

Computer and Information Sciences Departmental Goals and Strategies

Graduate/Research Program

Objective

CIS will strive to become a Top 50 Public Computer Science Program according to the U.S. News and World Report graduate program rankings. Current ranking: 2014: CIS (61).

Strategy

Align the CIS research program along faculty strengths in areas that are predicated to see sustained growth in research and development funding. We will also strive to support the College of Engineering and Kansas State University areas of emphasis and achieve measurable goals for the graduate and undergraduate program that are consistent with a Top 50 CS graduate program and the University Engineering Initiative Act.

While we will continue to provide a broad range of computer science education, we plan to focus our research efforts into relatively few areas to maximize our research impact. The areas chosen met our four key criteria: 1) they fit into the College of Engineering focus areas (Health, Information Technology, Infrastructure, and Energy), 2) they have a high potential for federal funding, 3) there is an existing campus and department leader, and 4) outstanding research facilities exist to carry out the research. The two areas that we will initially focus our efforts in are *cybersecurity* and *high-assurance software*. Both areas have existing internationally recognized leaders in CIS who have already demonstrated the potential for significant research funding from federal and industrial partners. While we will initially focus in these areas, we will continually monitor emerging areas such as informatics and cyber-physical systems.

In FY 2015, CIS will pursue this strategy in the hiring of two new tenure-track faculty members. We are specifically targeting cybersecurity and high-assurance software and are looking to hire at any level (assistant, associate, or full professor), as hiring at higher levels has a greater chance of immediate payback.

Goals for the Graduate/Research Program (3-4)

1. Ph.D. Enrollment: Increase Ph.D. enrollment to 3.0 Ph.D. students per TTF
2. Scholarly Activities: Increase scholarly production rate to 3.0 refereed papers per year per TTF
3. Research Expenditures: Increase research expenditures to \$200K per year per TTF

Ph.D. Enrollment: The department had 35 Ph.D. students in Fall 2014. The goal for the department is to increase enrollment to 3.0 Ph.D. students per TTF. With a complete faculty complement of 16 TTF, the goal is 48 PhD students¹. The goal will be achieved by emphasizing this metric during faculty

¹The intermediate (2020) goal set by CIS for 2025 was 45 PhD students.

reappointment, tenure decisions, and annual evaluations. In addition, departmental teaching assistantship funds and development activities will become more focused on promoting Ph.D. enrollment growth.

Scholarly Activities: CIS faculty published 36 refereed papers or 2.4 refereed papers per tenured track faculty members (TTF) in CY 2013. The goal for the department is to research an average of 3.0 refereed papers per year per TTF. With a complete faculty complement of 16 TTF, the goal is 51² refereed papers. This goal will be achieved by emphasizing this metric during faculty reappointment, tenure decisions, and annual evaluations.

Research Expenditures: CIS faculty had research expenditures from external sources of \$3,018,395 or \$177.5K per TTF in FY 2013³. The goal for the department is to raise this number to \$200K per year per TTF (with 16 TTFs that would equal \$3.2M total)⁴. This goal will be achieved by emphasizing this metric during faculty reappointment, tenure decisions, and annual evaluations. In addition, this goal will be achieved by building on-campus and off-campus research partnership in cybersecurity and high-assurance software while also ensuring that new faculty hires fit appropriately within these partnerships.

Undergraduate Program

Objective

The CIS Department will strive to achieve Kansas State University's vision of becoming a Top 50 Public University according to the U.S. News and World Report rankings.

Strategy

Build distinctive subprograms and characteristics that promote excellence in undergraduate education while facilitating the university's goal of becoming a Top 50 Public University and the department's goal of becoming a Top 50 computer science graduate program.

Goals for the Undergraduate Program

1. Maintain our existing high-quality undergraduate education with the highest possible ABET accreditation evaluation.
2. Create a departmental scholars program by Fall 2016, with additional scholarships (beyond K-State scholarships) for 50% of the initial cohort of students.
3. Maintain enrollment at approximately 20 students per teaching faculty.
4. Increase undergraduate research to involve 20% of its juniors and seniors.

² The intermediate (2020) goal set by CIS for 2025 was 50 publications per year

³ In FY 2013, CIS had 17 TTFs; when Dr. Wallentine retired, his position was not returned to the department.

⁴ The intermediate (2020) goal set by CIS for 2025 was \$4.5M total, or \$281K per TTF. However, this figure is based on the "Fact Book" numbers that includes internal funding and matching. For our purposes we will count actual external funds brought into the university (expenditures + overhead).

High Quality Education: Every six years, the undergraduate ECE program is evaluated by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). This ABET evaluation process is the foundation of the department's efforts to improve the quality of the undergraduate program. This evaluation process mandates educational program modifications after a detailed assessment of student outcomes, alumni surveys, co-op employer surveys, recruiter surveys, advisory board surveys, and senior exit surveys. In 2011, CIS achieved the highest possible ABET accreditation evaluation (i.e., no shortcomings, no comments, and no observations) for the undergraduate Computer Science program.

Scholars Program: The department will establish a CIS Scholars Program by Fall 2016 involving 20-30 high-achieving and inquisitive students in each class and provide them opportunities to excel beyond the traditional CIS curriculum. The program will include smaller, engaging, and more in-depth treatment of computer science theory and practice to prepare high quality students to be leaders in industry and academia. Major goals for the program are to provide additional scholarships to all Scholars (funded through industrial partners) and exposure to world-class CIS research. The goal of the scholars program is to ensure Kansas State University is considered the premier computer science program in Kansas and to produce highly sought after graduates in academia and industry. Ideally, several students a year would decide to continue their academic training in CIS graduate programs.

Undergraduate Research: CIS will strive to involve 20% of its junior and senior undergraduate students in undergraduate research projects. The goal of the CIS undergraduate research program is to expose capable undergraduate students to research and to encourage them to consider a career in research through graduate education. We will encourage students to participate in research through the Scholars Program, funded research projects, and senior projects. In Fall 2014, there were 30 juniors/seniors out of 177, or 16.9% of our juniors and seniors involved in undergraduate research⁵.

Enrollment. Undergraduate enrollment has exceeded all expectations and has grown dramatically beyond our record enrollment of 360 in 2002 and 2013. In the Fall of 2014, CIS has 446 undergraduate students with 15 TTFs (and 5 Instructors). These numbers give us an average of 29.7 students per TTF (which beyond the 75th percentile for public schools nationwide)⁶. Nationally for a faculty our size at a public school, the average student to faculty ratio is approximately 17 (and not all those are major research universities)⁷. A reasonable goal would be to manage our enrollment to not exceed an average of 20 students per actual teaching faculty. Without growing our faculty (currently 16 TTFs and 4 permanent instructors are authorized), this would limit undergraduate enrollment to 400 undergraduates. Outside of failing more students or simply not offering enough seats in classes (thus reducing our retention rate), there is currently no mechanism to control enrollment, which must be adopted at the college level.

⁵ The interim (2020) goal for CIS undergraduate research was 15 undergraduate students in funded research projects.

⁶ 2013 Taulbee Survey, Computing Research News, vol. 26, no. 5. May 2014.

⁷ 2013 Taulbee Survey, Computing Research News, vol. 26, no. 5. May 2014.

With the addition of a Scholars Program and the ability to control our enrollment, CIS should be able to raise the quality of the average CIS student. The current overall ACT average is 26.4.