

University of Houston AT&T Lab Supports Best in Class Innovation

Since 1876, AT&T ingenuity has connected individuals the world over and helped companies find better ways to do business. From Alexander Graham Bell's invention of the telephone to the first transatlantic phone call, from the development of transistors and communications satellites to today's powerful networks that support global enterprises, AT&T's inventiveness has forever changed the way people and enterprises communicate.

Innovation today comes not only from within AT&T, but from AT&T-supported researchers working to develop next-generation networking advancements. The company has a long history of collaborative research and mentoring programs with leading universities, conducting joint trials of new technologies and developing prototypes from innovative ideas.

One exciting example of this is the new University of Houston (UH) AT&T Technology Lab, an idea and information exchange hub for the educational, industrial and research communities. Funding from the AT&T Foundation gives UH researchers in the university's College of Technology access to telecommunications, networking and computing resources designed to acquire, analyze, integrate and visualize large volumes of data in real time.

Benefits Beyond the Ivory Towers

With its ability to simulate wide area networks and network protocols, the lab's impact will reach far beyond the university campus. In conjunction with the non-profit Greater Houston Education Collaboration group, the lab already extends into local communities through outreach programs for students in kindergarten through grade 12. High definition video conferencing and video streaming have the potential to connect students via distance learning with hundreds of thousands of their peers around the globe.

Businesses can use the lab to explore ideas, develop and test new technologies and upgrade the skills of their workers. The lab also provides opportunities for engineers, technicians, IT consultants and other industry professionals to maintain their licensure through seminars and networking training programs.

Dr. Enrique Barbieri, UH professor and chair of the Department of Engineering Technology, formed a team of faculty and staff whose proposal resulted in the awarding of a \$250,000 grant used to create the facility. The funds were part of a million-dollar gift from AT&T that supports the university's commitment to education, diversity and excellence. "We wrote this proposal with the idea of creating a center of communications operations that would educate our own graduate and undergraduate students with outreach to community colleges and K-12 schools, create strong links with industry and provide research and training to create a revenue stream to sustain the lab," he said.

Locating the AT&T research lab at the University of Houston is a natural fit, Barbieri asserts. "The university really embraces technology. There are more than a dozen university centers researching different aspects of technology, such as the genome project, nano materials, biotechnology and biochemistry." Barbieri predicts the AT&T Lab will become a top-tier center supporting focused research in instructional fields and network communications, attracting additional support from industry and government agencies.

Messages from the Space Shuttle

The lab brings many advantages to the UH campus. "Our faculty and students, along with those in other departments, have access to state of the art network communications equipment," Barbieri said. "They also have the opportunity to interact with faculty and researchers in other parts of this country and around the world."

Less than a year after it opened, the lab has already reached what Barbieri calls a critical mass of faculty and staff actively seeking potential collaborative projects with companies. Much research is already underway including a project for the National Aeronautics and Space Administration (NASA) that tests intelligent sensors that can relay information on their own health to other parts of the system. For example, the space shuttle might use thousands of these sensors, Barbieri said. With the volume of information being transmitted from one place to another, an intelligent sensor is invaluable to ensuring the integrity of the data being collected.

"Sometimes a sensor could be misleading or not operating well within its parameters so its data may be faulty," he explained. Intelligent sensors tell scientists to ignore that data. "The AT&T lab provides an opportunity for the faculty to conduct related tests."

In other projects, faculty and students are analyzing routing algorithms for optical networks and conducting research into MPLS-based virtual private networks designed to help companies improve network performance while managing costs. Researchers are also using the lab to test applied technologies like wireless radio frequency identification (RFID) systems to improve supply chain efficiencies.

The lab's IP backbone provides a reliable global environment for this and other studies, Barbieri said. Researchers have access to computer workstations, servers and routers with MPLS capabilities that prioritize traffic and allow for multimedia and data usage.

Collaboration Fuels Economic Growth

Public-private research partnerships are vital to the ongoing viability of the university's technical research programs and the development of next-generation technologies. Most university budgets are stretched to the limit, Barbieri said. "Putting together such a high-tech lab requires a great deal of investment that we just don't have available to us," he said. "Whenever there is a chance for a close relationship with a company like AT&T that's known worldwide, it's a win-win situation."

"Healthy collaboration between the UH AT&T Technology Lab and people working in industry helps to increase the technology literacy of the workforce," he said. For instance, the lab helps the College of Technology as it works with the Texas Manufacturing Assistance Center to provide training and workforce development. "Technical training provides a long-term investment in a company's future and boosts the value of the employees by preparing them for the 21st century," Barbieri said.

"From a business perspective, it's very attractive because of the correlation between increasing the technological fluency of the workforce with higher paying jobs and economic growth," Barbieri said. "Anyone with a stake in improving the workforce will be attracted to the lab."

The lab has also received funding to conduct workshops for the Instrumentation, Systems and Automation Society and the university was recently awarded a grant from the U.S. Department of Commerce

to implement a technology fluency enhancement program for economic growth. "The idea is to put together a variety of resources such as the AT&T Lab to conduct outreach programs for K-12 students and teachers, and the general technology workforce" Barbieri said. The proposal brings in \$100,000 per year from the government with a \$100,000 match from industry partners.

The relationships the lab develops with vendors and government agencies are crucial. "Public institutions are receiving less and less support from the state, so we are charged with trying to develop human resources, equipment resources and lab facilities that attract the best possible students. Having such a lab is one excellent tool," he said.

A Bright Future

The lab has made great progress in its first year, Barbieri noted. Within the next year the College of Technology faculty will work to raise the lab's profile within the university community. "We plan to continue to work collaboratively with other faculty members so we can diversify and expand the kind of projects we're doing," he said.

Barbieri also hopes to make the lab an international forum. "We have such a variety of nationalities in the department, so I think we can create a portal to enable faculty to do exchanges with graduate and undergraduate students across the globe."

Additionally, he noted, the lab will reach out to the 300,000 community college students in the Houston area, many of whom are interested in careers in technology. "We want to create from collaborative efforts with these students and faculty," he said.

In the next five years the university expects the UH AT&T Technology Lab will be widely recognized for the quality of its network communications program. "This will enable us to not only attract top students, but to retain our faculty so they continue to contribute to the University of Houston.

"In the future, with additional support from industry and from agencies like the National Science Foundation and NASA, we are going to position the lab to be part of that upper level group of centers that coordinate research and teaching," Barbieri said. "I think the university is quite happy with our progress. There is a bright future for the lab."

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