

# Computer Science Strategic Plan:

2010 - 2013

Goals:

## **GOAL 1: Attract, retain, and support a world-class and diverse faculty, staff, and student population.**

Maintain the size and quality of the undergraduate education program, and increase the size and quality of the graduate education program. (Appendices 6 and 7 show the number of majors and degrees awarded in recent years, while Appendix 8 shows the enrollment projection for CS majors.)

- Maintain majors per tenure/tenure track faculty within plus/minus 5% of the same measure in the College of Engineering, while increasing diversity;
- Maintain weighted student credit hours per tenure/tenure track faculty within plus/minus 5% of the same measure as the university as a whole, while increasing diversity;
- Increase the number of MS students enrolled to approximately 30;
- Increase the number of doctoral students enrolled to approximately 30.

### *1.2 Maintain a diverse student body and faculty.*

Attract and retain a diverse faculty. (Appendices 1 and 2 show the current faculty demographics and recent recruiting history, while appendix 4 details steps to be taken to address efforts to diversify the faculty and appendix 5 contains the mentoring plan that assists their efforts to become successful teachers and scholars.)

- Implement mentorship program for new faculty

Attract and retain a diverse undergraduate and graduate student population. Appendix 3 shows current students demographics and appendix 4 contains worksheets detailing efforts to broaden the diversity of CS students. These activities include:

- Investigate and seek new funding for summer program for high school women (chair);
- Seek external funding to support programs for high school teachers and female and minority high school students (e.g., ITEST) (chair)
- Contact female applicants (WICS);
- Provide admissions office with appropriate information related to targeting a diverse audience (chair and undergrad advisor)
- Develop alumni career profiles showing connections between degrees and careers (undergrad advisor);

- Develop “career” photos for web page highlighting the diversity of CS graduates and alumni (undergrad advisor);
- Identify and pursue support for endowed scholarships for CS majors, especially women and minorities (chair);
- Identify and implement mechanisms to mentor and support new graduate students (grad director).

**GOAL 2: Deliver a distinctive and rigorous discovery-based learning experience grounded in science, engineering, technology, sustainability, the business of innovation, and an understanding of the social and cultural contexts of our contemporary world.**

Maintain overall excellence in undergraduate education

- Prepare students for the global workforce by encouraging international experiences such as exchange programs;
  - Make students aware of opportunities in CS1000
  - Have undergraduate advisor encourage participation in exchange programs
- Continue to encourage co-op and internships experiences;
  - Have industry speakers present advantages of co-ops in CS1000
  - Have undergraduate advisor contact sophomores to make them aware of opportunities
  - Have undergrad committee develop 4-year+ study plans for those who choose to co-op
- Goal of 100% participation of undergraduates in a significant non-classroom experience such as a co-op, internship, enterprise or exchange program by graduation.

Strengthen the quality of CS graduate programs.

- Encourage research participation by top undergraduate students (faculty);
- Explore the development of “distance” MS degree (grad committee);
- Pursue 5<sup>th</sup>-year MS degree for majors (grad committee);
- Continue efforts to encourage undergraduates to attend graduate school (faculty);
- Identify and implement efforts to increase the number of applications from nearby 4-year institutions (grad committee);

**GOAL 3: Establish world-class research, scholarship, innovation, and creative work that promotes sustainable economic and social development in Michigan, the nation, and the world.**

### *3.1 Improve our stature as a research university and Ph.D. granting institution.*

Increase the quality and stature of the CS graduate program

- Increase external funding to attract and support quality graduate students;
- Reduce time-to-degree;
  - Target of 75% of graduates finishing within 5 years of entering the Ph.D. program
- Increase completion rate.
  - Improve our current completion rate from 25% to 50%

Increase stature and funding for the Department's research programs.

- Become a nationally ranked CS department

Table 1 examines the top 100 CS programs in terms of federal research expenditures and in terms of US News rankings. Programs ranked in the top 100 in federal research expenditures have either significantly more full-time faculty members than Michigan Tech's CS Department, or significantly smaller undergraduate programs. Only Lehigh has a faculty size similar to Michigan Tech, and their undergraduate program is less than half of Michigan Tech's. In order to reach the stature of a top 100 CS program, the size of the full-time faculty must grow to be on the order of 22-25.

Given current resources, we have the following goals to improve our research programs and make progress towards becoming nationally ranked:

- Increase the number of proposals submitted to at least an average of 2 proposals per year per faculty member.
- Increase the three-year average research expenditures to \$650,000 per year, with special attention to the support of graduate students;
- Increase the number of publications in respected peer-reviewed journals and conference proceedings to an average of 2 publications per faculty member per year.
- Increase research interactions with other departments, leading to greater participation in large interdisciplinary proposal submissions with a goal of 2 total proposals per year with budgets greater than \$500,000.
- Increase national visibility by
  - Bringing to campus external speakers in areas closely related to research areas of untenured faculty and topics where multi-disciplinary proposals are being developed;
  - Encouraging faculty participation in professional service (conference and journal reviewing, NSF panels, professional organizations, etc.)

- Strategically utilize the seminar series to support research, especially by reaching out to application areas;
- Strengthen relationships with alumni in order to provide a foundation of philanthropic support for departmental programs
  - Increase contacts (focused visits, newsletters, etc.);
  - Establish industrial advisory board;
  - Solicit contributions from alumni;
  - Consider an alumni award, but certainly utilize CSA Academy of Arts and Sciences to recognize distinguished CS alumni.

(Appendix 10 shows the pattern of gifts to the department.)

Table : Research and Ranking of CS Departments<sup>1</sup>

Name	U.S. News Rank 2009	Federal Exp. Rank 2008	Size of Full-Time Faculty	Number of Undergraduates	Federal Research Exp. 2008
<b>Departments Ranked 91-100 Federal Research Expenditures</b>					
Polytechnic Inst.	72	91	21	153	1,872,000
Connecticut Wayne State	72	92	22	185	1,724,000
Northeastern Michigan State	110	93	24	229	1,708,000
	61	94	--	--	1,670,000
	58	95	32	406	1,658,000
South Carolina Washington Lehigh	99	96	23	231	1,605,000
	7	97	--	348	1,597,000
	99	98	17	123	1,597,000
UC - Riverside	53	99	35	224	1,582,000
U. at Albany	91	100	--	--	1,564,000
<b>Departments at Rank 99 US News</b>					
Drexel	99	36	24	416	6,618,000
UNC – Charlotte	99	77	33	--	2,513,000
Louisiana State	99	84	22	197	2,197,000
Kansas State	99	105	19	207	1,454,000
Stevens Inst.	99	110	18	158	1,329,000
UT – Arling.	99	113	42	413	1,253,000
Georgia State	99	193	--	--	203,000
South Florida	99	327	--	--	0
Cincinnati	99	327	11	114	0
<b>Departments at Rank 121 US News</b>					
Miss. State	121	30	26	149	7,270,000
Wright St.	121	124	33	331	862,000
NM State	121	127	--	--	807,000
MUST	121	150	18	252	546,000
Texas Tech	121	162	16	240	410,000
Michigan Tech	RNP	194	15	328	199,000

<sup>1</sup>Research expenditure data taken from the National Science Foundation federal expenditures spreadsheet. Faculty size and undergraduate program data taken from the ASEE online database.

*3.2 Promote economic and social development and innovation in Michigan the nation, and the world.*

Strengthen relationships with industry:

- Develop promotional materials aimed at potential industrial partners, such as web pages identifying department strengths and focuses;
- Bring industrial speakers to campus with a goal of 2 per year;
- Better utilize existing alumni connections with industry;
- Pursue industrial research opportunities and collaborations, such as SBIR projects.

*3.3 Address societal needs through global partnerships.*

Pursue cooperative agreements with high-quality international institutions. Specifically, we will continue to pursue agreements with the following institutions:

- Beijing Normal University, Zhuhai Campus
- Fachhochschule Osnabrück