# Information Frontiers Education Initiative
Outcomes Executive Summary - 2016

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The Information Frontiers Initiative successfully supports and integrates the research mission of the Center for Science of Information with a long term vision of: (1) developing the next generation of scientists who will continue to strengthen the community and solve grand challenge information problems, and (2) a set of courses, modules, and teaching resources available to all that provides information literacy at foundational and advanced levels.

Membership of students and postdocs in the Center has increased each of the seven years of the Center reaching a current peak of 235 working with our faculty on Center research. Of students completing our annual survey, 97% reported gaining value from their engagement in the Center. Scholarship continues to increase as our graduate students and postdocs published 167 papers, along with 153 posters and oral presentations at conferences.

Center Student & Postdoc Members

Students + Postdocs

53	101	129	138	171	195	235
1	2	3	4	5	6	7
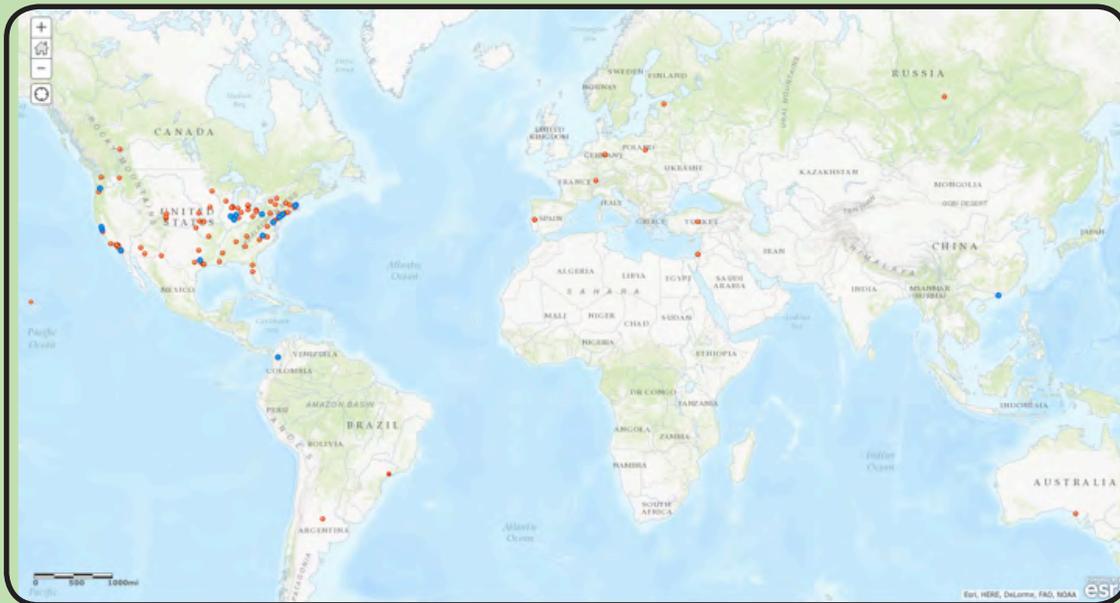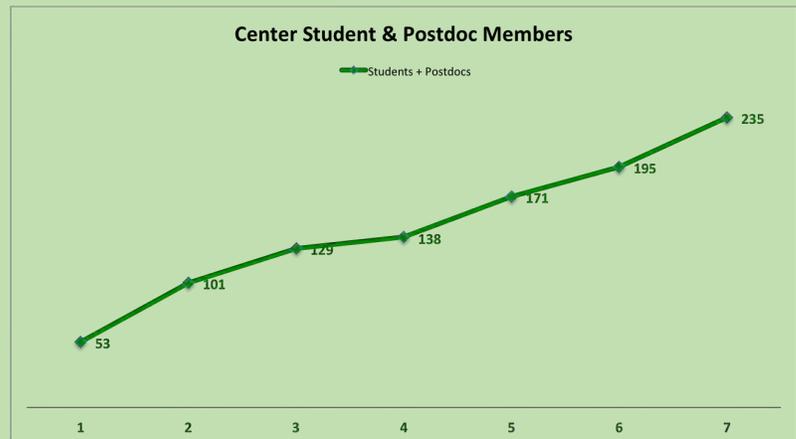
Participation in our education activities has now surpassed 3,000 attendees. The impact has reached far beyond our Center institutions with significant breadth where attendees at our activities represent 121 universities and colleges in the U.S. and abroad.

Blue dots also represent universities offering new courses associated with CSoI
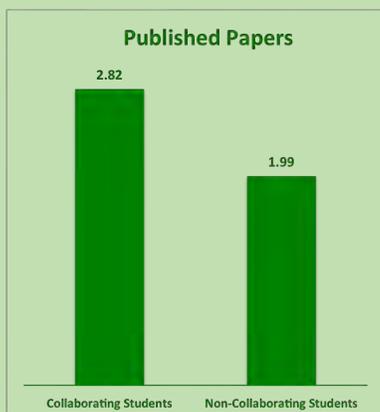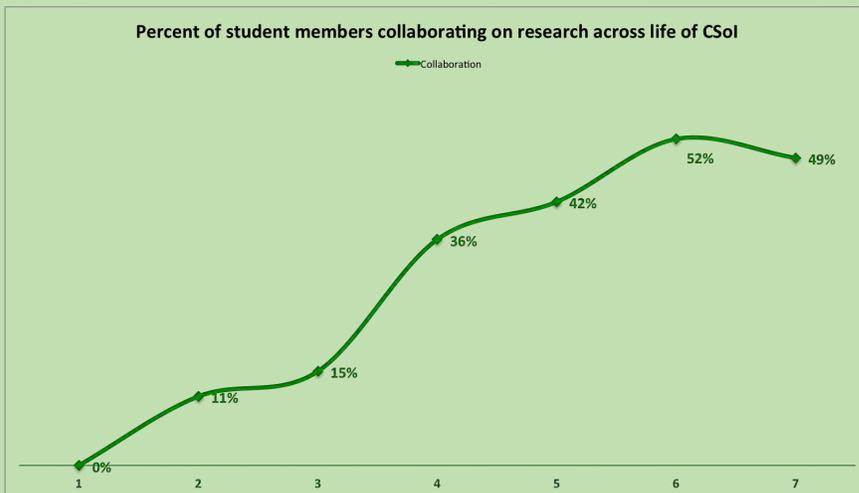
Eleven interdisciplinary, multi-institutional student research teams have formed where students and postdocs are working on problems within the research thrusts of the Center. These teams have demonstrated success in working together toward solutions and co-presenting results with 36 presentations (posters and oral) at conferences, and 14 publications thus far (published & submitted). Our annual student and postdoc research workshops have provided a venue for this important knowledge exchange and team formation. Ratings by students evaluating the workshop are shown in table 1.

Table 1. Student and Postdoc Ratings of Multidisciplinary Data Science Workshop

| Question	Mean/4.0
I obtained useful feedback to my projects/research from talking to other students, postdocs, and faculty members	3.9
I improved my ability to explain my research to others as a result of interactions during the workshop.	3.8
I started some level of professional connections with peers through the workshop	3.7
Overall, I learned specific skills I can put to use in my own research/courses	3.8
I gained an improved interdisciplinary understanding to approaching a research problem (either your research or another project)	3.8

As result of these collective efforts a community of practice has emerged with collaboration on research between Center students, postdocs, and with Center faculty now showing significant percentages of members engaging in these interactions.

Percent of student members collaborating on research across life of CSoI

Collaboration

0% 11% 15% 36% 42% 52% 49%

Published Papers

2.82

1.99

Collaborating Students   Non-Collaborating Students

Furthermore, the number of published papers is significantly higher from students that collaborated on their research with other members of the Center, compared with those students in the Center that did not collaborate beyond their major professor.
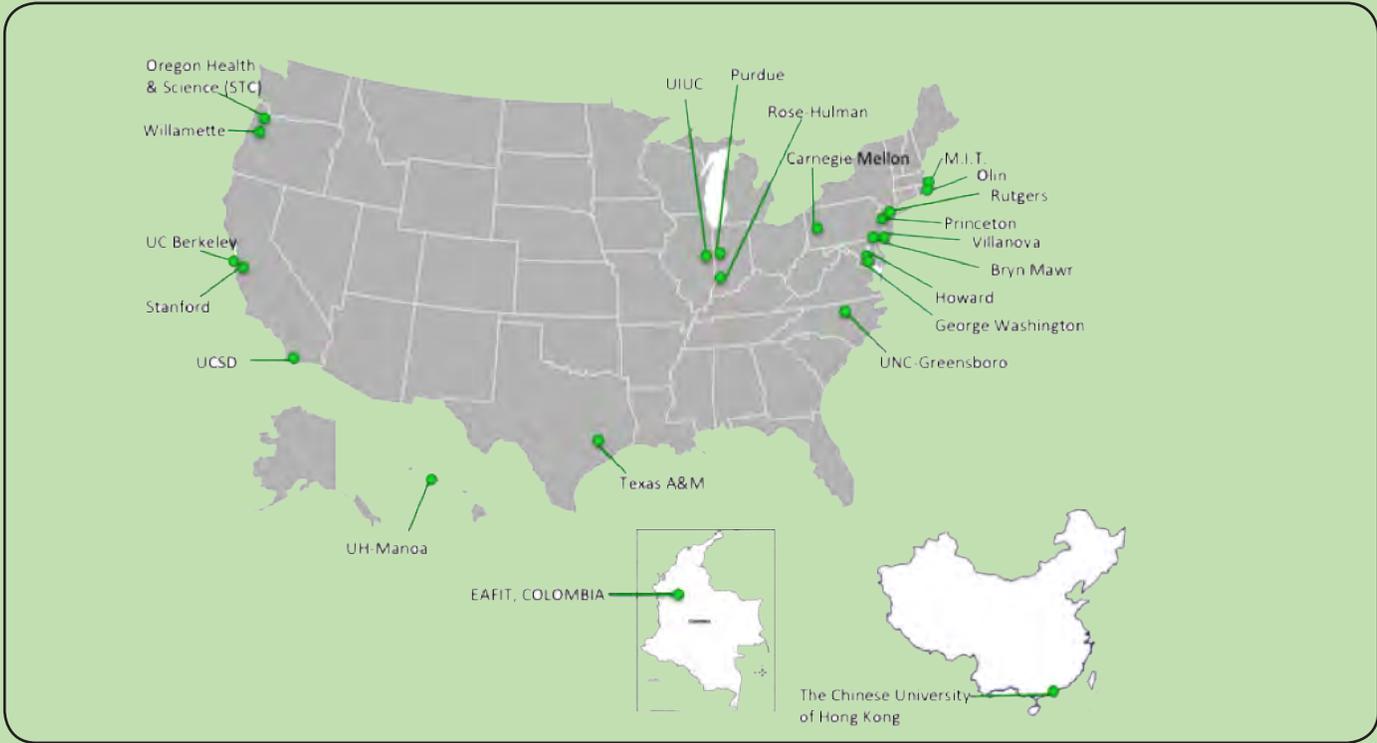
Students have been engaged in science of information in classrooms at 22 universities through the initiative to develop new courses and enhance existing courses. 58 new courses and modules have been developed and taught, with new content from faculty research integrated into 65 existing courses.
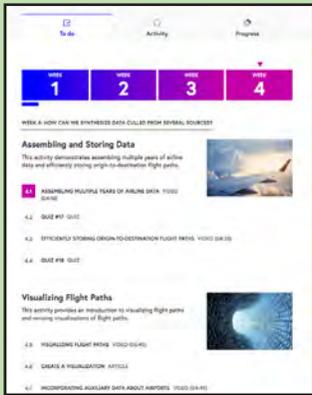
Our online materials have reached over 300,000 learners, with an additional 30,000 learners enrolling in our FutureLearn and EdX courses the past year. Faculty training workshops have lead to eleven universities outside the Center establishing courses for their students, such as computer science faculty member, Juan LaLind (above), at EAFIT, Colombia. He adapted our Introduction to Science of Information semester course for undergrads taught in Spanish with both classroom and online versions.

An extensive evaluation of learning outcomes from a subset of new science of information courses was undertaken in coordination with faculty and students at eight U.S. Institutions. As outcomes of completing one of these courses, the large majority of students reported moderate to significant increases in areas of multidisciplinary understanding (81.3%) science of information skills (81.1%), awareness (78.7%), and literacy (78.6%). Data science problem solving ability increased a moderate to significant level for 66.7% of students (See Table 2).

Table 2. Percent of students in CSoI courses reporting increases in outcomes related to learning objectives.

Indicator	Significant Increase	Moderate Increase	Slight Increase	No Change	Mean (max = 4)
Information Literacy	40.5	38.1	19.0	2.4	3.17
Data Skills	39.7	41.4	15.5	3.4	3.17
Multidisciplinary Understanding	37.5	43.8	14.6	4.2	3.15
SoI Awareness	38.6	42.1	14.0	5.3	3.14
Problem Solving Ability	25.0	41.7	29.2	4.2	2.88

Outreach efforts included development of a series of printed educational posters that have been displayed at more than 300 programs in the U.S. Our ever-growing online content we make available through our soihub.org sites has now been accessed by users in all 50 U.S. states and 166 countries worldwide.

The goals of the education program and the activities supporting these goals lead to professionals with unique skills and experience levels that afford them opportunities to gain excellent positions upon graduation. We have graduated 240 students and postdocs from the Center. Half of these members found positions in academia (graduate, postdocs, faculty), 35% in industry, 4% in government (10% are unknown).

In summary, our students state they value participation in the Center because it provides a venue for stimulating their own thinking about the science of information, provides productive networking and training opportunities with peers and leading researchers in the field, and fosters meaningful collaboration among students and faculty.