Master of Science in Biotechnology

The Graduate College at 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:

- Pre-professional
- Research
- 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 $81,920, 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

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTN-524</td>
<td>Career Planning</td>
<td>1</td>
</tr>
<tr>
<td>BTN-531</td>
<td>Laboratory Techniques I</td>
<td>2</td>
</tr>
<tr>
<td>BTN-532</td>
<td>Laboratory Techniques II</td>
<td>2</td>
</tr>
<tr>
<td>GCC-501</td>
<td>Molecular Biology: Genome to Proteome</td>
<td>3</td>
</tr>
<tr>
<td>GCC-502</td>
<td>Cellular Biochemistry: Proteins, Transport, and Signaling</td>
<td>3</td>
</tr>
<tr>
<td>GCC-503</td>
<td>Functional Cell Biology</td>
<td>1</td>
</tr>
<tr>
<td>GCC-546</td>
<td>Principles of Biostatistics I</td>
<td>2</td>
</tr>
<tr>
<td>GCC-548</td>
<td>Bioinformatics</td>
<td>1</td>
</tr>
<tr>
<td>Total: 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTN-533</td>
<td>Laboratory Techniques III</td>
<td>2</td>
</tr>
<tr>
<td>BTN-534</td>
<td>Laboratory Techniques IV</td>
<td>2</td>
</tr>
<tr>
<td>BTN-537</td>
<td>Research Capstone</td>
<td>4</td>
</tr>
<tr>
<td>GCC-506</td>
<td>Biomedical Ethics I</td>
<td>1</td>
</tr>
<tr>
<td>GCC-547</td>
<td>Principles of Biostatistics II</td>
<td>2</td>
</tr>
<tr>
<td>GCC-549</td>
<td>Bioinformatics II</td>
<td>1</td>
</tr>
<tr>
<td>GCC-590</td>
<td>Human Anatomy</td>
<td>5</td>
</tr>
<tr>
<td>GCC-900</td>
<td>Independent Study</td>
<td>1 - 9</td>
</tr>
<tr>
<td>Total: 19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
- 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

Visit [https://rushu.rush.edu/applyGC](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, as I felt it was important 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 the class size, allowing us to build relationships with professors. Knowing that your professors know you by name makes a difference in your academic experience. One of the best things is being around faculty that is willing to help in addition to things related to your career development. For most students, this program is a stepping stone to other professional programs as well as with things related to your career development. Being around faculty that is willing to help makes a big difference. 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 saw myself preparing for entry into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level coursework that enabled me to demonstrate my ability to handle graduate-level scientific coursework while developing laboratory techniques for future work in research. To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before attending 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 avenues of study so you may find opportunities for a career in something you never thought of!"

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 Rush placed on interprofessional education, and wanted a program that allowed me to focus on core science 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 saw myself preparing for entry into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level coursework that enabled me to demonstrate my ability to handle graduate-level scientific coursework while developing laboratory techniques for future work in research. To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before attending 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 avenues of study so you may find opportunities for a career in something you never thought of!"

Meet Our Faculty

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

Animesh Baner, PhD
Director, Proteomics Core, and MicroRNA and Gene Expression Core
Rush Medical College
Department of Cell & Molecular Medicine

Andrew Soon, PhD
Dean
Graduate College

Jeffrey P. Oswald, DVM, Diplomate, ACVIM
Director, Comparative Research Center
Rush Medical College
Department of Biomedical Sciences

Jitesh Pratap, PhD
Assistant Professor
Rush Medical College
Department of Cell & Molecular Medicine

Sandra Predescu, PhD
Associate Professor
Rush Medical College
Department of Internal Medicine

Sila Safavi, DVM, PhD Director, Career Development and Industry Outreach
Graduate College

Carlos A. G. Santos, MD
Medical Director, Rush Bioinformatics Core
Rush Medical College
Department of Cell & Molecular Medicine

Marden Wilson-Pham, PhD
Rush Medical College
Department of Biomedical Sciences

Meet Our Alumni

Emil Marc, MS (2018)

"Originally, I applied to medical school and Rush did not get any interviews. I was too surprised. I went into the application process all at once during college, assuming I’d go 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. I was driven to improve prior to coming to the Graduate College. I had volunteered in a U.S. at all. A Biotechnology degree in the Graduate College at Rush provided me with an opportunity to build both academic support and professional networks. My professors and administrators that have enabled me to build both academic support and professional networks. In fact, I participated 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 saw myself preparing for entry into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level coursework that enabled me to demonstrate my ability to handle graduate-level scientific coursework while developing laboratory techniques for future work in research. To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before attending 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 avenues of study so you may find opportunities for a career in something you never thought of!"

Danashe Lewis, MS (2018)

"The program is a stepping stone to my future. I have always been interested in 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 interested the college and hospital are in providing opportunities to interact with both students and faculty. For me, the most rewarding experience was exposure to classes and labs centered on a variety of topics and having the opportunity to attend lectures held by a diverse group of instructors within the Rush University system. Post-graduation, I saw myself preparing for entry into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level coursework that enabled me to demonstrate my ability to handle graduate-level scientific coursework while developing laboratory techniques for future work in research. To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before attending 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 avenues of study so you may find opportunities for a career in something you never thought of!"

"It is only a 9-month program, but a lot can be like to gain from the program whether that be exposure to healthcare-related opportunities. I would suggest planning out what it is you would like to gain from the program if you plan on continuing your education, and wanted a program that allowed me to focus on core science 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 saw myself preparing for entry into professional school as well as seeking a position in research. My degree at Rush exposed me to laboratory techniques and graduate-level coursework that enabled me to demonstrate my ability to handle graduate-level scientific coursework while developing laboratory techniques for future work in research. To students interested in following a similar path, I highly recommend picking an institution that embodies the values you seek. Before attending 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 avenues of study so you may find opportunities for a career in something you never thought of!"
Learn more about the Graduate College at Rush University
rushu.rush.edu/graduatecollege
gc_admissions@rush.edu
(312) 942-3589
600 S. Paulina St., Suite 438
Chicago, IL 60612