School of Computing

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Overview

In today's cutting edge science and technology, computers play an indispensable and integral role and their application areas are diverse and far-reaching. In order to respond to the ever-increasing demand for technical expertise in the computer and information technology industry, the goal of the School is to teach students to be well versed both in theory and application and to be highly adaptable and proficient in practice.

As the first Computer Science graduate program in Korea, we have produced the very best bachelors, masters, and PhDs in Korea. We take pride in being a top-notch world-class research and education school. Since its foundation in 1972, the School has produced 1,760 bachelors, 2,086 masters, and 724 PhDs (Dec. 2016 currently), and has been a major talent pool for the entire IT industry in Korea. Our curriculum is well-balanced between theory and application, with much emphasis on experimental approaches. To keep students up-to-date with new developments and advances that have not been incorporated into the regular curriculum, we also encourage them to participate in research projects and industry internships through independent studies and special topic courses.

Currently our school hosts three Engineering Research Centers funded by KOSEF, namely the Advanced Information Technology Research Center (AITRC), the Virtual Reality Research Center (VRRC), the Mobile Media Research Center (MMRC). The Software Process Improvement Center (SPIC) is funded by the Ministry of Information and Communications. Seven National Research Labs - the Computer Architecture Laboratory, the Computer Graphics Laboratory, the Artificial Intelligence and Pattern Recognition Laboratory (AIPR), the Global USN Laboratory, the Database Laboratory, the Advanced Information Technology Research Center, Multimedia Computing Laboratory - is funded by the Ministry of Science and Technology; and the Semantic Web Research Center (SWRC) and KAIST-Microsoft Research Center, Center for Mobile SW Platform (CMSP) and more KAIST research centers are funded by the Ministry of Knowledge Economy. Our school also has Auto-ID Laboratory ,funded by GS1. These research centers, along with the school, support research collaboration with other Korean universities and research laboratories, as well as with foreign research centers and universities.

Our school has programs such as Software Graduate Program funded by National IT Industry Promotion Agency, Web Science and Technology Division (World Class University) and NCRC KAIST-SNUH Joint Interdisciplinary Graduate Program on Biomedical Informatics funded by National Research Foundation of Korea.

Masters students have the opportunity of a Dual Degree Program with TU Berlin and TU Denmark. Our school also has a Dual Degree Program with HKUST for PhD students.
Our curriculum covers all topics related to design, implementation, and application of computer system hardware and software. Especially holding pervasive computing as our basic concept, we research and teach in interdisciplinary areas. With our excellent faculty (Dec 2016 currently, 48 faculty) and first-rate facilities, we will continue government-funded and industry-liaison research, and are committed to our leadership role in computer science in the 21st century.

✐ Life After Graduation
Most graduates of our school continue with master's degree programs or work in industry. Those with a master's degree either advance to PhD programs, or work as senior members in industry and research laboratories. Many of our graduates have been a driving force behind the 1990's IT boom in Korea and founded HandySoft, Serome, Future Systems, Nadatel, etc. Currently 8 listed companies and 73 venture business are founded by School of Computing graduates. Our 724 PhDs work in universities, corporate research laboratories, and industry and are the main backbone behind world-class research in computer science.

❒ Research Areas
The members of the school in 2016 alone have published 82 SCI(E)journal papers, including 159 in international journals, and received total of more than $11.7 million USD in research grants. The following are major research areas of the School of Computing.

▷Foundations (theoretical foundations, experimental foundations)
Theory is a fundamental foundation of computing and includes research areas such as algorithms, computational complexity, graph theory, computational geometry, discrete geometry, programming languages, compilers, and cryptology. In particular, computational geometry studies efficient algorithms for geometric problems that come from applications in graphics, networks, databases, CAD, robotics, GIS, and other areas of geometric computation. The research on programming languages and compilers studies software development from its design stage to its deployment and maintenance; it analyzes and optimizes software to help people to use software safely, easily, and efficiently.

Systems research provides experimental foundations for computing, encompassing continuously evolving research areas such as computer architecture, operating systems, networks, embedded systems, and real-time systems. Building on the strengths of the traditional systems research, our school aims to achieve global leadership in new systems research such as mobile systems with user experience, cyber-physical systems, cloud computing, and social network analysis.

▷Design (design for software, systems and services)
Various design techniques and tools are fundamental for fostering creativity in computing, and computational creativity is pervasive in all aspects of human lives. Our school focuses on developing creativity in designs for software, systems, and services. In particular, software engineering is a discipline that studies the lifecycle of software including development, operation, and maintenance systematically and quantitatively. In particular, software engineering focuses on making advancement in the rapidly changing software development paradigms and architectures as well as service technologies such as web-based computing, mobile computing, cloud computing, and big data research.

▷Secure Computing (theory and systems for secure computing, security and privacy)
Secure computing research provides foundations for ensuring confidentiality, integrity and availability of systems, applications, and services in all aspects of computing technology. As a fundamental area for computing, the sub-research area for secure computing include systems security, software security, cryptography, mobile and network security, vulnerability analysis, malware analytics, usable security, computer forensics, privacy technology, and the policy for security and privacy.

▷Visual Computing (next-generation graphics, vision, visualization)
Visual computing studies how to make and use computing in order to efficiently process, understand, and express visual and multimedia data such as images, videos, photographs, drawings, movies, and multi-dimensional data. It encompasses computer graphics, computer vision, information visualization, image processing, information hiding, and multimedia forensics. Recent research topics of visual computing include large-scale computer graphics and geometric processing, medical image processing and applications, computational photography and robot motion planning.

▷Intelligent-Information Service (database, data mining, artificial intelligence, knowledge service)
With the advancement of information technology and its pervasive uses, personal and social data have been vastly increasing, and thus, there is a rapidly rising need for intelligent processing and analysis of big data. Information Service refers to the studies in algorithms, systems, and services for efficiently processing, managing, and analyzing big data. Research areas include databases, parallel search engines, web data management, multimedia/spatio-temporal data management, sensor network data management, data mining, artificial intelligence, machine learning and knowledge

service. In particular, the foundational problems in artificial intelligence include visual and speech understanding, natural language processing, and planning.

▷Social Computing (pervasive computing for individuals and society)
Social computing addresses novel services and technologies that are related to managing, analyzing, and understanding various social data that arise in individual and societal activities. This emerging research topic develops ample opportunities to provide foundational knowledge and tools for computational social sciences. Our school plays leading roles with high global visibility in natural language processing for biology (BioNLP), social network analysis, data mining, computational journalism, and information security, as well as semantic web and information retrieval.

▷Interactive Computing (HCI on human life)
Interactive computing is a research area for new HCI technologies. Computers in diverse forms, such as smart phones, tablets, tabletops, and smart spaces are now creating entirely new user experiences (UX) and require research to provide a new paradigm of user interfaces (UI). Some of our ongoing research topics include gesture interfaces, touch interfaces, haptic interfaces, and natural language interfaces. We are also expanding our research to more pioneering topics including organic user interfaces and brain-computer interfaces.