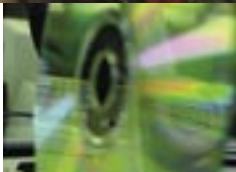


University of Pittsburgh

Graduate Programs in Information Science



School of Information Sciences
Connecting People, Information, and Technology



Letter from the Chair



As modern enterprises rely on the efficient management and processing of information more each day, a postgraduate degree in information science from the University of Pittsburgh becomes significantly more meaningful to professional success.

Whether you are considering taking a step into this dynamic and rapidly expanding profession for the first time, you simply want to expand your knowledge base, or you have ambitions for significant career advancement, our information science programs will meet your needs.

The Master of Science in Information Science (MSIS) degree is a professional degree, therefore, our faculty strive to balance the professional and career needs of our students with the theoretical foundations of the field. Thus, we incorporate practical hands-on experiences into the curriculum to complement and demonstrate the theoretical principles.

Information science is concerned with augmenting human information processing capabilities through technology. This includes storing and retrieving information, communicating information among systems, the interaction between people and information systems, and the role of information systems and technologies in business and society.

Our students learn from professionals who are building systems and performing research at the leading edge of the field. Studying with faculty such as ours at one of the top 25 research institutions in America offers you a depth, insight, and rigor that is difficult to obtain at other institutions. We embrace the notion that faculty who are engaged by the leading research questions of their field are committed to bringing this excitement and knowledge into their classrooms. It is, in fact, because our faculty are engaged in these research questions—often working collaboratively with industry—that your education will take you to places where the profession will be in the future. Our success in research demonstrates that our faculty are not only grounded in the foundations of the profession, but also possess the critical thinking skills and vision that enable them to push the frontiers of their field. These same attributes, nurtured in the classroom, will enable you to excel in this dynamic profession.

Our goal is to educate people who are efficient on the job from day one, while providing the foundation for our alumni to prosper professionally years down the road. We provide an education rather than training. Here, you'll receive a comprehensive base enabling you to become an expert in a variety of areas, whether it is consulting to help end users, working for companies or developers of technology, designing innovative information systems, performing in areas such as sales support processes, or preparing for a future as a chief information officer.

Thank you for your interest in the University of Pittsburgh information sciences programs. We look forward to welcoming you personally to our campus!

A handwritten signature in black ink, appearing to read 'Martin Weiss'.

Martin Weiss
Chair, Department of Information Science and Telecommunications

For more information about our programs and our faculty's individual backgrounds and interests, please visit our Web pages at www.sis.pitt.edu/~dist.

Master of Science in Information Science (MSIS)

The MSIS program is a 36-credit program that you can complete in one year of full-time study or as many as four years of part-time study. A typical plan of study includes two courses in the theoretical and mathematical foundations of information science, two courses in cognitive science, and eight technically oriented courses chosen from a varied and extensive list encompassing the most current technologies and topics. Our programs prepare you for careers in a variety of arenas including health care, business, industry, and the nonprofit sector in positions such as:

- systems analysts and designers,
- database developers and managers,
- software engineers,
- artificial intelligence specialists,
- information retrieval specialists, and
- information security experts.

You will find additional information about the MSIS program at www.sis.pitt.edu.

Additional Resources

The MSIS and PhD in information science (IS) degree programs have strong connections with other Pitt schools and departments including computer science, electrical engineering, business, and public and international affairs. The school also has relationships with Pitt's Intelligent Systems Program and the University Center for International Studies, both of which have certificate or degree options for students. Within the school, it is easy to take telecommunications as well as library and information science courses.

As a Pitt student, you also will have the opportunity to take courses at Carnegie Mellon University, which is within walking distance of Pitt's campus. Of particular interest to MSIS students are the courses associated with a new Master of Library and Information Science specialization in Digital Libraries and Information Management, offered in collaboration with CMU's School of Computer Science. Students also will find opportunities in Pitt's world-class medical center.

Systems and Technology Enrichment Program (STEP)

The recently introduced STEP program bridges the gap between an academic education and industrial training. It provides the means for information technology (IT) professionals to update their knowledge and upgrade their skills, while also providing relevant IT experience to graduates looking for experience that will jumpstart their careers. For more information about STEP, see <http://step.sis.pitt.edu>.

Certificate of Advanced Study (CAS)

The 24-credit CAS provides a structured, personalized program of studies beyond the master's degree. If you do not wish to pursue a PhD, you can explore a specific field of interest to update skills and competencies. The certificate program is an ideal way to refresh proficiencies and gain expertise in the most current areas of professional interest.

Doctor of Philosophy (PhD)

The PhD program prepares you for advanced work in research and teaching, providing research-oriented graduate study and professional specialization in the science of information. Candidates must demonstrate evidence of superior scholarship and mastery of a specialized field of knowledge and show evidence of their ability to perform significant and relevant research. The department also offers a separate PhD concentration in telecommunications (see www.tele.pitt.edu).

Our PhD graduates are members of faculties at universities around the world, as well as senior researchers in public and private enterprises. Details about the program guidelines and admission process for the PhD program are available online at www.sis.pitt.edu/~dist/academics/PhD_IS_apply.htm.

If you are interested in doctoral study, you would benefit from meeting with potential faculty advisors before applying to the program.



“Connecting people, information, and technology. That’s what we’re all about, and you won’t find another school in the nation with these three components as strong and as cohesively knitted together. You’ll find pieces, but not all together.

“We have an outstanding core of cross-disciplined faculty and excellent partnerships with computer science, electrical engineering, and the Joseph M. Katz Graduate School of Business. We also have an excellent relationship with Carnegie Mellon University. We’re not a castle unto ourselves, and that also makes us unique—and it makes us better.

“We have the license to enter into collaborative partnerships throughout the city, which in itself is quite attractive because Pittsburgh is compact enough that transportation is easy, yet large enough that opportunities abound. When the University says ‘the city is our campus,’ it means easy access to internships and employment opportunities, and cultural aspects as well.”

Dean Ronald L. Larsen

Specializations

"SIS is a great place to learn the modern technical skills to distinguish yourself from all the rest. The professors are very enthusiastic and foster a great learning environment that continually spawns great ideas. Not only did SIS provide a great learning environment that enabled me to obtain the latest technical skills, but through team projects I learned valuable lessons in teamwork that have helped me successfully complete projects in the professional world."

Philip Cwynar, MSIS 2003
Senior Application Developer,
Financial Information
Systems, University
of Pittsburgh

"My bachelor's degree is in mathematics with a concentration in computer science, and my graduate studies concentrated on the requirements of analysis and design of information systems. I found that softer skills, like research, management, communications, and business were essential to my long-term career aspirations. At SIS, I began to develop a deeper appreciation of information systems beyond their hardware and software components.

"My years at Pitt comprise some of the most rewarding times in my career. The challenges put forth by the professors are tempered with an understanding of the tribulations, and I found each to be a solid guide to my development. You can expect your grad student peers to be equally supportive; side bar conversations in work groups are just as educational as more structured exercises."

Jim McQuade, MSIS 1990
Data Administrator,
Giant Eagle, Inc.

With close collaboration throughout the department, our specializations in the information science curriculum overlap by design in many cases. A fundamental aspect of all courses in these areas is that successful systems analysis, design, and implementation is built on an understanding of both human and machine information processing. If you are interested in building and using systems and technology to fulfill human and organizational needs, to solve problems, and to advance social issues, we offer programs that you will find interesting and beneficial to career success. The enthusiastic dialogue among faculty and students of varying interests and areas of expertise contributes to our rich educational environment of which you will be a part.

Database and Web Systems

Information storage systems have been one of the cornerstones of information systems for centuries. As information became digital some 50 years ago, these systems took the form of database systems. In the emerging environment, people will interact with database and information processing systems through the Web using contemporary Web interface and future systems constructed from Web services.

We have a very strong specialization in database systems and technologies. The database course work consists of classes covering both fundamental concepts of modern database management systems (DBMSs) and advanced issues that typically arise in the context of large-scale enterprise data management. Course work is focused on developing practical skills in building and administering realistic database systems, data integration, data warehousing, and Web-based data management. Database research projects offer tremendous opportunities for students in specialties including scalable architectures for wide-area environments with heterogeneous information servers, query optimization in highly distributed databases, and wireless and mobile databases.

The Web systems curriculum consists of course work in modern Web technologies, including XML, and new distributed architectures for service provision. Hands-on projects will teach you technologies that can be applied to solve people's information processing problems.

If you specialize in database and Web systems, career options include positions as a systems analyst, systems architect, database administrator,

data steward, senior programmer/analyst, design analyst, and Web services manager.

Information Security

Providing security and assurance to information systems has emerged as one of the most daunting technological and social challenges of recent times. The rapid development of Internet-based technologies and society's increasing reliance on these systems, coupled with the threat of malicious attacks, have raised the importance of new knowledge, professional skills, and human resources in the area of information assurance.

A series of courses in information security and assurance provides you the opportunity to focus your studies in the theory and practice of developing secure and highly assured information systems and networks. The curriculum in Security Assured Information Systems (SAIS) has been certified by the Committee on National System Security (CNSS) as meeting the national standards for INFOSEC education. Joining an elite group of students in a National Security Agency-certified National Center of Academic Excellence in Information Assurance Education (NCAE/IAE), you will gain a thorough understanding of the principles of secure systems and networks and learn how to build highly assured information systems.

Cognitive Systems

The cognitive systems area addresses topics that are systems oriented but involve simulation of thinking processes and discernment of cognitive representations. You will learn about many of the important topics that lie on the intersections of technology and human cognition and behavior.

An essential course in this area is Human Information Processing in which fundamentals such as perception, pattern recognition, attention,





knowledge representation, problem solving, reasoning, decision making, natural language processing, and learning are presented. This background will prepare you to pursue further study in artificial intelligence, decision support systems, natural language processing, parallel and distributed processing, human factors, and interactive system design. The cognitive systems area also contributes to study in computing and society, and systems design and analysis, where the human aspect of design is critical.

By developing a strong background in cognitive systems, you will have entrée into exciting and rewarding career options, including professional work in virtual environments, in the gaming industry, or with interactive 3-D graphics. The field of decision support is growing fast and needs qualified professionals. A course in decision analysis and support, coupled with experience working on real-world projects, will develop your expertise in this emerging area.

Human Computer Interaction

Human computer interaction (HCI) is a growing field of specialization that overlaps with almost all other areas in the department. The ability to develop and manage systems that are easy to use, minimize catastrophic errors, and improve workplace satisfaction is critical in any information intensive environment.

Within this specialization, you will pursue course work in human information processing, human factors, and interactive system design. In addition, you will have the opportunity to pursue specialized course work in specific content areas, such as information storage and retrieval, geographic

information systems, network security, or document processing, where issues of usability engineering are critical to the success of a project.

Current research in HCI focuses on the building of adaptive interfaces, navigation through information spaces, creative uses of wireless technologies, and the use of networked multimedia environments in information science. Opportunities exist to explore the role of virtual reality interfaces through various research projects in the department's usability laboratory and the Visual Information Systems Center (VISC). The practical application of visualization and visual systems has experienced dramatic growth in recent years and has opened many new career possibilities for information science professionals.

The career opportunities for HCI experts are endless and include well-paid positions such as usability specialists, Web site designers, information architects, ergonomic specialists, graphic design professionals, and software engineers.

Telecommunications and Distributed Systems

Distributed computing involves the study of information systems in which the computer program and data are spread over more than one computer, usually in a network. The distributed systems specialization includes the study of client-server systems, distributed database management systems, and Web services, including content management, interface design, and security.

Because we offer master's degree programs in both telecommunications and information science, MSIS students have the unique possibility of specializing in one of the world's finest telecommunications programs.

If you are interested in network-based systems, an MSIS with a specialization in telecommunications allows you to explore the full potential of that career direction. The courses you will take in this concentration will prepare you for a range of careers, including the design and management of client-server and peer-to-peer systems, the management of network-based information systems, and network and information security.

As with the other MSIS specializations, the course of study is flexible to accommodate your individual interests and career ambitions.

"SIS gave me an excellent high-level understanding of information technology that I have been able to apply in my focus on information technology security.

"Combining the technology courses with user interface and business courses enabled me to advance professionally and enjoy a rewarding career. I had excellent faculty to help with course decisions as well as providing me opportunities for publishing and developing a reputation in this field.

"I would encourage people to pursue a postgraduate degree at SIS, especially if their background was not in computer science. The SIS degree offers a good way to get into technology and build on your capabilities."

Katherine Fithen, MSIS 1992

Senior Manager, KO-CIRT (Computer Incident Response Team) and Computer Forensics Program Strategic Security, The Coca-Cola Co.

"I was changing careers when I enrolled at SIS, and the practicum gave me experience that initiated my new career. SIS was a great place to grow and learn. It is not an exaggeration to say that SIS was a turning point in my life.

"The technology background opened the door to the corporate world, but the emphasis on problem solving, project management, and communication were factors that helped me the most. Every course I took had direct relevance to what I do at Mellon. As relationship manager in Global Securities Services, responsible for the trust and custody needs of institutional clients, I use the skills I learned at SIS every day."

Paul R. Kraus, MSIS, 1981

First Vice President, Mellon Financial Corp.

“Why should you choose Pitt from among the alternatives? Because Pitt brings together diverse faculty expertise, alumni, and students. Our program is designed to be technologically superior with a set of courses to meet the needs of industry. We are a research institution—and that’s important for students who want to know how things work.

“No other IS school has cognitive scientists, physicists, electrical engineers, mathematicians, computer scientists, visualization specialists, and on and on. We have technical diversity, database systems, telecommunications systems, interactive systems, document systems, decision support systems. You simply can’t get this type of education anywhere else.

“Sometimes students can’t understand why they have to learn so many different things. Then they get into the workplace and out of 20 people on the job, they’re the only one who knows what the boss is talking about. Either in a job interview or job situation, they’re going to excel because they have a far better understanding of a larger number of topics having graduated from Pitt.”

Michael Spring

Associate Professor
of Information Science
and Telecommunications

Geoinformatics

Geoinformatics is an interdisciplinary field requiring synergistic modeling and analysis for dealing with geospatial data and phenomena. Study in geoinformatics requires understanding of geospatial analysis and modeling, geospatial databases, geospatial technologies, information systems, systems design, human-computer interaction, and wired and wireless network technologies.

Geoinformatics technologies include geospatial information systems (GIS), global positioning systems (GPS), and remote sensing. Many fields benefit from geoinformatics techniques and tools, and with advances in geoinformatics and other technologies such as mobile computing and wireless networks, the emergence of many new applications is expected. In-car navigation systems, automatic vehicle location systems, transportation planning and engineering, environmental modeling and analysis, urban planning, telecommunications, agriculture, farming, and public health all use geoinformatics technologies.

With an emphasis in geoinformatics, graduates gain the unique skills necessary to facilitate and manage the design, development, and deployment of complex geoinformatics systems and applications in a rapidly emerging profession. Graduates conduct research in geotechnologies, pursue research in geoinformatics, or move into academic positions.

Technology and Society

As a society we have increasingly looked to technology to improve efficiency, expand productivity, and extend opportunity. Information technologies provide the opportunity to expand human capabilities to new levels, but the more we advance into the Information Age, the more we see how it is the interaction of interpersonal behavior and technologies that we must better understand and support.

Without an understanding of human interpersonal behavior and ethical issues, technologies can complicate processes more than simplify them, creating confusion instead of communication and knowledge.

This program addresses the critical issues relevant to the entire life cycle of information—from its creation and generation, through its organization, management, and preservation, to its evaluation, dissemination, and use. These issues involve topics such as:

- protection of individual privacy versus the public’s right to know;
- the extent to which an employer may have access to employee’s confidential records;
- trust, credibility, and reliability on the Internet; and
- the ethics of filtering.

The very expertise of information professionals entails an inherent measure of power, and with this power comes responsibility. Information professionals must recognize and understand the associated responsibilities and strive to use information in a responsible and ethical manner. Understanding ethical issues and applying ethical reasoning to practical, professional work is essential for developing and implementing information policies for any organization.

Students across all SIS master’s and PhD programs often take elective courses or specialize in this area as part of the dual master’s degree with the Graduate School of Public and International Affairs (GSPIA). Careers in e-government, e-commerce, e-learning, health care, and many other fields are expanding.



Employment Connections

When Preeti Churbock was seeking an internship in 2001 to complete requirements for her MSIS degree, Professor Michael Spring referred her to Pitt alumnus Greg Schmitt (MSIS '96), who serves as director of information systems at McKesson Automation, a local manufacturer.

As the two discussed the possible internship, Schmitt quickly realized that Churbock, who earned a bachelor's degree in pharmacy from Pitt in 1991, was well-qualified and had the perfect compliment of skills for a full-time position at the growing company.

Churbock is now in her third year coordinating all internal integration testing of computerized pharmaceutical supply equipment. She is one of nearly two dozen Pitt grads and students employed by McKesson, and she credits the relationship between Pitt professors, alumni, and students as a key to her enjoying a successful career.

"The interaction with the professors and Pitt alumni is great; they really care about your professional success," said Churbock. "I owe my job here to Mike Spring and Greg Schmitt. I came seeking an internship and ended up with a full-time job that is a perfect match for my skills and interests. I really liked science, so I worked in the pharmaceutical industry for seven years. But I also liked the technical side of pharmacy, so I explored my options and decided to combine my two interests, and I enrolled in the MSIS program."

Pitt information science and telecommunications graduates hold a variety of positions at McKesson, ranging from software engineers—who develop intelligent, leading-edge supply automation and medication management systems—to information technology administrators.

"SIS graduates are well prepared for the work force," said Schmitt. "SIS provides an excellent foundation of skills that may be drawn upon regardless of an individual's experience with ever-changing technology. Experience is always best; however, an individual with a broad base of relative fundamental skills may in fact prove more adept at achieving success when faced with decisions and challenges that are new to all.



"The school's combination of studies in telecommunications and information retrieval systems is truly unique because of its emphasis on human factors and end user application.

"The curriculum is what attracted me to SIS, but it was the faculty members who encouraged me to stick with it," Schmitt continued. "As a working and traveling professional attending school in the evenings, it was a real strain at times. The faculty worked with me to schedule classes appropriately, while ensuring that classroom assignments were both meaningful and achievable given my work schedule.

"Today, I work with this same group of faculty members, now interested in the business challenges I face and often connecting our business with new recruits and internships for today's students. The faculty helped me to succeed then, and continues to help me and other students succeed today."

MCKESSON
Empowering Healthcare

"The strength of this school is that we specify problems through needs analysis and design solutions. We study the nature and presentation of information itself.

"I'm doing my dissertation on virtual reality (VR) and on establishing methods of teaching in VR environments versus traditional teaching. I'm analyzing different methods of teaching Egyptian architecture—one-dimensional writing, as opposed to two-dimensional artwork, versus 3-D using space in virtual reality. It's pretty cool to see students light up when VR techniques are used instead of traditional teaching methods."

Jeffrey Jacobson,
PhD student in IS

"Tell me, I forget.
Show me, I remember.
Involve me, I understand."

Ancient Chinese proverb

Application and Financial Aid

Please consult our Web site, www.sis.pitt.edu/~dist, for application forms and additional information.

Each term the faculty awards financial aid to outstanding full-time students in the form of graduate student assistantships or graduate research assistantships. These awards are competitive and granted on the basis of academic achievement and financial need. Follow these deadlines for financial aid applications:

Fall Term: January 15
 Spring Term: September 15
 Summer Term: January 15



Pittsburgh's night skyline [Courtesy Jeff Greenburg]

Placement

The Bureau of Labor Statistics predicts that the economy will add more new jobs in the decade between 2000 and 2010 than it did in the previous decade with computer occupations projected to be among the fastest growing fields. Network systems analysts, data communications analysts, computer software engineers in applications and systems software, and database administrators are expected to be the fastest growing occupations.

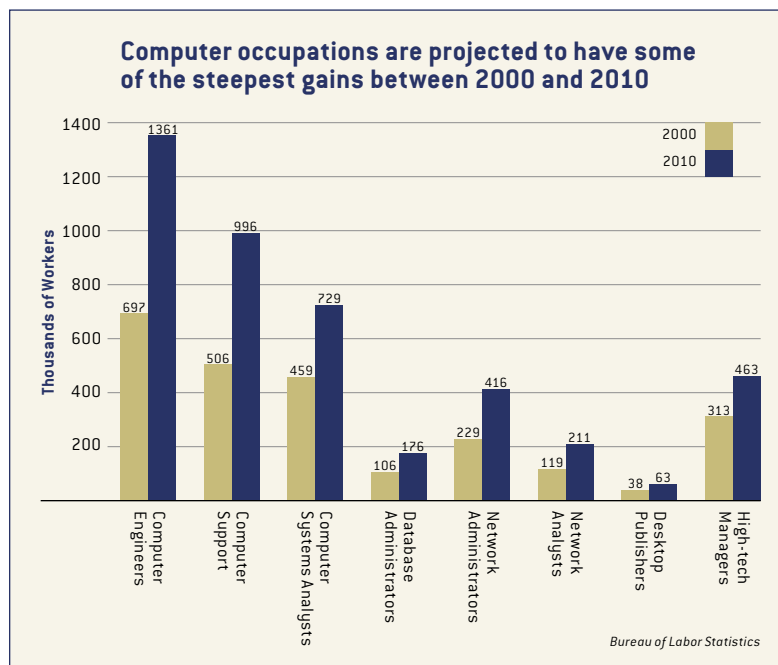
With the combination of basic theory, practical experience, and exposure to current research gained from study in our dynamic graduate programs, you will be in a position to perform one of these jobs and advance as the field continues to grow in directions we can't yet imagine.

Employers of graduates include:

- ALCOA
- American Red Cross
- Booz Allen Hamilton
- Bureau of Labor Statistics
- Deloitte
- FBI
- FedEx
- GNC
- IBM
- McKesson Automation
- Medrad
- Mellon Financial Corp.
- Mercy Behavioral Health
- U.S. Army
- U.S. Department of State

Job titles of alumni include:

- Computer Specialist
- Senior Consultant
- Information Systems Coordinator
- Software Validation Engineer
- Software Engineer
- Engineer/Data Analyst
- Implementation Engineer
- Chief Information Security Officer



University of Pittsburgh

School of Information Sciences
 135 North Bellefield Avenue
 Pittsburgh, PA 15260

www.sis.pitt.edu

The University of Pittsburgh is an affirmative action, equal opportunity institution. Published in cooperation with the Department of University Marketing Communications. UMC4317-0804