

# **UNDERGRADUATE CURRICULUM GUIDE**

for the

## **Department of Cell Biology and Neuroscience**

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### Department of Cell Biology and Neuroscience

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This Curriculum Guide should help you plan each year of your studies in order to complete your Bachelor of Science Degree in **Cell Biology and Neuroscience**. This information is also on our departmental website at <http://www.montana.edu/cbn/index.html>. Please *keep* this Curriculum Guide for future reference and use it to record important information. For updates, suggestions or inquiries about working in a research lab, see your advisor in 510 Leon Johnson.

BIOLOGY courses are offered through many departments on campus. This Curriculum Guide is for undergraduates in the **Department of Cell Biology and Neuroscience**. Course Descriptions are also On-line at <http://www.montana.edu/wwwcat/courses/courses2.html>.

**OVERVIEW:** The **Department of Cell Biology and Neuroscience** offers **2 Options** for obtaining a Bachelor of Science Degree. These Options are outlined on pages 3 and 4 of this Curriculum Guide. For both options, you need at least 120 total credits to graduate. Of those 120 credits, at least 42 of them need to be upper division (300 and 400 level courses) credits.

**OPTION I:** The **Biomedical Sciences Option** is designed to fulfill the requirements for admission to most medical, dental, optometry, physician assistant, and veterinary schools and also prepare students for other biomedical careers in science, teaching, or professional programs.

**OPTION II:** The **Cell Biology and Neuroscience Option** is designed for students planning to attend graduate school or who are preparing for careers in biomedical or neuroscience research. It offers additional preparation in mathematics, physical chemistry and neuroscience. This option can also be used to prepare for professional programs, or for teaching careers.

**ELECTIVE CONCENTRATIONS:** Within either of the two Options above, there is the opportunity to focus your electives on a specific area such as Neuroscience, Cell/Developmental Biology or Anatomy and Physiology or to minor in another subject, depending on your particular interests and career goals.

## **Biomedical Sciences Option**

| <b>Freshman Year</b>           |  | <b>F</b> | <b>S</b> |
|--------------------------------|--|----------|----------|
| BIOH 185                       | Integrative Physiology                     | 4        |          |
| CHMY 141                       | College Chemistry I                        | 4        |          |
| STAT 216                       | Introduction to Statistics                 | 3        |          |
| CLS 101 or<br>WRIT 101         | Knowledge & Community/College<br>Writing I | 3        |          |
| Univ. Core & Electives         |  | 0-3      |          |
| BIOB 256                       | Intro Biol: Cells to Organisms             |          | 4        |
| CHMY 143                       | General Chemistry II                       |          | 4        |
| M 161                          | Survey of Calculus                         |          | 4        |
| WRIT 101 or<br>CLS 101         | College Writing I/Knowledge &<br>Community |          | 3        |
| Univ. Core or Electives        |  |          | 0-3      |
|                                |  | <hr/>    | <hr/>    |
|                                |  | 14       | 15       |
| <b>Sophomore Year</b>          |  | <b>F</b> | <b>S</b> |
| BIOB 260                       | Cellular and Molecular Biology             | 4        |          |
| CHMY 321                       | Organic Chemistry I                        | 4        |          |
| PHSX 205                       | College Physics I                          | 4        |          |
| Univ. Core <i>or</i> Electives |  | 3        |          |
| BIOB 258                       | Intro Biol: Organisms to Population        |          | 4        |
| PHSX 207                       | College Physics II                         |          | 4        |
| CHMY 323                       | Organic Chemistry II                       |          | 4        |
| Univ. Core <i>or</i> Electives |  |          | 3        |
|                                |  | <hr/>    | <hr/>    |
|                                |  | 15       | 15       |
| <b>Junior Year</b>             |  | <b>F</b> | <b>S</b> |
| BIOH 320                       | Biomedical Genetics                        | 3        |          |
| BCH 380                        | Biochemistry                               | 5        |          |
| Univ. Core <i>or</i> Electives |  | 7        |          |
| BIOB 425                       | Adv. Cell & Molecular Biology              |          | 3        |
| WRIT 201 <i>or</i> WRIT 221    | College Writing II or Technical Writing    |          | 3        |
| Univ. Core <i>or</i> Electives |  |          | 9        |
|                                |  | <hr/>    | <hr/>    |
|                                |  | 15       | 15       |
| <b>Senior Year</b>             |  | <b>F</b> | <b>S</b> |
| BIOB 499                       | Senior Thesis/Capstone                     |          | 2        |
| Univ. Core <i>or</i> Electives |  | 15       | 13       |
|                                |  | <hr/>    | <hr/>    |
|                                |  | 15       | 15       |

### Additional Requirements

\*A minimum of 24 additional elective credits of courses in the life sciences must be completed. Of these 24 credits, at least 18 must be upper division; no more than 6 credits of BIOL 490; no more than 2 credits of BIOL 470 and no more than 2 credits of BIOB 494 can be applied toward these 24 elective credits.

## Cell Biology & Neuroscience Option

| <b>Freshman Year</b>   |                                      | <b>F</b> | <b>S</b> |
|------------------------|--------------------------------------|----------|----------|
| BIOH 185               | Integrative Physiology               | 4        |          |
| M 171                  | Calc and Anal. Geom. I               | 4        |          |
| CHMY 141               | College Chemistry I                  | 4        |          |
| STAT 216               | Statistics                           | 3        |          |
| BIOB 256               | Intro Bio: Cells to Organisms        |          | 4        |
| M 172                  | Calc and Anal. Geom II               |          | 4        |
| CHMY 143               | College Chemistry II                 |          | 4        |
| CLS 101                | University Seminar                   |          | 3        |
| Univ. Core & Electives |                                      |          | 0        |
|                        |                                      | 15       | 15       |
| <b>Sophomore Year</b>  |                                      | <b>F</b> | <b>S</b> |
| BIOB 260               | Cellular and Molecular Biology       | 4        |          |
| PHSX 205               | College Physics I                    | 4        |          |
| CHMY 321 * <b>OR</b>   | Organic Chemistry I                  | 4        |          |
| CHMY 211               | Elements of Org. Chem.               | 5        |          |
| WRIT 101               | College Writing I                    | 3        |          |
| Univ. Core & Electives |                                      | 0        |          |
| BIOB 258               | Intro Bio: Organisms to Populations  |          | 4        |
| CHMY 323 *             | Organic Chemistry II                 |          | 4        |
| PHSX 207               | College Physics II                   |          | 4        |
| STAT 332               | Stats for Scientists and Engrs       |          | 3        |
|                        |                                      | 15-16    | 15       |
| <b>Junior Year</b>     |                                      | <b>F</b> | <b>S</b> |
| BIOH 320               | Biomedical Genetics                  | 3        |          |
| BCH 380                | Biochemistry                         | 5        |          |
| CHMY 361 *             | Physical Chemistry                   | 4        |          |
| BIOH 313               | Neurophysiology                      | 3        |          |
| Univ. Core & Electives |                                      | 0 - 4    |          |
| BIOB 425               | Adv. Cell & Molecular Biology        |          | 3        |
| WRIT 201 or 221        | College Writing II/Technical Writing |          | 3        |
| Univ. Core & Electives |                                      |          | 9        |
|                        |                                      | 15       | 15       |
| <b>Senior Year</b>     |                                      | <b>F</b> | <b>S</b> |
| BIOB 499               | Senior Thesis/Capstone               |          | 2        |
| Univ. Core & Electives |                                      | 15       | 13       |
|                        |                                      | 15       | 15       |

### Additional Requirements

\* A minimum of 18 additional upper division elective credits in the life sciences must be completed. Of these 18 at least 6 must be from 400 level courses and at least 3 courses must be from the Cell Biology and Neuroscience Department. No more than 6 credits of 490; no more than 2 credits from BIOL 470 and no more than 2 credits of BIOB 494 can be applied toward the 18 elective credits.

## **ELECTIVE CONCENTRATIONS FOR EITHER OPTION**

Suggested Courses for Particular Areas of Interest

### **A) NEUROSCIENCE ELECTIVES\***

|          |                                |
|----------|--------------------------------|
| BIOH 313 | Neurophysiology                |
| BIOH 425 | Sensory Neurophysiology        |
| BIOH 435 | Cognitive Neuroscience         |
| BIOH 440 | Neuroscience of Mental Illness |

### **B) CELL / DEVELOPMENTAL BIOLOGY ELECTIVES\***

|           |                       |
|-----------|-----------------------|
| BIOB 467R | Gene Construction     |
| BIOH 323  | Developmental Biology |
| BIOH 340  | Histology             |
| BIOH 422  | Genes and Cancer      |
| BIOH 455  | Molecular Medicine    |

### **C) ANATOMY AND PHYSIOLOGY ELECTIVES**

|          |                                |
|----------|--------------------------------|
| BIOH 340 | Histology                      |
| BIOL 395 | Human Pathophysiology          |
| BIOL 409 | Advanced Human Torso Anatomy   |
| BIOL 410 | Advanced Human Anatomy         |
| BIOO 310 | Comparative Vertebrate Anatomy |
| BIOO 412 | Animal Physiology              |

\* Students are encouraged to participate in independent research or undergraduate teaching by enrolling in BIOL 470 or 490.

### **D) MINOR**

You are highly encouraged to pursue special interests which may pertain to your future goals or to round out your education by pursuing a minor in another field. The Cell Biology and Neuroscience major will give you a strong background in the biological sciences, and if carefully planned, there are enough elective credits to pursue a minor in another department.

## ELECTIVES OVERVIEW

There are three types of electives that should be completed in order to fulfill your graduation requirements:

### 1) ELECTIVES TO FULFILL MAJOR OPTION AND ELECTIVE CONCENTRATION REQUIREMENTS:

a) A minimum of 24 additional elective credits of courses in the life sciences must be completed. Of these 24 credits, at least 18 must be upper division; no more than 6 credits of BIOL 490; no more than 2 credits of BIOL 470 and no more than 2 credits of BIOB 494 can be applied toward these 24 elective credits.

A minimum of **15** of these credits must be from the following list:

|           |                                 |     |        |
|-----------|---------------------------------|-----|--------|
| BIOB 476R | Gene Construction               | 3   | F      |
| BIOB 494  | CBN Seminar/Workshop            | 1   | F/S    |
| BIOH 201  | Human Anatomy and Physiology I  | 5   | S/Su   |
| BIOH 211  | Human Anatomy and Physiology II | 4   | F      |
| BIOH 313  | Neurophysiology                 | 3   | F      |
| BIOH 323  | Developmental Biology           | 4   | S      |
| BIOL 411  | Advanced Human Anatomy          | 4   | S      |
| BIOH 422  | Genes and Cancer                | 3   | F      |
| BIOH 425  | Sensory Neurophysiology         | 3   | S      |
| BIOH 435  | Cognitive Neuroscience          | 3   | S      |
| BIOH 440  | Neuroscience of Mental Illness  | 3   | F      |
| BIOH 455  | Molecular Medicine              | 3   | S      |
| BIOL 395  | Human Pathophysiology           | 3   | S      |
| BIOL 409  | Advanced Human Torso Anatomy    | 4   | Su     |
| BIOL 470  | Independent Study               | 1-3 | F/S/Su |
| BIOL 490R | Undergraduate Research          | 1-6 | F/S/Su |
| BIOO 310  | Comparative Vertebrate Anatomy  | 4   | S      |
| BIOO 412  | Animal Physiology               | 3   | F      |

A maximum of **9** credits may be from the following list:

|          |   |
|----------|---|
| ANTH 306 | Forensic Anthropology                   |
| BCH 441  | Biochemistry of Macromolecules          |
| BCH 442  | Metabolic Regulation                    |
| BCH 444  | Biochemical & Molecular Biology Methods |
| BIOB 410 | Immunology                              |
| BIOB 412 | Hybridomas                              |
| BIOB 413 | Flow Cytometry                          |
| BIOB 414 | Advanced Microscopy                     |
| BIOB 415 | Advanced Immunology                     |

|            |  |
|------------|--|
| BIOB 424   | Ethical Practice of Science              |
| BIOB 428   | Molecular Evolution                      |
| BIOB 430   | Plant Biotechnology                      |
| BIOB 475   | Genome Science                           |
| BIOB 478   | Functional Gene Expression               |
| BIOB 480   | Conservation Genetics                    |
| BIOE 370   | General Ecology                          |
| BIOE 440   | Conservation Biology                     |
| BIOH 405   | Hematology                               |
| BIOM 250   | Microbiology for Health Sciences         |
| BIOM 360   | General Microbiology                     |
| BIOM 400   | Medical Microbiology                     |
| BIOM 410   | Microbial Genetics                       |
| BIOM 415   | Microbial Diversity, Ecology & Evolution |
| BIOM 427   | General Parasitology                     |
| BIOM 430   | Applied and Environmental Microbiology   |
| BIOM 431   | Medical Bacteriology                     |
| BIOM 435   | Virology                                 |
| BIOM 441   | Eukaryotic Pathogens                     |
| BIOM 450   | Microbial Physiology                     |
| BIOO 265   | Functional Anatomy of Domestic Animals   |
| BIOO 433   | Plant Physiology                         |
| BIOO 458   | Plant Cell Physiology                    |
| BIOO 460   | Plant Metabolism                         |
| CHMY 361   | Elements of Physical Chemistry           |
| CHMY 362   | Physical Chemistry Lab                   |
| CLS/US 460 | Teaching Internship                      |
| CSCI 451   | Computational Biology                    |
| CSCI 477   | Simulation                               |
| HDFN 221   | Human Nutrition                          |
| HDFN 321   | Life Cycle Nutrition                     |
| HDFN 411   | Nutrition for Sports and Exercise        |
| HDHL 230   | Drugs and Society                        |
| HDHL 240   | Human Sexuality                          |
| HDHL 440   | Principles of Epidemiology               |
| HDPE 320   | Anatomical Kinesiology                   |
| HDPE 322   | Exercise Physiology                      |
| HDPE 323   | Biomechanics                             |
| M 273      | Multivariable Calculus                   |
| M 274      | Introduction to Differential Equations   |
| M 348      | Techniques of Applied Mathematics I      |
| M 349      | Techniques of Applied Mathematics II     |
| PHL 236    | Logic                                    |
| PHL 242    | Science, Pseudo-Science and Subjectivity |
| PHL 321    | Philosophy and Biomedical Ethics         |

|          |  |
|----------|--|
| PHL 345  | Philosophy of Science                        |
| PHSX 446 | Thermodynamics and Statistical Mechanics     |
| PSYX 223 | Research Design and Analysis I               |
| PSYX 225 | Research Design and Analysis II              |
| PSYX 230 | Developmental Psychology                     |
| PSYX 325 | Applied Critical Thinking                    |
| PSYX 335 | Psychology of Women                          |
| PSYX 340 | Abnormal Psychology                          |
| PSYX 350 | Physiological Psychology                     |
| PSYX 354 | Sensation & Perception                       |
| PSYX 370 | Learning and Motivation                      |
| PSYX 380 | Memory and Cognition                         |
| PSYX 384 | Consciousness                                |
| PSYX 482 | Psycholinguistics                            |
| SOCI 380 | Sociology of Health & Medicine               |
| STAT 332 | Statistics for Scientists & Engineers        |
| STAT 401 | Statistics for Researchers                   |
| STAT 410 | Applied Multiple Regression                  |
| STAT 412 | Analysis of Variance & Design of Experiments |
| STAT 420 | Probability                                  |

b) 490s from the following departments will be accepted: Cell Biology & Neuroscience, Biochemistry, Chemistry, Animal and Range Science, Plant Science, Psychology, Microbiology, Undergraduate Scholars Program and Veterinary Molecular Biology.

c) If a student would like an elective NOT listed to be approved as one of their electives toward fulfillment of requirements for the CBN major, they should write up a brief (i.e. one paragraph) explanation of why the course is applicable to the major. This will be submitted to Lisa in the CBN department office (LJ 510) and will be reviewed by a faculty committee for approval. This is to ensure uniformity in enforcement of electives.

f) Students who wish to focus their major specifically on Neuroscience, Cell/Developmental Biology or Anatomy and Physiology, should refer to the categorized list of electives following the Cell Biology and Neuroscience Option.

**2) UNIVERSITY CORE REQUIREMENTS:** The University Core curriculum consists of 30 credits that need to be completed in order to graduate. These include: Seminar (US) (1 course), Quantitative Reasoning (Q) (1 course), Writing (W) (1 course), Inquiry-Arts (IA) (1 course), Inquiry-Humanities (IH) (1 course), Inquire-Social Sciences (IS) (1 course), Inquiry-Natural Sciences (IN) (1 course), Diversity (D) (1 course), Research and Creative Experience (R) (3 credits), and Contemporary Issues in Science (CS) (1 course). **The Cell Biology and Neuroscience degree requirements already incorporate the Quantitative Reasoning, Seminar, Inquiry-Natural Sciences, Contemporary Issues in Science and Writing courses of the University Core requirements.**

The purpose of Core courses is to ensure wide-ranging general education of consistent and high quality to all MSU students regardless of their major or area of study. Departments will offer 291 and 491 “Special Topics” courses which have been approved for specific Core areas and many University Honors courses can fulfill Core areas. Changing faculty staffing, departmental course offerings, and other factors will affect the list of courses available to satisfy Core offerings. **Please consult the Bulletin and current Schedule of Classes for descriptions and other details. IN ORDER TO RECEIVE CORE DESIGNATION FOR A MSU COURSE, THE COURSE MUST HAVE THE CORE DESIGNATION FOR THE TERM THE COURSE IS/WAS TAKEN.**

3) **GENERAL UPPER DIVISION ELECTIVES**: These are courses you may select from any department, assuming you have met any given prerequisites for that course. We highly suggest you choose electives from English, History, Honors, Philosophy, Sociology, Psychology and the Arts in order to provide a well-rounded approach to your science studies.

## HONORS

All students who are among the upper 10% of their entering class, have high ACT or SAT scores, or have demonstrated high academic achievement and personal initiative in previous university coursework should apply for entrance into the University Honors Program. As an honors student you will have access to courses in Chemistry, Communications (written and verbal), Economics, English, Mathematics, and Physics. Honors courses offer small classes and greater flexibility in planning your education. The University Honors Program is outlined on the MSU web site at <http://www.montana.edu/wwwcat/opportunities/spec2.html>; please read it right away if you are interested.

## ADVISING

There are ways to get help with choosing your major, selecting courses, solving issues of class conflicts, or learning what to do if a class has been filled or you need to retake a course. There are also other resources on campus you can go to for help.

- a) **ADMINISTRATIVE ADVISING:** Your first approach is to go to the Departmental Office where all of your records are kept as you work toward your degree. Lisa Musgrave, Advising Coordinator, will be able to help with most of your questions about coursework, transfer work, and forms that require signatures. Lisa Musgrave can be reached by email at [cellbio.msu@gmail.com](mailto:cellbio.msu@gmail.com), by calling 994-5120, or by stopping by the department office, located in Leon Johnson hall, room 510.
  
- b) **FACULTY MENTOR:** Additionally, each student can see a **Faculty Mentor** who will advise about career paths, research questions, answer specific questions about coursework, help with important decisions you may have to make, or address your concerns.
  
- c) **COUNSELING AND PSYCHOLOGICAL SERVICES (CPS):** Trained counselors and psychologists offer a variety of free, confidential counseling and psychological services to eligible students who may need assistance with educational and career counseling as well as personal issues. CPS is located on the second floor of the Swingle Health Center and is open Monday through Friday, 8 a.m. to noon and 1 to 5 p.m. There are also counselors who can help you get through **rough times** (994-4531). If these occur, you should also speak to your Faculty Mentor about how to handle university issues, *e.g.* when to drop courses, what to drop, *etc.*
  
- d) **OFFICE OF THE DEAN OF STUDENTS:** Acts as an advocate for students and works with other campus offices in creating a sense of community at MSU. They are located in the SUB room 120 or call 994-2826.
  
- e) **CAREER SERVICES:** Located at 125 Strand Union and On-line at [www.montana.edu/careers](http://www.montana.edu/careers), a full range of career planning and employment services are offered.
  
- f) **HEALTH PROFESSIONS ADVISING:** Students interested in medical school, dental school, optometry school, physician assistant or other health professions school should contact the health professions advisor in the Division of Health Sciences at <http://www.montana.edu/dhs/hpa/index.html>, 994-1670, 316 Leon Johnson Hall, or [hpa@montana.edu](mailto:hpa@montana.edu). The advisor provides advise on academic preparation for health professions schools, preparation for the required national exams, and appropriate choices of curricula. You should also inquire about how to become a member of the Health Professions Club which offers several helpful services to better prepare you for your future including a list-serv with current information relevant to your interests.

## UNDERGRADUATE RESEARCH

As part of your undergraduate experience in Cell Biology & Neuroscience, you should consider participating in research in a faculty member's laboratory. This can be a valuable and exciting experience to put to use the skills you have learned in class and determine if research is something of interest to you. For many students, the chance to be involved in original research on an issue has affected their future plans.

At MSU, students can participate in undergraduate research as a volunteer, for course credit, or for a stipend. If you are interested in undergraduate research, consider the points below.

### **Don't rush into it – build a solid background and develop interests**

- Concentrate on your course work. Good grades will help you get into a lab
- Take appropriate classes so you know the theory behind the work done in the laboratory
- Wait until you have enough time in your schedule to spend 10-15 hours a week on your project

### **Talk to lots of people and listen to their advice**

- Faculty advisor and professors in classes
- Grad and Undergrad teaching assistants
- Other students who do research

### **Do some research and generate a list of professors whose work you are interested in**

- Consider waiting until you have a few defined interests to follow. Comments like “I am interested in molecular biology” or “I want to do clinical research” won't get you too far. They are way too general. The faculty here are interested in what they work on. They will be thrilled to talk to you about that topic if you have some passion and enthusiasm about it.
- Get on the web and check out the research interests of the faculty. Read, or at least look at, a reference from their lab.
- Find out what it is like to work in the lab. Ask the professor to let you visit the lab or get email addresses of undergrads that work with him/her.

### **Contact the professors on your list**

- Many labs are popular places so start early. In many cases you should contact the professor the semester before you want to do research.
- In most cases, send the professors an email telling them something about yourself and why their research is interesting to you. If your grades are excellent – tell them that. If you are thinking about graduate school, tell them that. If you have lab or field experience in their area – tell them that. You have to sell yourself to the faculty and encourage them to talk to you.

### **Ask to make an appointment with them about their research**

- If you don't hear from the faculty member in 3-5 days (not including the weekend), give them a phone call and politely tell them that you are the student that sent the email and that you are VERY interested in talking to them.
- Be politely persistent! It will show that you have the commitment and energy to work hard on their research.

### **Options to consider:**

- What are you doing with your summer vacations?
- Think about doing research at MSU or at another research institution. Many schools (including MSU) have summer undergraduate research programs.
- Do you want to volunteer in the lab, or get some academic credit (**BIOL 490**)?

### **Things to Keep in Mind**

- Research takes time. Don't get involved until you can comfortably spend 10-15 hours a week in the lab. Many senior students spend over 20 hours a week doing their research.
- Research experience will not make up for poor grades when you apply to medical school or graduate school. Research is essential if you are applying for graduate schools, but again you will need good grades to be considered. Research is not required for medical or veterinary school, despite the rumors you hear! It will be helpful and will give you something to talk about in your interview, but only if you can talk intelligently about your project.
- You will need three letters of recommendation to apply to medical, veterinary, or graduate school. Doing a good job with your research will help provide you with one or more of these letters.
- The term "independent research" is confusing to both students and faculty. Generally, the term "independent" means that a student has her/his own project to work on and think about in collaboration with a faculty member, graduate student, post-doc, technician, or other undergraduates. It does not mean that you have to have an idea in mind to approach a faculty member.
- Few undergraduates get paid to do research. In most cases, paid positions are assistant or lab support positions. There is nothing wrong with starting there and moving up into your own project.

*Adapted from Cornell University*

## **SCHOLARSHIPS AND AWARDS**

Below are listed descriptions of some scholarship opportunities for students in the Department of Cell Biology and Neuroscience. You should complete the scholarship information sheet available in the departmental office (510 Leon Johnson Hall) and return it to the departmental office to then be submitted to your advisor. You should also inform your advisor if you are interested in a particular scholarship.

### **CELL BIOLOGY AND NEUROSCIENCE**

#### **•Harold Watling Scholarship**

Harold Watling was a Professor of Zoology at MSC/MSU from 1947-1980 and was a respected pre-medical advisor during those 33 years of teaching. The scholarship was started by one of his former students, Dr. David Burgan of Polson, and is contributed to by other physicians and MSU alumni and staff. This scholarship is awarded each year to a currently enrolled junior or senior student who will graduate from Montana State University. The student can be in any curriculum that provides the possibility of medical school application. Approximate due date: February

### •Swingle Memorial Scholarship

The Swingle Memorial Scholarship was originally established in 1944 in memory of Prof. Deane B. Swingle, founder of the Montana State University student Health Service. It was expanded to further memorialize Dr. Karl Frederick Swingle, Elizabeth Carter Swingle, and Stanley Swingle, all of whom received a degree from Montana State University. The objective of the scholarship is to provide fee support for worthy students--undergraduate, graduate, or non-degree, registered in either the Ecology or Cell Biology and Neuroscience Departments. Approximate due date: February

### •Gary L. Lynch Memorial Fund (Graduate Students only)

The Scholarship was established in memory of Gary K. Lynch who was a candidate for the degree of Master of Science in Zoology at Montana State University, from January 1977 until May of 1978. The intent of the Scholarship is to recognize and encourage the development of those qualities that made Gary Lynch an outstanding graduate student.

### **LETTERS AND SCIENCE SCHOLARSHIPS**

- Day of Student Recognition
  - Christy Foundation Scholarship
  - Hart Scholarship
  - Minerva “Tommy” Morgan Scholarship
- Kopriva Fellowship
- Frances Tolman Folger Memorial Scholarship
- Fassler Scholarship

### **LETTERS AND SCIENCE AWARDS**

- Day of Student Recognition
  - Roskie Award
  - Dean’s Award for Excellence

### **HONORS PROGRAMS**

- Goldwater Scholarship
- Truman Scholarship
- Udall Scholarship
- USA Today—all academic team

### **OTHER SCHOLARSHIPS AND AWARDS**

- Phi Kappa Phi Graduates
  - Fellowship
- Phi Kappa Phi
  - Outstanding Junior
  - Outstanding Senior
- Target All-around Scholarships—  
(for students engaged in community service)—call (800) 316-6142 or apply on the web at: [http://www.target.com/target\\_group/community/community\\_scholarships.jhtml](http://www.target.com/target_group/community/community_scholarships.jhtml)