

CONNOLLY'S MENTORING PRESENTATION FOR KANEB

1. SUMR (SEMINAR FOR UNDERGRADUATE MATHEMATICAL RESEARCH)

SUMR is a two year program designed for students who show commitment and talent in Mathematics. To date, 46 SUMR students have won nationally competitive fellowships. Also 42 SUMR grads have obtained Ph.D.s in the mathematically related sciences while 23 more current SUMR grads can be expected to obtain such a Ph.D. eventually. In addition, 80 of the 84 graduates of SUMR have pursued a graduate degree of some kind. See: <http://sumr.nd.edu/sumr.html>

Below are the principal features of SUMR:

SUMR Graduate Course (required):

Each junior takes one grad course. This *can* be the SUMR course. The SUMR graduate course is designed so that a diligent and talented junior can manage it. It focuses on a topic that will be valuable to the student in graduate school.

Honors Senior Thesis (required):

The Senior Thesis develops the habit of independent research in the student. It must be based on graduate-level readings. In the final three semesters the student meets with the thesis director weekly.

Topology Reading Group:

Honors students in the first two years are invited to join this reading group. It introduces a relatively simple formal system (General Topology) in which they can actively engage. It challenges students (they must present proofs in class) and builds cohesiveness. It is very popular and draws recruits into SUMR.

Weekly Putnam Practice:

This is a one-credit Problem Solving course consisting of a weekly Putnam practice of 2 hours in length during the fall semester.

Grad-Undergrad Seminars:

A graduate student finds a mathematical text which he wants to read, and which is approachable by our SUMR students. The proposed seminar is then advertised to these undergraduates and is led by the graduate student.

Graduate Courses in Senior Year (required):

Each fourth-year SUMR student must take two graduate courses in Mathematics (or a related area if a student plans to do graduate work in that area) each semester.

REUs; Goldwater; Other National Fellowships (required):

Each SUMR student must apply to an REU at least once. Moreover each student is expected to apply for the Goldwater Scholarship and for the NSF GRFP.

2. MY MENTORING STYLE

Over many years a certain style has emerged in my mentoring efforts. This is very much a product of my own personality and so is not easily replicated. But I will try to articulate seven principles of that style here.

First of all: *be welcoming and genial and friendly*. Ensure that the student enjoys interactions with you, and begins to internalize the professional values that you hold dear.

Second (or even first): *be demanding*. The work you propose should be difficult but manageable. Let the student assume that this elite level of work is simply the way the world is around here.

Third: *treat the student as a member of an elite*, an elite of accomplishment and commitment, and a member of a community of scholars. Provide praise whenever you can honestly do so.

Fourth: *maintain clarity and precision without pedantry* in all mathematical instruction. These qualities make learning a thrilling and convincing experience for the student.

Fifth: Introduce *Independent Work and Research as early as possible*. In Mathematics, term papers, short research projects, REU's, and especially, the Senior Thesis, are excellent vehicles for this.

Sixth: Work out a *clear goal* with the student. The student needs to see that her efforts can lead to a highly rated graduate program, a highly regarded fellowship, and a rewarding career.

Finally, a *strong program of instruction in the student's major courses* is an indispensable foundation for the student's future success. SUMR, for example, is built on the Honors Mathematics Major at Notre Dame, and would be impossible without it. Our Honors Major consists of a separate collection of courses specifically designed for our Honors students.

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