

## Details About Undergraduate Research in Chemistry

Undergraduate research is an opportunity for majors (and non-majors) to conduct original and creative research in an area of chemistry that interests them and to earn credit for their efforts. Many research areas are available, covering all the chemistry disciplines of organic, inorganic, analytical, physical and biochemistry.

### Who should enroll in undergraduate research?

Three credits are required for the BS Chemistry major; three credits are also required for the BS Chemistry with Concentration in Biochemistry degree. An additional three credit hours can fulfill one of the Natural Science upper level electives requirement. The BA Chemistry major and the BS Chemistry with Concentration in Business programs include undergraduate research as one option for fulfilling upper level elective requirements. Up to six credit hours can be earned toward the Chemistry degree. (More than six credits can be earned, but those beyond six would not count toward the major.) In addition to credits under Chem 391, 392, 491 and 492, a writing version is also available, Chem 390WR.

### When should I enroll in undergraduate research?

Most professors prefer that students complete General and Organic Chemistry before attempting a research project. Some projects, however, may be available with less or more required background. **DO NOT WAIT** until well into your senior year to begin investigating your research options! In general, you must set up arrangements in advance of the academic term.

### How do I find a research advisor and a project for undergraduate research?

Students enter research along different pathways, and you need to decide what is right for you. A good place to start is the Chemistry Department's Undergraduate Research webpage (<http://louisville.edu/chemistry/undergraduate-studies/undergraduate-research.html>). This is where you can find out what kinds of projects are being conducted in the Department's research labs. Explore the areas of research that are available. Choose several faculty to contact. Some students already have a particular professor they would like to work with. That's fine, but you can shop around, too. Your chemistry academic advisor is also a good resource for information on options within the department.

Here's what you need to do once you've decided whom to contact. First, contact the faculty member (email is fine) by way of introducing yourself and ask if they have a project available. Provide them the following information.

What chemistry courses have you recently completed and which are you currently in?  
How many hours to you intend to commit on average, per week? (See later section, below.)

Do you intend to do only one academic term or are you open to doing a longer project?  
("Open" does not establish a binding commitment, but it's just an indicator of your time frame of interest.)

Projects and faculty involvement vary, and this information can help the faculty member assess whether they do in fact have a project suitable at that time for your circumstances.

Don't be put off if a faculty member says no; projects can pop in and out of existence from one semester to another. If the faculty member tells you that they are interested, then set up a face-to-face meeting with them. This meeting is a two-way street: they are assessing you and you are assessing them. You want to work on a project that truly interests you.

### **Must undergraduate research be done within the Chemistry Department?**

No, often students discover research opportunities outside of the Chemistry Department. For instance, students often work with researchers at the Health Sciences Campus. The project should contain a substantial chemistry component within any of the usual disciplines. In order to do research outside the Chemistry Department, you must coordinate the arrangement with both your chemistry academic advisor and the research advisor you will work with.

Research credit can also be awarded for projects completed at other colleges and universities. Occasionally students are accepted into Summer Research Opportunity Programs at other institutions. If you would like to have your summer research project accepted as your research requirement, you must coordinate this with your chemistry academic advisor before beginning summer research.

For any research outside of the chemistry department, a separate form is required. This can be obtained from the Undergraduate Research website (<http://louisville.edu/chemistry/undergraduate-studies/undergraduate-research.html>).

### **Can business co-ops count as undergraduate research?**

Yes. Even though the course numbering is different (Chem 420), your cooperative internship with local industry can be substituted for the undergraduate research requirement. Co-op arrangements must be discussed with and approved by Dr. Richard Baldwin in the Chemistry Department in order to receive credit.

### **Can you receive both credit and payment for undergraduate research?**

Yes. Stipends are sometimes available. Check with the research advisor in advance.

### **What are the other requirements for undergraduate research?**

Specific requirements, including time commitments, will vary somewhat depending on your research advisor. In general, expect to average ~3-4 hours per week per credit hour or ~ten hours for three credit hours. For doing research during the summer, there is some flexibility in the scheduling; check with the research advisor. Most advisors will require that you maintain a research lab notebook so that they have a permanent record of your data and results. Also, many advisors require you to write a short research paper summarizing your project. Check with the research advisor for those details. If you enrolled in Chem 390WR, then a paper of 2400 words is required to fulfill WR.

### **How do I register for undergraduate research?**

If you are completing a project within the chemistry department, your research advisor will assist you with enrollment. For projects outside Chemistry, your chemistry academic advisor will arrange enrollment after approving the project. (Be sure to fill out the form mentioned above.)