientists are expected to increase for the next several years, according to the U.S. Department of Labor.
- Ninety-five percent of our graduates find work at university laboratories and biotechnology or pharmaceutical organizations or pursue advanced degrees in science (PhD) or medicine (MD, DDS, DO, or PharmD).
- About 60 percent of our graduates go on to medical or dental school.
- About 20 percent of our graduates go on to a PhD program.
- Graduates can become laboratory instructors or managers, and they may also pursue further education to become high school or college science teachers.

What can you do with a master’s in biotechnology?

People with a master’s degree in biotechnology have no shortage of career options. The following are some of the more popular types of biotechnology careers:

- **Agricultural engineers** assess current techniques and develop new technologies to make farming environmentally friendly and sustainable. Their median yearly salary is \$77,110, according to the Bureau of Labor Statistics (BLS).
- **Biochemists** use their training to find solutions to biological problems. They may work for a pharmaceutical company, where they screen compounds for therapeutic use. The median salary for biochemists is \$93,280, per BLS.
- **Biomedical engineers** develop technology for use in the health sciences. For example, they may develop a way to fine-tune an MRI machine to enhance resolution, which would give clinicians a more accurate tool for detecting health concerns. BLS lists an \$88,550 median salary for biomedical engineers.
- **Biotechnology laboratory technicians** help scientists with lab research. They may work in a clinic, where they use technology to help clinicians diagnose, treat, and monitor diseases. The median annual pay for biotechnology laboratory technicians is \$44,500, according to BLS.
- **Environmental engineers** help protect the environment by testing, minimizing, and managing pollution levels. For example, they may keep our drinking water safe by testing for contaminants. Environmental engineers earn a median annual salary of \$87,620, per BLS.

Biotechnology Career Paths



Where Alumni Work

Biomedical research is rewarding and exciting because scientists significantly contribute to the wide-ranging and influential field of biomedical sciences. Whether you ultimately decide to pursue an advanced degree in science or medicine, join a university laboratory, or become employed in a pharmaceutical or biotechnology organization, you will have the opportunity to play an integral role in this growing and expansive field. Many students utilize this program to earn a master’s degree while also learning about their future career options.

What Makes the Rush University Master of Science in Biotechnology Unique?

- Study comprehensive course work in the life sciences, including biochemistry, molecular genetics, cell and tissue biology, systems physiology and human anatomy
- Learn basic research skills including research design, data management, scientific writing and application of the latest techniques and methods to research
- Gain certification in Good Laboratory Practices, which involves setting up, maintaining and working in a laboratory under federal regulations
- Develop communication and management skills in the laboratory environment
- Participate in interprofessional teams to learn the skills to be a valuable team member
- Prepare for additional studies in science or medicine
- New Human Anatomy course in the second semester of the program
 - Medical school level course
 - Highly clinically relevant
 - Will help students get a head start on pre-professional school
- Partnership with Kaplan for professional school test prep and classes to help deal with test anxiety
 - MCAT/DAT Preparation
 - Reduced price for Graduate College students

General Program Requirements

The Master of Science in Biotechnology program consists of three components:

- Minimum of 34 graduate credits
- Track components
 1. **Pre-professional:** Standardized test preparation and test anxiety workshops
 2. **Research:** Capstone independent research project, practicum
 3. **Education:** Capstone independent research project, practicum

Curriculum Requirements

Courses in the following subject areas are required (34 total credit hours):

- Experimental design and disease models
- Biomedical informatics
- Biostatistics
- Molecular Biology
- Biochemistry
- Cell Biology
- Career Development
- Pre-professional Track: Professional school preparation and Capstone/Thesis Research
- Research Track: Capstone/Thesis Research
- Education Track: Internship/Practicum, and Capstone/Thesis Research

Course Schedule

Fall Semester		
Course Name		Credit(s)
BTN-524	Career Planning	1
BTN-531	Laboratory Techniques I	2
BTN-532	Laboratory Techniques II	2
GCC-501	Molecular Biology: Genome to Proteome	3
GCC-502	Cellular Biochemistry: Proteins, Transport, and Signaling	3
GCC-503	Functional Cell Biology	1
GCC-546	Principles of Biostatistics I	2
GCC-548	Bioinformatics	1
Total:		15
Spring Semester		
Course Name		Credit(s)
BTN-533	Laboratory Techniques III	2
BTN-534	Laboratory Techniques IV	2
BTN-537	Research Capstone	4
GCC-506	Biomedical Ethics 1	1
GCC-547	Principles of Biostatistics II	2
GCC-549	Bioinformatics II	1
GCC-590	Human Anatomy	5
GCC-900	Independent Study	1 - 9
Total:		19

How do I apply?

Application deadline:

July 30

Application Requirements:

- Online Application
- Unofficial transcripts from all colleges attended
- Resume/curriculum vitae
- GRE, MCAT, PCAT, GMAT or DAT scores
- Statement of purpose
- Three letters of recommendation
- International students:
 - TOEFL scores for applicants who have received a diploma from a university at which English is not the language of instruction
 - Official course-by-course evaluation from Educational Credential Evaluators (ECE)
- Application fee

Visit <https://rushu.rush.edu/applyGC> to learn more and apply online.

Meet Our Alumni

Esmeralda Cardoso-Mendoza, MS (2020)



“My ultimate goal is to attend medical school, so I chose Rush because it is a well-known health-care institution. They also have a strong commitment to serving the community. As part of the accelerated Biotechnology program, I really enjoyed that the class sizes, allowing us to build relationships with professors. Knowing that your professors know you by your name makes a difference in your academic experience. One of the best things is being around faculty that is willing to help academically as well as with things pertaining to our career development. For most students, this program is a stepping stone to other professional programs so I think it is motivating being around students who have a common goal.

Post-graduation I will be applying to medical school. Completing the Biotechnology program has greatly expanded my scientific knowledge and has prepared me for the rigorousness of medical school.

The number one piece of advice I would give is to take advantage of all the resources available. Rush having a medical center offers even more exposure to healthcare-related opportunities. I would suggest planning out what it is you would like to gain from the program whether that be research, mentorship, volunteering, or academic enhancement, and pursuing it from the beginning. It is only a 9-month program, but a lot can be accomplished.”

Jack Kapes, MS (2020)



“I chose Rush to pursue my Master’s in Biotechnology as it allowed me to obtain a Master’s degree in an accelerated program. I was interested in the emphasis that Rush places on interprofessional education, and wanted a program that allowed me to focus on core sciences to be a competitive candidate for a multitude of post-graduate opportunities.

My experiences at the Graduate College have been positive. I have developed strong relationships with both my professors and administrators that have allowed me to build both academic support and professional networks. I was exposed to classes and labs centered on a variety of topics and have had the opportunity to attend lectures held by a diverse group of instructors within the Rush University system.

Post-graduation, I see myself preparing for entrance into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level science courses that have allowed me to demonstrate my ability to handle graduate-level, scientific coursework while developing laboratory techniques for future work and/or research.

To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before starting at Rush, I had little laboratory experiences and was looking for a program that allowed me to participate in graduate-level science courses and gain exposure to laboratory techniques involved in research. Find a program that will introduce you to various areas of study as you may find opportunities for a career in something you never thought of.”

Emil Maric, MS (2018)



“Originally, I applied to medical school and didn’t get in. In retrospect, that wasn’t too surprising. I went into the application process at full throttle during college, assuming I’d get in somewhere but not really considering the quality of my application or my experiences. I put my ego aside, looked at my application, and realized that I lacked a strong research and U.S. volunteering background. In fact, I had no research experience prior to coming to the Graduate College, and I hadn’t volunteered here in the U.S. at all. A Biotechnology degree in the Graduate College at Rush University offered me the opportunity to fill those gaps.

If your plan is to go to medical school, I suggest taking a gap year and pursuing a degree or experience that will be applicable to medical school. My situation wasn’t unique; I don’t think most people get into medical school right after college. Pursuing a master’s degree like the one offered through the Biotechnology program at Rush can make a difference. We study topics that translate well to the field of medicine, such as organ and immune systems, tissue biology, and pharmacology.

When you go to a school like Rush, you are exposed to volunteer opportunities that can deepen your interests in serving communities in addition to strengthening your medical school applications down the line. Find yourself a stepping stone. I was upset when I didn’t get into medical school right away, but now I look at this master’s program — my stepping stone — as the best thing to have happened to me.”

Danesha Lewis, MS (2018)



“This program is accelerated. No one really wants to be in school for two to three years so getting all of this information and knowledge in one year, it pretty much sold me. I chose Rush because it is known for its high-quality healthcare education. We use our different skills and techniques to constantly improve healthcare. I’m going to medical school in the future, and I want to have some research knowledge because I plan to do some research in my career. So this degree has helped me to learn the necessary techniques I need to move forward. Rush is very integrated. The interprofessionalism that they’re trying to create by working with teams. They’re teaching us how to work with a medical student, physical therapist, or nursing student so we can share what we know. A lot of the faculty members still do research and being able to work with them is a great opportunity.”

Rodney Quansah, MS (2020)



“I chose Rush because of the academic prestige the University carries in the Chicagoland area followed by its focus on diversity and inclusion along with community outreach.

My experience at Rush was incredibly rewarding. I enjoyed how intersected the college and hospital are providing opportunities to interact and build close relationships with professors, researchers, and healthcare workers. I also enjoyed volunteering in RICSIP (Rush Community Service Initiatives Program) where I could see the direct impacts of my volunteered time on the local community.

After graduation, I plan to work in a clinical setting gaining further insight into what life in healthcare is like while applying to medical school.

A degree in Biotechnology drastically improved my ability to critically analyze and inspect unfamiliar concepts/problems in a rational manner. As a physician, this skill can be applied to dealing with cases presented by patients.”

Meet Our Faculty

Kristin Al-Ghoul, PhD
Assistant Director, Integrated Biomedical Sciences Program
Rush Medical College
Department of Cell & Molecular Medicine

Animesh Barua, PhD
Director, Proteomics Core, and MicroRNA and Gene Expression Core
Rush Medical College
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Andrew Bean, PhD
Dean
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Jeffrey P. Oswald, DVM, Diplomate, ACLAM
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Sanda Predescu, PhD
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Sina Safayi, DVM, PhD
Director, Career Development and Industry Outreach
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Marenda Wilson-Pham, PhD
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