




2003

# Reflections on Mentoring Undergraduate Research

Robin L. Cooper

University of Kentucky, [rlcoop1@uky.edu](mailto:rlcoop1@uky.edu)

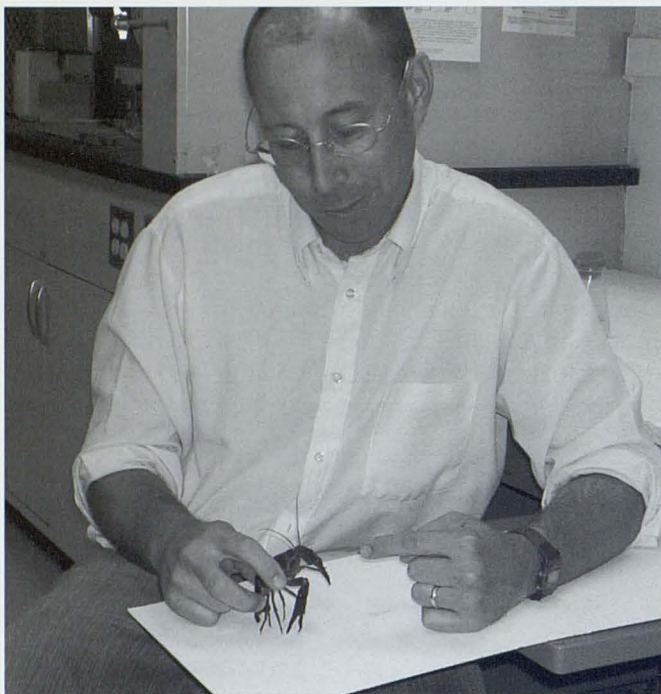
Follow this and additional works at: <https://uknowledge.uky.edu/kaleidoscope>

 Part of the [Higher Education Commons](#), and the [Science and Mathematics Education Commons](#)  
**Right click to open a feedback form in a new tab to let us know how this document benefits you.**

## Recommended Citation

Cooper, Robin L. (2003) "Reflections on Mentoring Undergraduate Research," *Kaleidoscope*: Vol. 2, Article 16.  
Available at: <https://uknowledge.uky.edu/kaleidoscope/vol2/iss1/16>

This Beckman Scholars Program is brought to you for free and open access by the The Office of Undergraduate Research at UKnowledge. It has been accepted for inclusion in Kaleidoscope by an authorized editor of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).



## Reflections on Mentoring Undergraduate Research

by:

Robin L. Cooper, Ph.D.  
Associate Professor, Department of Biology

*“From the joy of working with these first students, I quickly realized that working and exchanging ideas with undergraduate students is half the fun of conducting research.”*



When I first came to the University of Kentucky seven years ago I was leery of taking undergraduates into my research laboratory because of the great amount of time it would require to train them. I had to remind myself that it was my experience working in a laboratory as an undergraduate chemistry major that stimulated me to continue on for graduate studies. In addition, my first peer-reviewed publication was from the results I obtained during undergraduate studies. So, I did accept a few undergraduates to work in the lab my first year at UK. From the joy of working with these first students, I quickly realized that working and exchanging ideas with undergraduate students is half the fun of conducting research. For most investigators like myself, academic research will not make one rich financially, so one ought to enjoy what one does and make the working environment as rich intellectually as possible.

During my tenure here at UK, I have had 32 undergraduates conduct research for at least one semester in my lab. Thirteen of these undergraduate students who worked one semester in the laboratory came back to continue their projects for a full year or more. Five worked in the lab for at least two years. Twenty-three of these undergraduates have appeared as primary author or as co-author on peer-reviewed publications. Some of the undergraduates have their name on two or three articles, as well as a book chapter. In addition, many of the undergraduates have presented their research findings at local, national, or international scientific meetings.

The University has been helpful in seeing that undergraduates get a chance to present at scientific meetings by financially assisting students to

## BECKMAN SCHOLARS PROGRAM

partially cover their expenses. This type of continued assistance for the students and mentors is necessary, because it allows mentors to avoid depleting grant dollars in travel and boarding costs while attending national or international meetings. A number of my students have also been granted National Science Foundation (NSF) Research for Undergraduate Education (REU) funds.

This last year, Garrett Sparks was working in my laboratory supported by a Beckman Foundation scholarship. One of several different projects he is undertaking concerns 3,4-Methylenedioxyamphetamine (MDMA, "Ecstasy"). In mammalian models, damage to central serotonergic neurons after exposure to doses of MDMA, similar to human recreational doses per body weight, causes depletion of serotonin (5-HT), and 5-HT transporters. Using simple invertebrate preparations, we have demonstrated additional mechanisms of MDMA activity that had not yet been addressed in vertebrate systems. These studies are now under review for publication in a peer-reviewed journal.

I feel collaborative efforts with my undergraduates and other academic collaborators at various universities around the world make life more interesting for the undergraduate students as well as for my colleagues. Because of my international connections, the office of International Affairs at UK asked for short comments from undergraduates working in my laboratory. Below are a few excerpts from their remarks.

When Dr. Cooper approached me with the opportunity to collaborate, with two of his colleagues, on a review article proposing an autonomic nervous system (ANS) in Crustacea, I was immediately interested. Over the next several months, we wrote numerous drafts, prepared figures, and reviewed literature dating back to the 19th century. Throughout the entire process, we maintained contact with Dr. Cooper's colleagues in Russia by e-mail and the Internet. Over these months, I learned not only that this Russian husband and wife team knew a tremendous amount about the ANS, but that most of the early work in this field began in Russia in the 1920s. Moreover, I was amazed to see how, even though our interests were very similar, we often had entirely different perspectives on the context and development of these ideas.

This collaboration revealed that, at least in terms of common scientific goals and

approaches, the world is quite small. I was able to observe this again at the University of Cincinnati where I worked as a clinical/laboratory technician before beginning medical school. During this time, we frequently met with a Russian scientist in the laboratory adjacent to our own, whom I came to learn had trained some 25 years ago with the husband and wife team with whom we had been collaborating. I also came to learn that this husband and wife team are very well known and respected in the Russian scientific community. Learning this not only gave me a true sense of the interconnectedness of the international scientific community but also filled me with a sense of pride to have had an opportunity to work with these Russian scientists at the University of Moscow. (Jeff Strawn—University of Kentucky Ribble Scholar, NSF-REU award)

Reading about Josef Dudel, with whom we were collaborating on my current project, in a history of crustacean neurobiology gave me an added sense of the significance of my work. Especially as undergraduates, researchers can easily feel as if they are just small faces in a sea of others, all scurrying about with unrelated work in loosely related fields. Forming ties with others outside the University and especially internationally helps researchers to understand why their work holds importance. Novel writers must know their audiences. Biologists ought to have the same benefit. (Garrett Sparks—Singletary scholar-UK, Gaines fellow-UK, Ribble scholar-UK, Arnold and Mabel Beckman Foundation scholar)

I started working in Dr. Cooper's laboratory on a project related to chemical communication among crayfish. It was really fun because I was carrying on research that a visiting scientist from Germany started when he worked in our lab here at UK. This work was also later tied in with Dr. Cooper's connections with Russian scientists. It has been fun to see and be part of the collaborative efforts to understand basic scientific questions using the crayfish as a model preparation. Seeing the new techniques that the German scientist brought to our lab was interesting. He found a way to dye the urine of the crayfish so that one could tell if they use urine as a signaling mechanism when they interact socially. We have had very good results, which has led to me being first author on a peer-reviewed manuscript to be published soon. I am working on a second paper now. (Heidi Schapker)

I have come to the realization that, yes, working with undergraduates takes a lot of time and effort, but it pays off in terms of publications and having students represent my research team at scientific meetings. It also pays off in vastly increased educational experiences for the students.