

As the first university to officially form a Computer Science department, Carnegie Mellon helped define and continually redefines the field. Here, it has always been more than software and code. It's robots exploring planetary terrain. It's enabling people speaking six different languages to communicate easily with each other by speaking into translating computers. It's elementary school students getting help in algebra from computer tutors.

Home to the largest terascale computer in the world dedicated to non-classified research and the world's premier computer incident response team, Carnegie Mellon and its School of Computer Science are sure to lead the world in computer science innovation for years to come. Detailed here are a number of the university's largest and most recent research initiatives.



### **GigaPan Enables Digital Cameras to Produce Interactive, Multibillion-Pixel Panoramas**

Researchers at Carnegie Mellon, in collaboration with scientists at NASA's Ames Research Center, have built a low-cost robotic device that enables any digital camera to produce breathtaking gigapixel (billions of pixels) panoramas, called GigaPans. The technology gives people a new way to make and share images of their

environment. It is being used by students to document their communities and by the Commonwealth of Pennsylvania to make Civil War sites accessible on the Web. To promote further sharing of this imagery, Carnegie Mellon has launched a public Web site, [www.gigapan.org](http://www.gigapan.org), where people can upload and interactively explore panoramic images of any format. In cooperation with Google, researchers also have created a GigaPan layer on Google Earth. Anyone using Google Earth can now fly into these GigaPan panoramas in the context of exploring the world.

### **Center for Automated Learning**

**and Discovery:** CALD's mission is to pursue basic science in automated learning methods, including data mining, statistical methodology and knowledge discovery driven by applications to problems of societal importance. New algorithms and theories developed here are being applied to areas like industrial process control, DNA sequencing, environmental assessments, information filtering and government statistical surveys. [www.cald.cs.cmu.edu](http://www.cald.cs.cmu.edu)

**Robotics Institute:** Even when robotics technologies were relatively primitive, their potential role in boosting the productivity and competitiveness of the United States was foreseen in the evolving global marketplace. The Robotics Institute at Carnegie Mellon University was established in 1979 to conduct basic and applied research in robotics technologies relevant to industrial and societal tasks and is recognized worldwide as one of the premier organizations of its kind. [www.ri.cmu.edu](http://www.ri.cmu.edu)

**Entertainment Technology Center:** A joint computer science and fine arts research endeavor, this center strives to provide a new model for interactive multimedia entertainment by incorporating technologies like artificial intelligence, speech recognition, and advanced learning technologies with the fine arts. [www.etc.cmu.edu](http://www.etc.cmu.edu)

### **Human Computer Interaction Institute:**

The largest and most diverse group of HCI researchers anywhere in the world, research at the Institute is devoted to the design, implementation and evaluation of interactive computer-based technology. HCII researchers have developed more than 20 generations of wearable computers, systems that combine wireless with handheld technologies. [www.hcii.cs.cmu.edu](http://www.hcii.cs.cmu.edu)

### **Carnegie Mellon Office of Government Relations**

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## Anastasia Ailamaki Wins Nobel-sized Award

Anastasia Ailamaki, associate professor of computer science at Carnegie Mellon University, is one of 20 scientists chosen for this year's highly selective European Young Investigator Awards. The EURYI program is designed to attract outstanding young scientists from around the world to create their own research teams at

European research centers and includes five-year grants of €1 million to 1.25 million, comparable in monetary terms to the Nobel Prize. Ailamaki's research focuses on database systems, and she is particularly interested in addressing the peculiar problems of large, scientific databases, such as those used for earthquake or astrophysics simulations. Switzerland, with its heavy concentration of research centers, is fertile ground for such work.

## Online Library Gives Readers Access to 1.5 Million Books

The Million Book Project, an international venture led by Carnegie Mellon University in the United States, Zhejiang University in China, the Indian



Institute of Science in India and the Library at Alexandria in Egypt, has completed the digitization of more than 1.5 million books, which are now available online. For the first time since the project was initiated in 2002, all of the books, which range from Mark Twain's *A Connecticut Yankee in King Arthur's Court* to *The Analects of Confucius*, are available through a single Web portal of the Universal Library ([www.ulib.org](http://www.ulib.org)).

### Institute for Software Research, International:

ISRI creates innovative solutions to the problems of practical, large-scale, high-quality software-intensive systems for the new millennium. The primary focus is on systems that exploit the growing infrastructure for high performance, nearly ubiquitous computing and communication, especially systems the public depends on for services provided through the electronic marketplace. [www.isri.cs.cmu.edu](http://www.isri.cs.cmu.edu)

### Language Technologies Institute:

This center draws on Carnegie Mellon's longstanding accomplishments in the natural language processing of written and spoken language and information management to make language barriers a thing of the past. Speech translation systems developed here have made it possible for multilingual communication over the Internet and have aided the military's need to translate foreign languages while in the field. [www.lti.cs.cmu.edu](http://www.lti.cs.cmu.edu)

### Pittsburgh Supercomputing Center:

The PSC houses the most powerful computing system in the world dedicated to non-classified research. Funded by the National Science Foundation and available to scientists and engineers nationwide, its research capabilities bear on a wide range of important problems such as earthquake modeling, storm-scale weather forecasting, global climate change and protein genomics. [www.psc.edu](http://www.psc.edu)

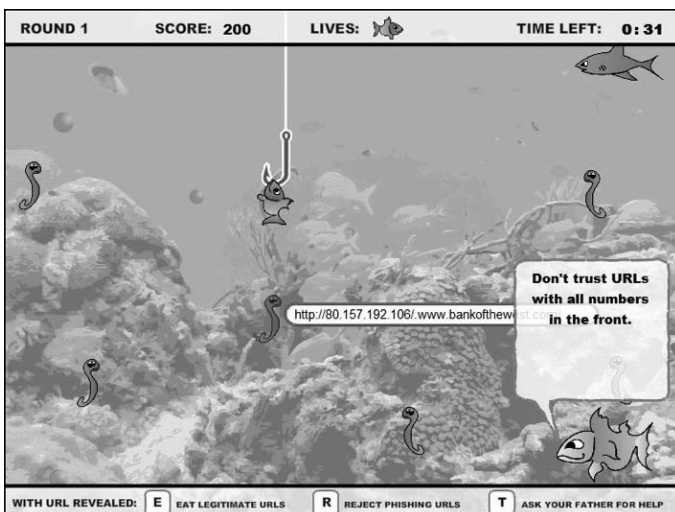
### Laboratory for International Data Privacy:

By partnering with institutions, agencies and corporations facing real-world privacy concerns, the "Data Privacy Lab" is dedicated to creating technologies and related policies with provable guarantees of privacy protection while allowing society to collect and share private (or sensitive) information. Work involves developing ways to learn sensitive informa-

tion from disparate and seemingly innocent information and constructing solutions; the Data Privacy Lab seeks balanced, integrated solutions that weave technology and policy together. <http://privacy.cs.cmu.edu>

### Creative Technology Nights for Girls:

A free weekly program focused on exposing middle and high school girls to creative technologies, Creative Technology Nights uses computer animation, Web design, programming, robotics and interactive media, taught by graduate students from the School of Computer Science, to engage a future generation of women in technology. In addition, students are encouraged to socialize through a variety of social events such as movie nights, open houses and Bring-Your-Mother-to-Work-Night to create an alternative social space for female students pursuing technology. <http://creativecommons.org>



## Online Game Helps People Recognize Internet Scams

Carnegie Mellon computer scientists have developed an interactive, online game featuring a little fish named Phil that can teach people how to better recognize and avoid email "phishing" and other Internet scams. In testing at the Carnegie Mellon Usable Privacy and Security Laboratory, people who spent 15 minutes playing the "Anti-Phishing Phil" game were better able to identify fraudulent Web sites than people who spent the same amount of time reading anti-phishing tutorials or other online training materials.