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"Why Should Students Do Research?"

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Delivered at Convocation, first day of classes, August, 2003

I'd like to start by first belatedly thanking Timo Ovaska for nominating me for last year's Nancy Rash Faculty Research Award. Timo's nomination was especially meaningful because it came from a colleague that I respect very much. I also would like to belatedly thank Helen Regan for her very considerate words during last year's award presentation. I am sure that John Coats and the previous winners of this award feel honored, as I do, to have been chosen for a recognition that celebrates the memory of Nancy Rash, in the thoughtful and generous manner intended by her father, General Dillman Rash, and husband, Professor Frank Turner.

Well, today is certainly an exciting occasion for many of us. I think of Convocation as a kind of academic opening day. It should be a day in which you, like most New York Yankee fans in April, are really optimistic about the great promise of the upcoming academic year. Or perhaps at the very least, you are cautious in your optimism after having had a few years that you would prefer to forget — not unlike those unfortunate Red Sox fans. I certainly believe that the beginning of this particular academic year is a cause for great optimism for many reasons. As my small contribution to this ceremony, I have chosen to speak briefly about what I know to be one very important reason for us all to look forward to this academic year. I think it is remarkable that there are such a great variety of excellent opportunities here at Connecticut College for students and faculty to do high quality research together. In fact, there are approximately 150 such opportunities — each one represented by a faculty member at this college. While each one of us is here because we share a commitment to providing a top quality undergraduate education, our own individual scholarly and creative activities are amazingly diverse.

Some of us create art and music, while others are experts in the history of art and music. Some create critical essays, prose and poetry in beautiful English and others do likewise in languages spoken mainly on other continents. Several write analytically about the influence of economics, politics and religions on modern societies, and others focus their interests on societies that existed thousands of years ago. Some of us are concerned with the particular ways in which humans interact in diverse

social environments, while others investigate how the Earth's environment is affected by human intervention.

Groups of faculty study the components of life and matter on scales so small they can barely be imagined. At the same time, others here are investigating the workings of the universe using great scales of distance and time that are difficult to comprehend. Several faculty search for mathematical and computational order in our world, while others pursue studies of chaos and the laws of disorder in nature. There are faculty here who are experts in the behavior of birds whose beauty we all enjoy, while others study organisms that are too small to see. A group of us are experts in the biology and chemistry that characterize the normal and abnormal functioning of organisms as simple as bacteria and as complex as humans.

If you can believe this, I have the honor of speaking today based on my own research accomplishments, which are aimed at understanding the basic biochemical details of how fireflies produce scintillating flashes of yellow-green light on warm summer evenings. This fascinating natural phenomenon is called bioluminescence. It is a process used by a diverse array of organisms — bacteria, fungi, fish, crustaceans and insects — to efficiently convert chemical energy into light. While it is a process of fundamental scientific importance, there are an amazing number of practical applications of this phenomenon that include: clinical assays for heart attack damage, therapeutic drug development, tests for extraterrestrial life, tests for bacterial contamination of food and the detection of malignancies — just to name a few. Of course, the real reason that fireflies use bioluminescence is to satisfy a strong urge shared by our own species. They use bioluminescence in courtship rituals announcing to each other that they are ready to "do it."

At any rate, as strange as some of our fields of research may seem — even to each other — the faculty here are all experts in areas we have freely chosen to pursue. While our specific reasons to do what we do may vary, we really pursue our own areas of research and creative activity because we are all curious and because we love to do what we do. We also love to talk about what we do. We will go just about anywhere to present our work. Importantly, we are here and we would like to share our enthusiasm with this community, most especially the students.

I would like to dispel the notion that as faculty we must always be off on our own pursuing research in a solitary manner. It is certainly true that there are aspects of our work that are best done without interruption, but

significant facets of our research can and are being done together with students here. We are not alone as at many similar undergraduate institutions, faculty and undergraduates do research together in all academic fields. In fact, there is an organization called NCUR, which sponsors an annual national meeting for the purpose of bringing together hundreds of undergraduates to present their research results and to just have a great time hanging out together. The self-described mission of the National Conferences on Undergraduate Research is to promote undergraduate research scholarship and creative activity done in partnership with faculty as a vital component of higher education.

Several of my colleagues and I have brought students to NCUR meetings, and over the years, the travel expenses of the students have been subsidized, usually quite generously, by the Dean of the Faculty. Typically, at these meetings there are presentations representing the creativity of students in the fine arts, studio arts, dance and theater. There are more traditional poster and oral presentations by students in the arts, humanities, social and behavioral sciences, engineering, mathematics, biological, chemical, physical and environmental sciences as well. With the possible exception of engineering, outstanding opportunities for student research in all of these disciplines exist here at Connecticut College.

There is no college-wide requirement here at Conn that obligates students to do independent study or research. I agree with our policy in the sense that the wisdom of requiring anyone to commit to doing something independently is questionable. Without a doubt, however, I would like to see every student here elect to do independent study. I strongly encourage every student who has not yet done so to make a genuine and full commitment to working with at least one faculty member here on campus during your 4 years at Conn. If you have already done independent research and have found it to be one of your best college experiences, congratulations to you! If, you did an independent project, and it was not fully satisfying, try again - perhaps with another mentor. For those of you, including my own students, who are continuing to work along with one of us, congratulations to you, too! I hope you will stay committed and put more effort into your research than you have for anything else you have done so far.

For those who have not yet initiated independent study projects, please seriously consider doing so. Talk to the faculty. Don't be shy; every faculty member here would love to talk with you about his or her own research interests. Find out what is going on in your major area or even in areas outside of your major. Talk to other students who are or have done

independent study projects. Identify a topic that seems just plain interesting to you.

Don't think you have to immediately come up with your own original ideas for a project. There are plenty of good project ideas that you can develop as you gain experience. If you do have your own ideas, that's great too. We can still help.

Please, don't think you aren't smart enough to get involved. What you may lack is experience, but not intelligence. We will provide the experience. I have no doubt that every student here is very well-qualified to do independent research.

Once you have identified someone to work with, fully commit yourself to a project. To be really successful, you have to take full responsibility for yourself and your own progress. You will very likely begin as an apprentice. Most of us did too. Especially at first you'll probably find out that doing research is not so easy. Expect it to be challenging. You are going to find out very early on where your true strengths and weaknesses lie. You are going to find out how motivated you are to be successful. If you remain committed, you are going to learn to solve your own problems and you are really going to find out what it means to be a lifelong learner. Don't worry though because you will get plenty of support from your mentor. You may need it too, especially when you start out, but you will learn how satisfying it is to be independent. In fact, you will determine your own level of satisfaction.

Please, just get started as soon as you can.

OK, but really why should students do research? Well, first of all, you or your parents already paid for this opportunity. Independent study as a course is included in every department's course offerings. It is a course that you can even take more than once and get credit and a grade for it each time.

Summer jobs. Often, if you continue during the summer, you can get paid to do research — although you can't receive academic credit at the same time. As an added bonus, you even get to live in New London for an extra few months. Conn is beautiful in the summer, just like you remember it when you visited as a high school student, fell in love with the campus, and decided you just had to come here.

Real Jobs. When you go for a job interview, your independent work will

give you something to talk about that the interviewer will really want to hear. You are bound to make a positive impression by demonstrating that you have initiative.

Travel. If you present the results of your research, you may get a free trip someplace nice and maybe even get to legitimately miss a few days of class. Who knows, maybe you have always wanted to go to La Crosse, Wisconsin the site of the next NCUR meeting! It's actually a really nice place and, besides, what is not to like about a town that consumes more beer per capita than just about any other place in the country?

Letters of Recommendation. What better way to impress a faculty member you can later call on to write that letter you need for a job, graduate school, medical school, dental school, law school and so on. In science at least, there is no better way to get into the best graduate and professional schools than having done independent study as an undergraduate.

Romance. I witnessed this firsthand. It was in Wisconsin, but I'm sure it has happened or can happen here too. I remember well the days when Jeff Hermes and Nancy Post fell madly in love in my lab while synthesizing bioluminescent substrates for proteolytic enzymes. They remain happily married to this day.

OK, I really do hope that the students here will take my advice to begin or to continue to make a committed, enthusiastic effort to do undergraduate research for any reason whatsoever. More importantly, I really do hope that you will discover for yourselves what so many of my former students from Wisconsin, Johns Hopkins and Conn alike have told me — that doing independent research was absolutely the very best educational experience of their entire college careers.

Thank you, and have a great year !!