Professor Barbara Liskov has been awarded an honorary doctorate by the Universitat Politècnica de Catalunya · BarcelonaTech (UPC) for significant contributions to computer science.

Professor Barbara Liskov has a degree in mathematics from the University of California, Berkeley. In 1968, she became one of the first women in the United States to be awarded a PhD in computer science, which she received from Stanford University.

At present, she is an Institute Professor at MIT and also Associate Provost for Faculty Equity. She is a member of the National Academy of Engineering and the National Academy of Sciences, a fellow of the American Academy of Arts and ciences, and a fellow of the ACM. She received the ACM Turing Award in 2008, the ACM SIGPLAN Programming Language Achievement Award in 2008, the IEEE Von Neumann medal in 2004, a lifetime achievement award from the Society of Women Engineers in 1996, and in 2003 was named one of the 50 most important women in science by Discover Magazine.

Her research interests include distributed systems, replication algorithms to provide fault tolerance, programming methodology, and programming languages. Her current research projects include Byzantine-fault-tolerant storage systems and online storage systems that provide confi dentiality and integrity for the information stored.

The ceremony took place of the Vèrtex building on 28 September 2012 and professor Núria Castell grave the *Laudatio* of professor Barbara Liskov.

Laudatio of professor Barbara Jane Liskov, by professor Núria Castells, Dean of the Barcelona School of Informatics (FIB), UPC.

“Distinguished rector of the **Universitat Politècnica de Catalunya ·** Barcelona**Tech**, distinguished members of the University Senate and Board of Trustees, authorities and representatives of institutions and companies, lecturers, students, administrative staff, family and friends, and dear Dr. Barbara Liskov.

I am very pleased to be here today at this solemn ceremony to welcome to the University Senate a new doctor honoris causa of the Universitat Politècnica de Catalunya, pursuant to the Governing Council agreement of June 12th 2012, sponsored by the Facultat d’Informàtica de Barcelona, of which I am proud to be the dean. Professor Liskov's nomination was supported by UPC departments and schools, some main companies of the IT sector, and other organizations attesting the prominence and high repute of the person receiving this distinction from the UPC.

Professor Barbara Liskov is an Institute professor (the highest title) of computer science at the Massachusetts Institute of Technology at Boston, and head of the Programming Methodology Group. Her research interests include distributed systems, replication algorithms to provide fault-tolerance, programming methodology, and programming languages. Her current research projects include Byzantine-fault-tolerant storage systems and online storage systems that provide confidentiality and integrity for the stored information.

Barbara Liskov's research has led to major breakthroughs in such fundamental areas as operating systems, distributed systems, programming languages, and programming methodology. Her ideas helped to form the foundation for modern programming languages such as Java, which are designed to make use of self-contained modules of data and instructions that can be developed once and reused to many different ends.

Today, I will attempt to summarize the extensive and fruitful work carried out by Dr. Barbara Liskov in the course of her 40-years academic and research career.

Information technology is one of the youngest disciplines of engineering. Its contributions over the last 30 years have drastically changed our world. All fields of human activity are modified and transformed by efficiency and new opportunities that computers offer. No one can imagine a level of social development as we know today, without the contribution of computer scientists.

The work and intelligence of computer pioneers, among them Barbara Liskov, has laid the foundations of a science which is the driving force of progress we have experienced in recent decades.

2012 is a special year for informatics community. It's the centenary of Alan Turing's birth in London. The world is honoring Turing's life and achievements. He was highly influential in the development of computer science, giving a formalization of the concepts of "algorithm" and "computation" with the Turing machine, which can be considered a model of a general purpose computer. Alan Turing is widely considered to be the father of computer science.

2012 is also a special year for the Facultat d'Informàtica de Barcelona. It is the celebration of its 35th anniversary. Since 1977 our school offers a quality university education and excellence in the area of computer engineering that responds to the needs of the social and economic environment. FIB is part of the international computer community. The work done by its more than 250 researchers and the training provided during these 35 years have contributed to the progress of our society.

From this standpoint, the scientific community and the UPC recognize the value of the achievements made by Dr. Barbara Liskov.

Barbara Liskov, born Barbara Jane Huberman, on November 7th, 1939, in California, earned her BA in mathematics at the University of California, Berkeley in 1961. Rather than go directly to a graduate school, she took a job at the Mitre Corporation where she was involved in the computer programming world.

In the early 60's computer programming could be considered an experimental world. The features, performance, cost and reliability of those machines, made them accessible to only a few experts. The job at Mitre was the beginning of the very fruitful career of Barbara Liskov.

After a year at Mitre, she moved to Harvard University to work on a project that sought to automatically translate English sentences into something a computer could understand. Though natural-language processing is a problem that computer scientists are still working on, back then people expected that it would be solved in a few years.

Returning to California to do graduate work at Stanford, she was given financial support in John McCarthy's lab partly because her earlier work on natural language translation was in the general area of artificial intelligence. In 1968 she became one of the first women in the United States to be awarded a computer science PhD. Her thesis on chess end-games was supervised by John McCarthy.

After receiving her PhD, Barbara married Nathan Liskov and moved back to the Boston area to work at the Mitre Corporation in Bedford, MA on computer design and operating systems. Using an Interdata 3 computer that had the ability to change the instruction set via microcode, she created the "Venus Computer" tailored to supporting the construction of complex software. The Venus operating system was a small timesharing system for the Venus machine used to experiment with how different architectures helped or hindered this process. The Venus system supported 16 teletypes and each user was connected to a virtual machine so that major errors would not compromise the entire system, only the virtual machine for that user.

In 1971, shortly after finishing her experiments with Venus and presenting a conference paper on the topic, Liskov was urged by another attendee to consider a position at MIT. She left Mitre and joined the MIT faculty as a professor in the Laboratory for Computer Science. Building on her experience at the Mitre Corporation, her research has focused on creating more reliable computer systems.

At MIT she led the design and implementation of the CLU programming language, which emphasized the notions of modular programming, data abstraction, and polymorphism. It was the first language to support data abstraction. These concepts are a foundation of object-oriented programming used in modern computer languages such as Java and C#, although many other features of modern object oriented programming are missing from this early language.

Any sophisticated software application is a complex structure of interlocking parts, often modified over time by a large team of engineers. Any change can have unintended effects on other parts of the software, requiring programmers to essentially rewrite the program. Barbara Liskov came up with ways to structure programs in discrete chunks, or "multi-operation modules," so that changes would be less likely to affect code outside certain boundaries.

Because it was hard to illustrate her ideas to programmers, she designed a programming language that put them directly into practice. "I had a very strong idea about what were good programs and what were bad programs," she says. "I wanted to make it easy for people to write good programs, and while you can't prevent people from writing bad programs, I didn't want to make it too easy for them."

Her MIT group also created the Argus language, the first high-level language to support implementation of distributed programs over a network, which extended the ideas of CLU, including support for nested transactions. An example of such a distributed program might be a network based banking system. Argus provided object abstractions called "guardians" that encapsulate related procedures. As an experimental language, Argus influenced others developers but was never widely adopted or used for deployed networked applications.

She is also at the origin of the Thor object-oriented database system, which provides transactional access to persistent, highly-available objects in wide-scale distributed environments.

Liskov's subsequent work has mainly been in the area of distributed systems, which use several computers connected by a network. Her research has covered many aspects of operating systems and computation, including important work on object-oriented database systems, garbage collection, caching, persistence, recovery, fault tolerance, security, decentralized information flow, modular upgrading of distributed systems, geographic routing, and practical Byzantine fault tolerance. Many of these, like Byzantine fault tolerance, deal with situations where a complex system fails in arbitrary ways. Liskov developed methods to allow correct operation even when some components are unreliable.

With Jeannette Wing she developed a new notion of subtyping, known as the Liskov substitution principle. Her contributions have influenced advanced system developments and set a standard for clarity and usefulness.

Liskov is currently the Ford Professor of Engineering at MIT. She leads the Programming Methodology Group at MIT, with a current research focus in Byzantine fault tolerance and distributed computing. She became a full professor at MIT in 1980. She served as the Associate Head for Computer Science from 2001 to 2004, and in 2007 was appointed Associate Provost for Faculty Equity. In 2008, MIT named her an Institute Professor, the highest honor awarded to an MIT faculty member.

MIT President, Susan Hockfield, said "Barbara is revered in the MIT community for her role as scholar, mentor and leader. Her pioneering research has made her one of the world's leading authorities on computer language and system design. In addition to her seminal scholarly contributions, Barbara has served MIT with great wisdom and judgment in several administrative roles, most recently as Associate Provost for Faculty Equity."

She has written three science books and more than 150 scientific articles in leading international journal and conferences. She has supervised the research programs of more than twenty-five PhD students and large numbers of MSc students.

Her work had an important impact on the research work carried out in the Programming Department of FIB, at present included in the Software Department of UPC. The work done on algebraic specification was based on the concept of data abstraction from Barbara Liskov. Also the methodological contributions on program design were based on Liskov’s work. Moreover, her proposals have been used for many years as the basis for teaching of programming at FIB.

Just to mention some honors and awards: Barbara Liskov is a member of the National Academy of Engineering and the National Academy of Sciences, and a fellow of the American Academy of Arts and Sciences, and of the Association for Computer Machinery. She received the Society of Women Engineers’ Lifetime Achievement Award in 1996, the IEEE von Neumann medal in 2004, the ACM SIGPLAN Programming Language Achievement Award in 2008, and in 2009 she received the A.M. Turing Award from ACM.

She has received several Honorary Doctorates: ETH, Zurich, Switzerland (2005); Brown University (2010); Northwestern University, Chicago (2011); University of Lugano, Switzerland (2011)

In 2003 was named one of the 50 most important women in science by Discover Magazine. In 2012, she is named to National Inventors Hall of Fame.

Talking about nonscientific aspects, Barbara Liskov has always encouraged and helped female students and in recent years has devoted considerable attention to making computer science a more welcoming field.

Being a woman in the early days of computer science would have been difficult for someone who paid more attention to such obstacles, Liskov says. And even though those barriers didn't much bother her, societal expectations prevented her from acknowledging the importance of her career until her own research interests began to mature.

As associate provost for faculty equity at MIT, she works to recruit more women and minority faculty members and to help them to manage and advance their careers.

In addition, Barbara Liskov made it a priority to cultivate a rich set of interests outside the workplace, including gardening and reading mystery novels. She is a very kind and friendly person.

To conclude: FIB started its academic life on September 1977, so we are celebrating the 35th anniversary. At the same time we are celebrating the centenary of Alan Turing. The best way to give academic relevance to those facts is to give the UPC’s highest honor to a pioneer woman in informatics in the world. Congratulations, Barbara!”