
Engineering Learning Initiatives:
Intel Foundation Retention Program
Progress Report
2004-2005

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Programming Initiatives:

- Undergraduate Research Program
- Academic Excellence Workshops (AEWs)
- Tutors-on-Call
- Undergraduate Leadership Development (LeaderShape)
- Engineering TA Development Program
- Inching toward faculty development

Intel Funded Programs

- Undergraduate Research Program
- Academic Excellence Workshops (AEWs)
- Tutors-on-Call

I. Undergraduate Research Program

- Facilitating connections and providing opportunities for undergraduates to pursue research
- Both faculty and students complete funding application/proposal
- Selection and review
- Funding supports student stipend or project expenses
- Faculty and student evaluation process

Goal

To enable as many students as possible to benefit from an undergraduate research experience at Cornell

Sampling of Intel-Funded Projects

- Multiscale Modeling of Complex Biochemical Networks
- Autonomous Aircraft Development through Systems Engineering
- Corrugated Surfaces for Liquid Crystal Alignment
- Learning the Research Process through Designing and Simulating Hardware Performance Monitors

What does our data show?

Term	Pool	# Students Receiving Grants						Avg. GPA
		Gender/Ethnicity Makeup of Students						
			Native Am.	Hisp/ Latino	African Am.	Total URM	Female	
Fall 04	2815	61	0	2	1	3	15	3.47
Spring 05	2741	55	0	2	1	3	18	3.51

- Absolute numbers of URM participants low
- 6 awards going to URM reflects 200% increase over same timeframe last year
- 83% increase in women participants as compared to same timeframe last year

Faculty Surveys Indicate...

- Practical and intellectual gains in student researchers
- Development of research skills
- Increases in confidence, intellectual maturity, and ability to work independently
- Growing awareness of the challenges of research
- Importance of steady perseverance

Student Surveys Indicate...

- Enhanced interest in engineering courses and engineering research
- Influenced plans for future
 - Of the 85% who indicated this, 52% stated that the experience has inspired or solidified graduate school aspirations.

Now I am more assured that going to graduate school is for me and that receiving my Ph.D. is a goal of mine.

I originally intended on getting an M.Eng. and then going into industry, but now I desire to get a doctorate and continue in academia.

I know now, without question, that I wish to pursue an academic research career.

II. Academic Excellence Workshop Program

- Optional, one-credit, weekly, two-hour cooperative learning sessions
- Taken in conjunction with core engineering courses in math, computer science, and chemistry
- Taught at or above level of core course instruction
- Peer-facilitated
- Connection with core dept. through Content Liaison

What does our data show?

Term	Pool	# Students Who Initiated The Program	Gender/Ethnicity Makeup of Students					# Students Who Completed Program
			Native Am.	Hisp/Latino	African Am.	Total URM	Female	
Fall 02	2060							169
Sp 03	1854							129
Fall 03	1960	295	1	19	8	28	125	257
Sp 04	1912	211	2	11	10	23	111	163
Fall 04	2359	328	0	26	18	44	124	293

- Available pool includes all students enrolled in core engineering courses and duplicates those enrolled in multiple core courses.
- Number of students initiating program is determined at end of third week.

Gender/Ethnicity Makeup of Completed Group

Term	Pool	# Students Who Completed Program	Gender/Ethnicity Makeup of Completed Program				
			Native Am.	Hispanic/Latino	African Am.	Total URM	Female
Fall 02	2060	169				22	62
Sp 03	1854	129				12	59
Fall 03	1960	257	1	17	8	26	107
Sp 04	1912	163	1	10	7	18	79
Fall 04	2359	293	0	21	17	38	106

Core Course Outcomes

Term	Mean Grade in Core Course for AEW	Avg. Mean Grade in Core Course for Non-participant
Fall 2002		
Spring 2003		
Fall 2003	3.12	2.96
Spring 2004	2.89	2.93
Fall 2004	3.03	2.96

- Evidence that increased enrollment in AEW program includes those entering college less prepared to excel (lower avg Math SAT scores).
- Qualitative data show that these students are looking to AEWs for extra help and support.

Student Surveys Indicate...

- Appreciation for less formal, cooperative environment
- Improved understanding of course concepts
- Opportunity to develop supportive peer connections

III. Tutors-on-Call Program

- Tutors available free of charge for many first- and second-year core engineering courses and distribution courses
- Promote better understanding of key concepts, apply concepts to problems and projects, and review and prepare for tests

Goal

To promote students' development of critical-thinking and problem-solving skills and to facilitate independent learning

Gender/Ethnicity Makeup of Tutors

Term	Student Tutors in Program	Gender/Ethnicity Makeup of Tutor Group				
		Native Am.	Hispanic/Latino	African American	Total URM	Female
Fall 04	38	0	5	2	7	12

- Expanded tutor pool by 50% between Fall 2003 and Fall 2004
- 32% women
- 18% underrepresented minorities

Gender/Ethnicity Makeup of Tutored Clients

Term	Pool	Students Who Received Tutoring	Gender/Ethnicity Makeup of Student Group				
			Native Am.	Hispanic/ Latino	African American	Total URM	Female
Fall 04	1393	85	1	10	6	17	49

- 273 tutoring sessions for a total of 457 tutoring hours
- 58% of tutor clients were women students
- 20% of tutor clients were URMs, while only 8% of student body were URMs

Course Grade Outcomes

Term	Mean Grade on Prelim for Tutor Clients	Avg. Mean Grade in Core Course for Tutor Clients
Fall 2004	2.05 (C)	2.55 (B-)

Post-Semester Tutor Client Survey

- 95% of respondents rated their experience as “excellent” (60%) or “good” (35%).
- 79% were confident that the tutoring improved their course grade.

Benefits of Intel-Supported Programs in Engineering Learning Initiatives

- Promote higher grades
- Greater persistence
- Deeper comprehension
- More enjoyment in learning
- More positive attitudes toward academic work
- Opportunities for peer and faculty connections
- Support underrepresented populations by creating those connections
- Pipeline for graduate programs