

What Can I Do With a Major In...

Biotechnology, Plant Systems Option?

Biotechnology-Plant Systems programs² teach how to use scientific principles and technical skills in support of plant biotechnology research in industrial, academic and government settings. The program includes instruction in plant biology, creation and analysis of transgenic plants, cell culturing, protein purification, plant genetics, industrial microbiology, bioprocessing, chromatography and bio separation, genetic technology, laboratory skills and hazardous materials safety, and computer applications. The goal for this program is to promote research, education and technology transfer for the applications of plant biotechnology in order to benefit the agriculture. Completion of this program will lead to a B.S. degree or academia or the ability to continue on to graduate school in the plant sciences. The professors and staff in the program engage in teaching and research in areas such as cell, molecular, and developmental biology, biochemistry and genetics and the creation and analysis of transgenic plants. Majors have the opportunity through coursework, laboratories and research experience to develop the knowledge and skills necessary to enter into a career in biotechnology or to continue on to a graduate program.

Programs at Montana State University² combine traditional approaches of altering biological materials with the rapidly expanding methods of plant molecular biology. This option is for students with an interest in applying new technology to plant systems. Students in the Plant Biotechnology option concentrate on coursework specific to plant systems and are required complete an internship in a research setting on or off campus. Modern research in plant cellular and molecular biology and its resultant technology offers unparalleled opportunities to provide solutions to our society's most urgent problems in agriculture. The rapidly growing biotechnology industry is involved in developing products to increase agronomic yields, develop new and improved food crops, decrease dependence on nonrenewable resources, and improve food and fiber production. Students interested in plant biotechnology will find challenging careers in the diverse areas of biotechnology in either an academic or industrial setting. Students successfully completing a biotechnology curriculum will also be prepared to enter graduate school for further study. The Bachelor of Science in Biotechnology is an interdisciplinary degree offered by the College of Agriculture. Students will pursue a basic science curriculum the first two years and then choose an area of emphasis in plant, animal or microbial systems for the junior/senior years. Depending on the option chosen, students will be advised by participating faculty in the Colleges of Agriculture and Letters and Science.

Characteristics associated with success¹ include a strong interest in understanding why things work, curiosity about the logic and laws of nature, and a need to ask questions and find the answers.

You should¹:

- Enjoy and be skilled in mathematics and in science
- Enjoy working with plants and as part of a team
- Be logical and organized
- Be able to express yourself, both orally and in writing
- Be able to use a computer
- Be creative in problem solving
- Have good observational skills
- Be an active learner
- Have critical thinking skills
- Be an active listener
- Have sound judgment and decision making skills

Occupations in this field require ability to¹: have laboratory skills, deductive reasoning, originality, problem solving skills, professional ethics, communication skills, writing skills, and the knowledge of scientific literacy.

Related occupations include¹:

- Bioinformatics specialist
- Biotechnical scientist
- Consultant
- Biochemist
- Fisheries/Marine Biologist
- Pharmacologist (human and vet)
- Research associate
- Clinical research associate
- Industry researcher
- Ecologist
- Professor/Teacher
- Microbiologist
- Veterinarian
- Biophysicist
- Laboratory technician
- Health policy consultant
- Medical professional
- Food Science Technician

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MSU graduates (Bachelor's degree) were hired in the following selected fields³:

No graduates have reported employment information at this time.*

Salary averages of survey respondents: (# of respondents in parentheses)³

2010: MT: Insufficient Data*	Out of State: Insufficient Data*
2009: MT: Insufficient Data*	Out of State: Insufficient Data*
2008: MT: Insufficient Data*	Out of State: Insufficient Data*
2007: MT: Insufficient Data*	Out of State: Insufficient Data*

The Biotechnology, Plant Systems Option program has graduated 4 students from 2007-2010, therefore because of this limited data set, please review the following information for additional context for educational outcomes. Please remember when reviewing the salary information that it is the “median”, meaning 50% of reported wages fell below and 50% above the reported wage.

In the field for “Soil and Plant Scientist” the median⁵ wages in National median wage for 2010 is estimated at \$57,300 annually. In 2008 there were 13,900 positions nationally with an expected growth forecast of 15% through 2018. Job openings nationally, due to both growth and net replacement, is estimated at 700 for 2008 through 2018⁶.

Graduates from this program entered programs of further education at these institutions:

Washington State University

Texas A & M

University of Idaho

Other Sources of Information:

Montana State University-Bozeman: College of Agriculture: www.montana.edu/wwwcat/programs/biot.html

ACT, Inc. Discover: <http://actapps.act.org/eDISCOVER/>

Cornell University-Biotechnology Department: www.biotech.cornell.edu/

University of Missouri– Biotechnology Department: www.umsl.edu/bulletin/as/biotechnology.html

***Insufficient Data:** Each year the Career, Internship & Student Employment Services Office at Montana State University conducts a survey to determine placement rates and salary survey information from recent MSU graduates. Graduates were requested to participate in the survey to provide relevant information regarding the transition from college to career/graduate school. At times, there are few or no respondents or not all respondents answer all questions. Statistics, therefore, are not always based upon the response of the total sample group and are sometimes listed as “Insufficient Data”.

For more information contact:



Montana State University
177 Strand Union Building
Bozeman, MT 59717
(406) 994-4353
www.montana.edu/careers

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²Montana State University College of Agriculture

³Montana State University Career & Internship Services⁵50% of reported wages fall below the Median wage and 50% above and include entry to senior level positions. This is not an average.

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Number of graduates/number of respondents: 2007: NA; 2008: NA; 2009: 3/0; 2010: 1/0