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## The Student's Forum

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# Majoring in biology just isn't enough!

Louise Hecker

*Department of Biological Sciences, Binghamton University, Binghamton, NY 13902*

**T**o all of you undergraduates who plan to go to graduate school or pursue a career in biology: Majoring in Biology just isn't enough! In today's competitive world, it is advantageous to make yourself as marketable as possible. Graduate schools and professional schools, such as medical or veterinary, look for students with more to offer than a biology degree and a high grade point average (GPA). Acceptance usually requires skills gained from experiences outside the classroom. Employers look to hire people with skills from hands-on experience. What makes you different from other students with the same GPA and degree, applying for admission to the same graduate programs at major universities? What will set you apart from other candidates applying for the same jobs? I believe that independent research is the key to success if an undergraduate plans to continue in biology.

After graduating from college, I noticed that many of my classmates had trouble obtaining a job or being accepted into graduate school. I watched as my peers, despite many interviews, did not find opportunities from graduate schools and industry. Some even had to accept jobs in different fields (such as sales) simply because no positions seemed available in biology. I, on the other hand, had only one interview before I ac-

cepted a tenure-track position as a histologist/cell biology preparator at SUNY's Binghamton University. Immediately after accepting the position, I was also admitted into the graduate program. I began to wonder why I had no trouble finding a job and acceptance into graduate school, while so many others had difficulty. The answer was simple: research experience!

I was fortunate to have had an excellent research experience under the supervision of Dr. Stanley K. Sessions, a professor of biology at Hartwick College in Oneonta, New York. My project involved microsurgical limb rotations in tadpoles. I tested the hypothesis that mechanical disturbance can disrupt spatial relationships among cells in the developing limb bud, and thereby creates positional confrontations causing intercalation. My research experience gave me many skills that prepared me for a career in biology.

When I asked Dr. Sessions why he believed it was important for undergraduates to become involved in research, he replied, "It gives students a taste of what it's like to be a biologist." He asked, "Do you remember the first time you tried to perform a limb rotation on a tadpole? You walked into my office and told me that it was impossible! But soon you figured out a way to make it work, and you realized that it *was* possible." He added, "Research provides students with an opportunity to solve problems on their own, and it gives them a sense of empowerment." Dr. Sessions feels that although the goal

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Correspondence to: LHecker@binghamton.edu

of undergraduate research is to get students to start thinking independently, other fortunate consequences include acceptance into graduate programs and job opportunities.

Dr. Dale Madison, Graduate Coordinator of the Department of Biology at Binghamton University, commented that "Research experience coupled with other acceptance criteria not only helps students get into a graduate program, it also accelerates their passage through the program." Students with research experience do not have to waste time learning basic skills, and, therefore, they can begin research projects without delay.

Being involved in research also provides undergraduates with a one-on-one interaction with a faculty member. The professor can get to know the student and share knowledge and experience on a personal level. This enables the research advisor to write a meaningful letter of reference. According to Dr. Madison, "In many cases, letters of reference can be just as influential as grades or GRE scores for acceptance into a program."

There are numerous opportunities to become involved in research at the undergraduate level. However, undergraduates need to take the initiative. You could start by talking with other students (graduate or undergraduate) that are actively involved in research. Offer to help them with their research for a day (most students would be delighted to have the help) so that you can get an idea of the types of research going on in your department. It will also give you an opportunity to ask them useful questions, such as, how they got started, how they chose their project, how long it took, etc. You should also inform faculty members about your interest in research. They possess a wealth of knowledge and are invaluable resources. They may offer research opportunities within their lab or provide you with information about other research prospects.

The internet is also an excellent way to find out about research opportunities in your vicinity and around the world. All you need to do is search "Undergraduate Research" to find many

helpful Websites. Some helpful Websites include Grantsnet (<http://www.grantsnet.org/>) and The Foundation Center (<http://fdncenter.org/>). Many national organizations offer grants or fellowships to undergraduates involved in research. For example, Tri-Beta has a research scholarship program through which students can receive funds to support their projects (<http://www.tri-beta.org>). Students can obtain funding for project supplies through Sigma Xi, The Scientific Research Society (<http://www.sigmaxi.org/>). This is also an excellent way to show a faculty member or an advisor that you are serious about research and are willing to take the initiative. Research stipends are available through the Council on Undergraduate Research and from several other professional societies, such as the American Society for Microbiology. During my junior year of college, I looked on The National Science Foundation (NSF) website (<http://www.nsf.gov/home/crssprgm/reu/reulist.htm>) and found out about Research Experiences for Undergraduates (REU). Through this program I obtained a grant to spend a summer doing research at the Institute for Sensory Research in Syracuse, NY. Opportunities abound; all you need to do is find them.

My undergraduate research experience has been invaluable to me. It was the single most important and helpful tool in preparing me for a career in biology. The benefits ranged from learning complicated technical skills, writing and presentation skills, to learning how to think independently and solve problems. Furthermore, taking on the responsibility for my independent research project gave me a tremendous sense of self-confidence. I was responsible for running experiments, keeping a detailed notebook, writing and publishing papers, etc. As a young biologist and a recent graduate, the best advice I can offer to an undergraduate biology major is this: Take the initiative and get involved in research! You will not only learn about biology, you will also learn to think independently.

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