Broad Education Programs, Research Investments Spur Enrollment Growth

With more than 800 graduate and undergraduate students, CCIS reached record enrollment levels in 2008, and is poised to keep on growing. This strong enrollment is a key sign that CCIS programs and resources are aligned with students’ educational aspirations as well as industry needs.

“The market for IT professionals is strong, but it is increasingly complex,” says CCIS Dean Larry Finkelstein. “Professionals often need skills in computing as well as an application domain. We recognized that fact early on, and we’ve developed a broad interdisciplinary curriculum that enables students to develop both levels of expertise.”

At both the undergraduate and graduate levels, interdisciplinary programs and

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Letter from the Dean

Information technology is an intrinsic part of most professional disciplines today, from business to science, healthcare to the arts. IT professionals no longer work in silos, but interact with content experts in countless other fields to develop and implement computing solutions to manage vast quantities of information.

To prepare students for this collaborative world, CCIS has unveiled a range of interdisciplinary programs over the past several years. As we report in our cover story, this flexible programming is helping to drive record enrollment. It is also leading to increased recognition, such as our being named one of the top Schools to Watch by Computerworld magazine. See page 10 for details.

Our interdisciplinary MS in information assurance draws from CCIS and the College of Criminal Justice. On page 7, we report that the National Security Agency and the U.S. Department of Homeland Security named Northeastern a National Center of Academic Excellence in Information Assurance Research, based on this program and the researchers who support it.

On page 8, we profile an alumna who has taken interdisciplinary computing in a different direction. Melinda Kramer, ’83, began combining computing and business during her CCIS co-ops. In the 25 years since she graduated, Melinda has earned an MBA and held IT leadership positions in financial and investment firms, demonstrating that technology plus business is a formula for success.

Page 9 features Matthew Horan, an undergraduate studying the use of computer science curricula to improve secondary education. Matt recently returned from Vienna, where he learned about new educational approaches and shared some of those developed by CCIS thought leaders.

Our newest undergraduate dual major, computer science and game design, is highlighted on page 5. The program will combine graphic design, computer science, and other disciplines to provide students the formidable technical and creative background they need for this dynamic field.

Opportunities in computer and information sciences are exploding. As the creativity of our alumni, faculty, and students demonstrates, the integration of computing and other fields is limited only by our ability to imagine the future.

Larry Finkelstein

Professor Mitchell Wand

Selected as ACM Fellow

Professor Mitchell Wand has been selected as a Fellow of the Association for Computing Machinery.

The ACM, the principal academic organization for the computing field worldwide, elects a small group of fellows annually to recognize their leadership in the discipline. Wand was cited in the ACM’s announcement for his “contributions to type theory and program analysis.”

Within his area of programming languages, Wand’s career has been striking for the breadth of his work, which has included important results ranging over mathematical theories of language semantics, models of parallelism and concurrency, and language design. In one of his important papers,

Wand showed how advanced type theory could be extended to object-oriented languages. Wand subsequently led a team that produced one of the first completely verified implementations of a programming language—a topic that has recently enjoyed a resurgence due to renewed interest in securing a critical software infrastructure against cyber attack.

Wand has also been a leader in education. Essentials of Programming Languages, the textbook he coauthored with his long-time friend and colleague, Dan Friedman of Indiana University, has caused a radical shift in the way the topic is taught. The text is now entering its third edition.

Professor Mitchell Wand
CIS is adding three new outstanding faculty members to its roster this year: Peter Desnoyers, Mirek Reidewald, and Emanuele Viola.

“The caliber of our recent faculty hires is outstanding,” says CCIS Dean Larry Finkelstein. “The ability to recruit top faculty is an important measure of a college’s overall quality, and I’m happy to say that these new faculty reflect our ever-increasing stature in the field of computer and information science.”

Desnoyers joins the college as an assistant professor, bringing a strong combination of academic and industry experience in the area of operating systems and storage. He focuses on applications in Flash-based storage. “Most applications have been designed around the performance characteristics of magnetic disk storage,” he says. “For Flash storage, which has different characteristics, that design needs to be revisited.”

Between earning his PhD from the University of Massachusetts at Amherst in 2008 and his MS and BS from MIT in 1988, Desnoyers spent 15 years as a research engineer, including stints at Apple Computer and Motorola Codex. More recently, he investigated methods of optimizing storage and network transfer of virtual machines at VMWare, Inc.

“Northeastern seemed to be a place that would value my industry experience as well as my research,” he says. “Students here have energy, they’re doing things. I thought it was a good fit for me.”

Viola joins CCIS as an assistant professor. He received his PhD from Harvard University in 2006 and his BS from La Sapienza University in Rome, Italy, in 2000. He works in theoretical computer science, including computational complexity and the pseudo-randomness of systems that are actually constructed deliberately. He has served as a postdoctoral fellow at the Institute for Advanced Study in Princeton, New Jersey, as well as at Columbia University.

“Northeastern is growing fast, which is very exciting,” he says. “There are so many opportunities to interact with other researchers and to focus on research. I am looking forward to branching out into other areas here.”

Riedewald will join the college as associate professor beginning in the spring semester of 2009. He received his PhD from the University of California at Santa Barbara in 2002 and his undergraduate degree from Saarland University, Saarbrucken, Germany, in 1998. His research interests lie in data management and data mining at the intersection between computer science and the natural sciences.

“I am interested in developing theoretical foundations and practical methods for analyzing the massive collections of observational data that are being created in many sciences," he says. "As part of that, I will continue my ongoing collaboration with the Cornell Lab of Ornithology, one of the world’s leading authorities on birds and their environment.”

At Northeastern, Riedewald is looking forward to initiating new collaborations on issues like parallel processing of massive data and efficient processing of data streams.

“When I visited the College of Computer and Information Science in early 2008, I was immediately impressed by the people I met,” he says. “Everybody showed great excitement about their work. It was important for me to see the department’s strong focus on growth and academic excellence.”
Salzberg, Williams Find Fulfillment in Retirement

Longtime CCIS professors Betty Salzberg and Ron Williams, retired at the end of the 2007-2008 academic year.

Salzberg, an IEEE fellow whose research focused on database access and organization, has become something of a political activist in her hometown of Wayland since leaving CCIS. She chairs the town's Housing Partnership Committee, is a member of the Wayland Democrats, and covers Conservation Commission meetings as a reporter for an electronic newsletter.

“It all comes down to storm water runoff,” she says with a laugh, adding that she’s taking a workshop on storm water drains at the University of New Hampshire to learn more about the topic.

Salzberg stays connected to the world of computer science in several ways. She is on the editorial board of the journal *ACM Transactions on Database Systems*, a post she will hold until 2010. In addition, she continues to advise two students, one who is finishing his doctoral dissertation and another who is trying to get his dissertation published.

Like Salzberg, Williams keeps a hand in the computer science field by working with a doctoral student. But beyond that, the machine learning expert has turned his attention to his music, a pastime he hasn’t had a chance to devote himself to since the late 1970s.

“I used to play in groups in California,” he says. “When my research started taking off, that stopped. But it’s always been on the back burner.”

He hasn’t returned to public performing yet, but he is practicing his guitar and keyboard once again, and he’s taking up composing and arranging for the first time, with the aid of electronic devices. To speed up his learning, he is taking an online course in orchestration from Berklee College of Music, and may take another at the New England Conservatory.

“I used to say, ‘In another lifetime I’ll master this,’” Williams says. “But then I realized, I have this lifetime.”

Both faculty members will continue their involvement in the computing field as professors emeriti, but will focus on exploring other lifelong interests.
New Dual Major Combines Visual, Programming Aspects of Game Design

“Game design is not a game,” says Richard Rasala, associate dean and director of undergraduate programs. Rasala is putting the finishing touches on a new undergraduate dual degree program in game design and computer science that he says is one of the most rigorous he has worked on.

Expected to launch in Spring 2009, the program combines courses in computer science, math, art and design, and multimedia studies to give students a practice-oriented foundation in both the visual design and programming of interactive games. Curriculum development involved collaboration across multiple departments as well as a lengthy competitive analysis of similar programs across the country to identify best practices.

Game Design will aim to carve a set of core capabilities from a range of academic programs. For instance, Rasala is working with faculty in the mathematics department to create a course, tentatively titled “Math Fundamentals for Games,” that will address the issues critical to game design: vectors and linear algebra, functions, and parametric curves.

Similarly, “Artificial Intelligence for Games” will focus on AI concepts that are practical for high-speed gaming applications.

Other courses will address games and society, programming for games, game design algorithms, animation for games, and level design and game architecture. Several digital art requirements, core computing courses, and a series of electives serve as a foundation.

After mastering the basics, students will progress to project courses, including pre-production planning, assets and prototyping, and a two-semester capstone in which they will draw on their skills to create a game.

The program addresses the demand for skilled game designers in the entertainment and software industries as well as in business and education, where interactive games and programs are increasingly used for training, testing, and other applications.

Creatures from Hopeful Monster, a 3D video game created by Northeastern undergraduates. The game environment includes nine species in three biomes: desert, swamp, and forest. Players try to help their species evolve amid predators and prey.

In addition to the dual degree in game design and computer science, two other programs will be offered: one in digital art and game design, and one in graphic design and game design. Both of these programs will require a limited number of computer science and math courses, including Fundamentals of Computer Science I, Programming for Games, and Math Fundamentals for Games, but will otherwise focus on the graphic elements of game design.

“Game design takes place on several levels,” Rasala says. “Each person contributes their own expertise, and our goal is to give students options.”

In addition to Rasala, contributors to the curriculum development included: Anthony DeRitis, chair of the music department and director of multimedia studies; Edwin Andrews, associate professor and acting chair of art and design; Cynthia Baron, associate academic specialist and associate director of multimedia studies; Ann McDonald, assistant professor of art and design; Jay Laird, assistant academic specialist in the College of Professional Studies; and Terrance Masson, senior academic specialist in the multimedia studies program.
CCIS Reaches New Heights in Doctoral Degrees in 2008

A record nine CCIS graduate students earned PhDs in 2008, highlighting the college’s strengths in advanced research and education.

“Our graduate programs have been growing at a very strong pace for several years,” says CCIS Dean Larry Finkelstein. “This year’s record number of doctoral degrees is the result of our long-term commitment to supporting research and attracting top faculty.”

The strong research program required for the graduate student population also benefits undergraduates, Finkelstein noted. With more research being conducted at the college, there are more opportunities for undergraduates to participate and gain exposure to new knowledge.

“The impact of our strong doctoral program enhances the college at every level,” Finkelstein says. “Everyone benefits.”

This year’s PhD recipients and the subjects of their dissertations are:

- **Alan Feuer**
  Increasing Conversation in Proximity Search Using Phrasal Query Suggestions

- **Jun Gong**
  Improved Text Entry for Mobile Devices: Alternate Keypad Designs and Novel Predictive Disambiguation Methods

- **Xin Liu**
  Cross Layer Design for Cooperative and Adversarial Wireless Networks

- **Eric Robinson**
  Large Implicit State Space Enumeration: Overcoming Memory and Disk Limitations

- **Wenxu Tong**
  SVM and Novel Pool Method Coupled with THEMATICS for Protein Active Site Prediction

- **Tian Xia**
  Subspace and Relaxed Skyline Query Processing

- **Roupeng Ye**
  Authenticated Software Update

- **Emine Yilmaz**
  Informative and Efficient Evaluation of Retrieval Systems

- **Feng Zhu**
  On the Design and Analysis of Efficient Group Key Management Schemes for Secure Multicast

ENROLLMENT GROWTH  continued from page 1

Professional-level co-op opportunities give students the complementary skill sets that set them apart in the job market or prepare them for advanced study in emerging fields like health informatics and information assurance.

Another key component of the CCIS growth strategy is investment in research. The college recently made important faculty hires and plans to continue with an aggressive hiring strategy, including several interdisciplinary hires in collaboration with other Northeastern colleges.

Higher enrollment isn’t the only positive news regarding CCIS admissions. Students entering the college this fall have SAT scores 50 points higher than those of the previous class.

“The foundations are in place to significantly enhance our national reputation and provide students with a challenging array of educational opportunities,” Finkelstein says. “We have the students, the research faculty, and the determination to be one of the top programs in the country.”
Northeastern Recognized as National Center of Academic Excellence in Information Assurance Research

The National Security Agency (NSA) and the U.S. Department of Homeland Security (DHS) have named Northeastern a National Center of Academic Excellence in Information Assurance Research (CAE-R). The University is one of 23 nationwide to have earned this distinction.

This is the second major designation Northeastern has received from the NSA. In 2003, the University was named a National Center of Academic Excellence in Information Assurance Education. That designation was renewed again this year.

Both recognition programs were developed by the NSA to tap universities’ advanced academic research and development capabilities to educate the next generation of information assurance professionals and to help secure the global information grid. They are part of the President’s National Strategy to Secure Cyberspace, issued in 2003.

Through the Centers of Excellence program, Northeastern will serve as a regional center of information assurance expertise for NSA, DHS, and other federal agencies and provide programs aimed at training and retaining current federal and state information technology personnel. Both designations are renewable every five years.

In addition to its two Center of Excellence designations, Northeastern also won a Centers of Excellence grant from DHS this year to form a new center called ALERT (Awareness and Localization of Explosives-Related Threats) through the College of Engineering.

The rigorous application process for the designation was spearheaded by Agnes Chan, associate dean for graduate studies at CCIS. “Our strengths are communication security, cryptographic protocols, and intrusion detection,” she says. Chan’s research focuses on efficient algorithms for generating symmetric keys for communication devices such as cell phones. She develops coding schemes that are easy to implement, make it difficult for others to eavesdrop, and are resilient to noise interference.

“Being recognized amongst the very first CAE-R certifies that our program is highly regarded in both education and research,” said Chan. “As a designated center, Northeastern will continue to attract world-class students and researchers.”

CCIS Dean Larry Finkelstein said the awards validate the college’s broad interdisciplinary approach to information assurance.

“This designation recognizes the research contributions of university faculty in helping to secure the global information grid and acknowledges our strong commitment to information assurance as an area of strategic focus,” said Finkelstein. “I applaud Professor Agnes Chan for her vision in leading our efforts in information assurance and for recognizing at the very outset that it was necessary to emphasize an interdisciplinary approach to our research and educational programs.”

Chan cofounded the Research Institute for Information Assurance with Professor David Kaeli of the Department of Electrical and Computer Engineering and initiated the development of a joint master’s degree in Information Assurance with the College of Criminal Justice.
Alumna Combines Computing, Business for High-Powered Finance Career

As chief technology officer at a Chicago-based investment management firm, Melinda Kramer, ’83, works at the crucial junction of business needs and technology solutions. It’s a role she’s been preparing for since her first programming co-op at CCIS.

“I understood right away what a program would do for the business, not just what it would do technically,” she remembers. “It wasn’t about the elegance of the programming for me. I don’t know how cognizant I was about the direction I was moving in, but in hindsight, I realize now that I was integrating programming and business.”

That integration helped shape Kramer’s subsequent co-ops so that by the time she graduated, her résumé demonstrated an impressive background in both domains. That caught the attention of financial services giant JP Morgan, which recruited on the Northeastern campus for the first time that year. She was offered a position as a programmer analyst.

Over the next decade, Kramer held positions in various Wall Street firms. Along the way, she earned her MBA at New York University’s Stern School of Business and moved up from programmer analyst to project manager.

“The project manager is a critical position,” she says. “That person is the interface between business and technology. They need to be able to think through the business problem and know what’s possible in terms of the technology solution. They meld technology with creativity and manage all the pieces.”

Kramer’s work as a project manager evolved from small projects to large-scale, global ventures after a few years. Another couple of job changes landed her at the Chicago offices of Goldman Sachs, where her global responsibilities increased substantially, allowing her to travel frequently to London, Luxembourg, and New York.

“Global experience is so important,” she says. “There’s so much to see and to learn from having that opportunity.”

After seven years of globetrotting, Kramer shifted to a less travel-intensive schedule in order to be home with her husband and two young sons, consulting for two years before joining her current firm as CTO.

“Companies are looking for people who are thinkers, who can learn and apply. If you have a background in technology, there are a lot of ways to use it to help grow a business, increase efficiency, and solve challenges.”

Hedge Funds Care

With her comparatively relaxed work pace, Kramer also makes time for her “second job” as Midwest cochair of Hedge Funds Care, a non-profit organization dedicated to prevention and treatment of child abuse and neglect. The group has raised $980,000 so far in 2008, applying solid management practices to the non-profit sector.

“We give grants to best-in-class agencies,” she says, “We go through a very thorough RFP process with the help of an academic advisor. It’s very similar to the investment process of evaluation and selection but we do it for the children.”

Reflecting on how her career has advanced, Kramer says there are plenty of opportunities for success stories like hers. “Companies are looking for people who are thinkers, who can learn and apply,” she says. “If you have a background in technology, there are a lot of ways to use it to help grow a business, increase efficiency, and solve challenges.”
Undergraduate Shares Computer Education Platforms with Austrian Scholars

Senior Matthew Horan traveled to Vienna this spring to share ideas and insights on computing education in secondary schools with his Austrian sponsors.

Horan was an early participant in the Bootstrap program, developed at CCIS to introduce middle school students to computer programming. Based on Trustee Professor Matthias Felleisen’s highly regarded TeachScheme! curriculum for high school and college students, Bootstrap has been offered through middle schools and Northeastern’s Compass Computer Program, where students like Horan served as teachers.

“Teaching is so rewarding,” Horan says. “Sharing something I’m passionate about and having the student become passionate about it is an amazing feeling.”

Because of his enthusiasm for computer education, Horan volunteered to work at a 2007 conference on computing education sponsored by CCIS with Professor Viera Proulx as organizing chair. It was there that he met Erich Neuwirth of the University of Vienna. Neuwirth had developed a computer science program for preteens and early teens that taught programming through music: the students wrote algorithms to compose tunes. Horan was intrigued, and wanted to study with Neuwirth to learn more about his approach. But with no formal internship or co-op program in place, he wasn’t sure how to structure a learning opportunity.

“We asked around and found that Matt could do a special project and I could be his advisor on the Northeastern side,” says Proulx, who has worked with Neuwirth on various conferences since 1991 and once hosted him as a visiting scholar.

During the resulting two-month special project in Vienna, Horan ported the tools used in Neuwirth’s program from the Logo programming environment to PLT Scheme, which is the foundation for Bootstrap. He also gave presentations to the university’s computer science department on Bootstrap.

“He was a great advisor,” Horan says of Neuwirth. “We met every day. He had great ideas and he was amazing to brainstorm with.”

Since returning, Horan has been modifying the Bootstrap and Compass Computer programs’ curricula to incorporate the musical programming tools, which allow students to compose music in PLT Scheme and output a Midi file, the universal protocol for electronic music.

Reflecting on his experience, Horan says he admires the Austrians’ focus on computer education and hopes U.S. educators follow their lead.

“Computer science education is really important to them,” he says. “They stress the importance of informatics, as they call it, and what can be done with it. Right now, that seems to be a European phenomenon.”

He thinks that’s starting to change. “Bootstrap is developing a hold,” he says. “More teachers know about TeachScheme! I hope it continues.”
CCIS Named One of Top 10 IT Schools to Watch

C CIS has been named one of the “Top 10 IT Schools to Watch” by Computerworld magazine. The ranking recognizes the college’s interdisciplinary information technology graduate programs, including the MS in Information Assurance and MS in Health Informatics, as well as the MS in Computer Science.

“This honor reflects the commitment of our faculty to provide our students with outstanding educational programs that will give them a significant advantage in pursuing a career in the IT field,” says Larry Finkelstein, dean of CCIS.

“The development and design of the Information Assurance, Health Informatics, and Computer Science programs are the University’s responses to the changing demands of the information technology world,” said Agnes Chan, associate dean for graduate studies. “Our programs are constantly evolving and answering society’s IT needs in a timely manner. They are flexible and strong in providing both theoretical fundamentals and practical viewpoints.”

As the impact of globalization and outsourcing continues to drive companies to manage projects in a distributive fashion, the most valuable professionals are those who can work effectively across disciplines. In response to industry’s complaint that technically trained individuals do not communicate well, all three of the information technology programs at CCIS educate students to work in more complex, global environments and to build a common vocabulary so that diverse groups of professionals can work together to overcome constraints, exchange ideas, understand alternative styles of thinking, and solve problems. The college recently added a required course, “Program Design Paradigm,” which promotes verbal communication skills by allowing students to build software and defend their intellectual work in front of their peers during code reviews.

CISters Aims to Attract Young Women to Computing

Women may still be a minority in most computer and information science programs, but the women of CCIS are hoping to balance the scales through CISters, a student group dedicated to nurturing girls’ interest in computer and information science (CIS), supporting women already pursuing a CIS education, and fostering a diverse image of the technology field.

The group got its start in 2005 under the leadership of Andrea Grimes, ’05, now a doctoral student at Georgia Institute of Technology. This past year, a new group of undergraduates reinvigorated the organization, hosting an array of social and educational events and reaching out to high school students and CCIS applicants.

“This is something that a lot of people wanted,” says Alex Schieren, one of the group’s organizers. “A core group of friends got together and picked up where it was left off.”

As part of the group’s outreach mission, members write to every female high school student accepted to CCIS. “We tell them who we are and what we’ve been able to do at Northeastern,” Schieren says. “We also try to meet them face-to-face at Welcome Day [an annual event for accepted students].”

Members also try to reach out to younger students by volunteering in local schools and promoting computer science education and awareness.

To keep their own membership engaged in the field, CISters hosts educational events like speaker panels featuring female alumni. At a dinner this spring, guests included Cathy Bilotti-Lucia, ’86, director, project office, Raytheon; Andrea Grimes, ’05, PhD student at Georgia Tech; Danna Studvint, ’95, IS engineer, Philips Medical Systems; and Catherine Weeks, ’07, user experience engineer, SeaChange International.

The group also tries to broaden its horizons through educational programs such as a lecture on breast cancer from a local hospital researcher, or a talk on speech and language featuring Professor Harriet Fell of CCIS.

Some events are strictly for fun, like a rock-climbing outing or a skating trip to Frog Pond on Boston Common.

For the coming year, CISters is reaching out to potential speakers at Google and Microsoft, among others. Its first priority, though, is getting official recognition from the Student Government Association, which will mean a steady source of funding.

“With recognition, we’ll get a budget, and that will mean better speakers and activities,” Schieren says. With CISters’ ongoing efforts to help recruit young women to computing, the University can be sure it will be money well spent.
College of Computer and Information Science Supporters, 2007-2008

The following list includes CCIS alumni who made gifts or pledges to any Northeastern University fund, as well as alumni and friends who directed their gifts specifically to CCIS, between July 1, 2007 and June 30, 2008. Every effort was made to ensure the accuracy of this list. Our sincere apologies for any errors or omissions that may have occurred.

Kaushik Agrawal, MS, '08*
Lester Allen, '94
Michael Armstrong, MBA '97*
Jacqueline Barnard, '85
Lisa Beaulieu, '90
John Benson, MS '06
Arunkumar Bhavanishanke, MS '08*

* Indicates donors who directed their gifts to the College of Computer and Information Science.

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Your Annual Gift to the College Makes a Difference

CIS is enjoying tremendous success on every level. From our recognition as a National Center of Academic Excellence in Information Assurance Education and Research to being named one of the "Top IT Schools to Watch," the college continues to be a national leader in computer and information science education. All of this news and recognition positions Northeastern University and the College of Computer and Information Science as the number one choice for many students. This year, we are pleased to welcome a bright new cadre of students and must thank you, our loyal alumni and friends, for making this possible. With your vision, commitment, and generosity, the college was able to offer critical scholarship support and attract students with our renowned faculty and cutting-edge, interdisciplinary degrees.

As we near the end of 2008, please consider supporting the college again with a gift to the CCIS Dean's Fund. Designated in this way, your gift allows Dean Larry Finkelstein to continue his commitment to student groups such as CiSters, support graduate students in their professional endeavors, and make undergraduate scholarship awards possible. Your gift, too, will have a direct impact on the college's vision and core mission: It will ensure the continuation of educational excellence and allow us to attract, teach, and foster tomorrow's IT scholars, innovators, and leaders.

For more information, please contact:
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