September, 2005 – Dr. Brian Hopkins, Mathematics

Research Tip:
Ideas for Connection

How do we find research topics and collaborators? How do we come up with directions for undergraduate research? Answers to these questions can vary widely by discipline and personality. In this research tip, I want to share some strategies that have been successful for me. While my particular discipline is mathematics, the ideas are hopefully widely applicable.

First, let me make a case for doing research with collaborators. It's the pedagogical idea of group learning applied to our own work. Besides the benefits of sharing the work load, two or more people are more likely to come up with a good idea worth pursuing, and multiple perspectives on an issue are often helpful. Here's a recent example. Mike Jones of Montclair State University is a friend of a friend, and we finally got together to share research ideas. After finding one we both liked, we went about working on it, meeting once or twice a month in Hoboken or Greenwich Village coffee houses to compare notes. There was one particular result that we each proved, using entirely different methods. Finding the connections between our almost contrary approaches was very engaging and ultimately made for a richer article.

Where do you find collaborators? My general advice is to stay connected. Another joint venture of mine came from my application to give a talk in the history of mathematics. As it happened, Robin Wilson of Keble College, Oxford submitted a similar proposal around the same time, and the organizer of the session connected us, suggesting that we work together. We both liked the idea, and ended up not only giving a joint talk but writing an article, "The Truth About Königsberg." (Unfortunately, Robin and I could not meet regularly for tea, but email helps make distance moot.) Overall, I find that smaller, more specific conferences are more conducive to finding potential collaborators. Despite the cheesy names, I've done better at the Bay Area Discrete Mathematics Day (BADMath) and CombinaTexas than large national meetings.

And student research? I find the same strategies that help my research help with finding student research topics. (Mathematics is a field where topics for undergraduate research are usually provided by the faculty, so that the undertaking has a better chance of being tractable). Jenny Buontempo's honors topic was developed from a two-day workshop on counting that I gave for Seattle area high school teachers last summer. Mukta Varsani is working on an extension from last spring's Topics in Applied Mathematics class on Fair Division, which was inspired by a friend's article on how to split rents in an apartment where the bedrooms are different sizes. Bigyan Bista will be doing work on phylogenetic trees, which I know about through the Faculty Resource Network's summer workshop and this year's Park City Mathematics Institute. My next go at

Topics in Applied Mathematics will probably focus on this and other topics in mathematical biology. Hopefully these examples also challenge the notion that research and teaching are at odds. Sometimes they can work in tandem, to the benefit of both faculty and students.