Reinvent-ing the campus

with AT&T 5G

Fore-word

5G has the opportunity to completely revolutionize education and we are seeing exciting implementations and ideation on campuses across the country. On the pages that follow, learn how leading colleges and universities are creating 5G environments, testbeds, and courses for students to learn this transformative technology and innovate in ways to change the world. These testbeds are being set up to test new approaches to any number of use cases as well as those that have yet to be imagined.

Education institutions have the opportunity to create an ecosystem of innovation that will foster advanced research, technology development, product & application testing, and hands-on career training. This transformation will include the development of world-class research centers focused on areas of exploration such as cyber-physical systems and robotics, advanced material sciences, autonomous transportation systems and vehicles, chemical process safety, and industrial distribution innovations to name only a few.

This research will have the ability to positively impact our safety on the road and the ability to improve agriculture to help farmers determine when and how to fertilize, plant, and harvest. And the opportunities for public safety are extraordinary when you think about simulating any natural or man-made disaster for the purposes of proactively training for a future response. The possibilities are endless.

We hope you enjoy these stories and they spark your imagination!

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University of Tennessee, Knoxville

AT&T Brings 5G to the UT Campus to Power Research and Education

Vision includes 5G-powered innovations to help close the digital divide, reinvent training, and help the military to 'see through' walls.

What's the news?

The University of Tennessee, Knoxville (UT) and AT&T are working together to accelerate research and develop innovative new capabilities powered by AT&T 5G using millimeter wave spectrum (5G+) and Multi-Access Edge Computing (MEC) technology on the UT campus. The AT&T 5G+ network is expected to enable the university to help make an impact on society beyond conventional engineering through potential uses in several industries including defense, public safety, healthcare, education, entertainment, and banking.

UT is the hub of a vibrant research community that includes Oak Ridge National Laboratory, The University of Tennessee Research Park at Cherokee Farm, and other University of Tennessee System campuses and institutes. The addition of AT&T 5G+ technology can enhance its research capabilities and create opportunities to help solve issues that impact the university, the region, and the world.

As part of these enhancements, an expert faculty group from multiple departments in UT's Tickle College of Engineering has been created to collaborate on research and teaching, seek funding, and establish partnerships with industry leaders and the UT community.

What are people saying?

"We are excited to bring the expertise and talent of our faculty together with the capabilities of an industry leader like AT&T to solve real world problems. Our collaboration will not only provide a better network on our campus for students, faculty, and staff, but it will also create opportunities for innovation and collaboration that could change the lives of Tennesseans."

Dr. Donde Plowman—*Chancellor, University of Tennessee, Knoxville*

"The technology behind next generation broadband systems, 5G and beyond, is expected to impact society perhaps even more than the internet. Customized and smart systems will be at our fingertips connecting all devices surrounding us, and instantly processing and optimizing information touching everything we do as an individual, community, society, and more. This collaboration with AT&T provides our research and education community at UT a platform to collaborate across disciplines to address societal needs and improve quality of life at all fronts."

Dr. Ozlem Kilic—*Associate Dean for Academic and Student Affairs, Tickle College of Engineering, University of Tennessee, Knoxville*

"The new 5G+ testbed will lead to a smarter campus and enable massive machine-type communications that place UT research in the forefront of the automation and digitization implementation. The new resources will also complement the newly established NSF Industry University Collaborative Research Center for High Frequency Electronics and Circuits for Communication Systems. Furthermore, UT's ongoing defense research at the Tickle College of Engineering's ultra-wideband lab will greatly benefit from the 5G technology's faster unprecedented connectivity, ultra-notable reliability and security, superfast broadband with lower latency and network slicing to provide almost real time data analysis and visualization. Multitude of innovation opportunities and training for our future generation of engineers and entrepreneurs will be realized."

Dr. Aly Fathy—*Professor, Min H. Kao Department of Electrical Engineering and Computer Science, University of Tennessee, Knoxville*

"Access to ultra-fast 5G technology is critical to Tennessee's economic future and for business and Tennesseans alike. This work with AT&T and the University of Tennessee is another step in setting the groundwork for future capabilities that will help unlock new economic development opportunities for Tennessee."

Randy McNally—*Lieutenant Governor, Tennessee*

"Bringing AT&T 5G to the University of Tennessee's already robust research community opens the door for exploring new possibilities, developing innovative solutions to real-world problems and furthering ambitions to make a positive and productive impact on society. The possibilities are wide open with 5G and we look forward to delivering the capabilities that will power the innovative solutions and applications that the students, faculty, and other researchers develop."

Jason Porter—*President, AT&T Public Sector and FirstNet*

"The men and women of AT&T Tennessee are turning billions of dollars of investments into high-speed connections for businesses and residents across the state, and with this announcement, the staff and students at the University of Tennessee will have access to technology capable of unforeseen innovation. This investment is possible thanks to the positive, pro-investment policies pursued by Tennessee's legislative leadership who created a regulatory environment welcoming of next generation networks."

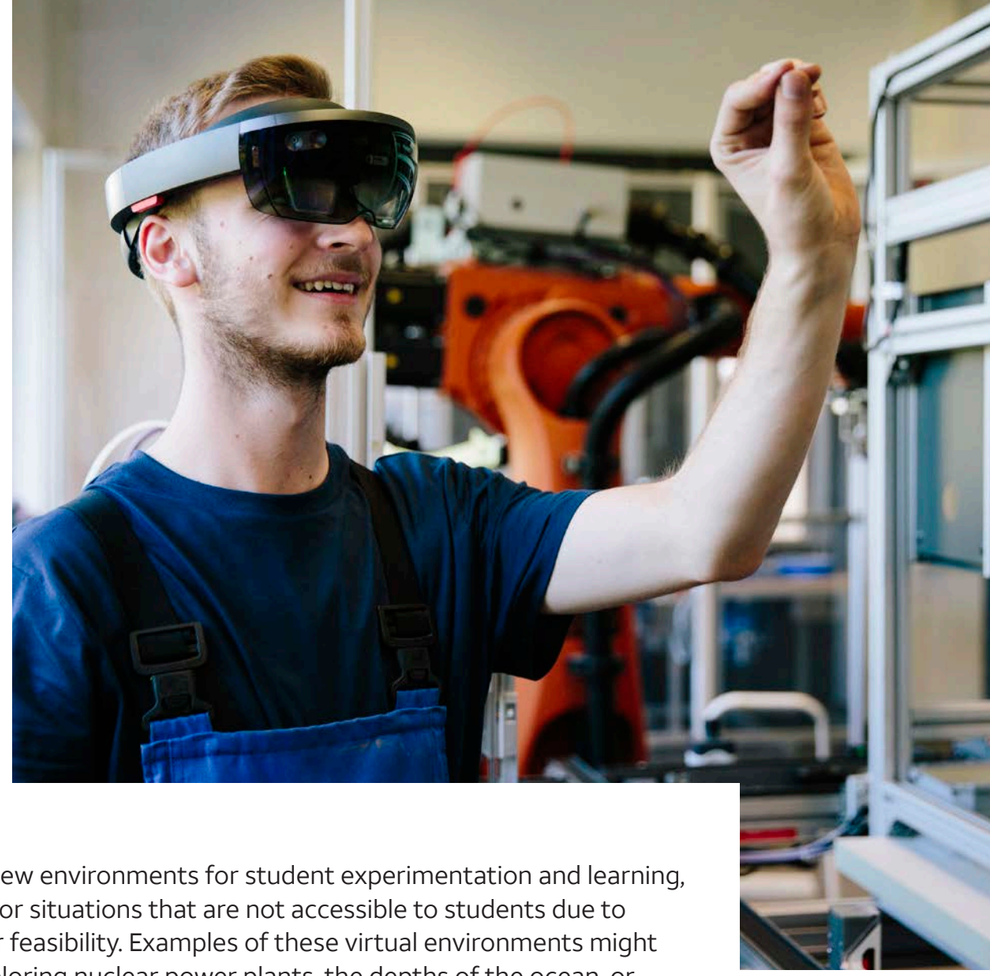
Joelle Phillips—*President, AT&T Tennessee*

Why is this important?

AT&T 5G+ and MEC will provide a high-speed private network on campus that can bring ultra-low latency, ultra-high speeds and better capacity. Combined 5G and edge technology can support unprecedented digital learning, research, and development opportunities for faculty, students, administration, and other researchers. Planned use cases at the UT campus powered by AT&T 5G+ and MEC include:

- **Bringing 5G to rural areas—** Mobile 5G networks can provide reliable high speed, low latency, and high capacity connectivity to rural areas and help improve the quality of life and equity within those communities, including access to telehealth, education, local economies and job creation. 5G technology can render itself to portable platforms enabling on the move type of services for gap measures to address the digital divide. Furthermore, the use of 5G+ sensing technology renders itself to agricultural applications such as supporting precision agriculture technologies by allowing for real-time monitoring of the soil and crop health.

- **Expanding academic and training offers for students—** AT&T's 5G+ with MEC is expected to enable immersive learning experiences such as augmented reality (AR) and virtual reality (VR) to render new environments for student experimentation and learning, especially for situations that are not accessible to students due to cost, risk or feasibility. Examples of these virtual environments might include exploring nuclear power plants, the depths of the ocean, or experiencing a rocket launch. Furthermore, near real-time capabilities enables the combination of artificial intelligence (AI) and machine learning (ML) technology to gather and analyze large amounts of data using student's biometric signatures to evaluate student performance and the amount of time they're engaged in course material to personalize learning experiences.



- **Millimeter wave radars to see through physical barriers—**the military will explore the use of millimeter wave radars to help warfighters to "see through" physical barriers such as walls. This solution would include a portable communications system that captures and shares images through a wall, allowing soldiers with connected devices to exchange this information with each other in near real-time to help protect and defend against potential threats. The new 5G testbeds will facilitate testing, refining, and validating the low latency connectivity vital to these experiments.

2

Texas A&M University

AT&T and Texas A&M to Launch Private 5G Test Beds

Public and private sector participants expected to explore 5G-powered autonomous vehicles, robotics, advanced manufacturing, smart grids, and other uses.

AT&T and The Texas A&M University System's RELLIS Campus will open private 5G testbeds to public and private sector organizations to develop and innovate with 5G powered applications and solutions.

The addition of AT&T's 5G network, with its combination of lower latency, massive connectivity, and fast speeds, is expected to power a wide range of innovations benefiting defense, commercial enterprises, and society at large. Commercial customers will have a chance to access the testbeds to explore autonomous and connected vehicles, robotics, roadside safety, and physical security, large-scale infrastructure, autonomous agriculture, Internet of Things, and smart cities/campuses among many other predicted use cases.

"This new 5G testbed will be one of the most advanced university based 5G testbeds in the country. Bringing together the private and public sectors, the RELLIS 5G testbeds can test 5G technologies at scale utilizing both on-road and off-road terrains through 5G mmWave and Sub-6 frequencies," said Brad Hoover, Chief Information Officer for The RELLIS Campus. "These testbeds are being set up to test new approaches to augmented and virtual reality, autonomous vehicles, or any number of use cases as well as those that have yet to be imagined."

With the addition of 5G, the RELLIS Campus will be home to one of the large-scale testing and evaluation sites for five of the Department of Defense's 11 modernization priorities: hypersonics, artificial intelligence, autonomy, cyber security, and directed energy.

Texas A&M System state agencies—Texas A&M Engineering Experiment Station (TEES), Texas A&M Transportation Institute (TTI), Texas Division of Emergency Management (TDEM), and Texas A&M Engineering Extension Service (TEEX) will be the first organizations to use the testbeds. Funding for 5G capability to equip an Innovation Proving Ground (IPG) as part of the Bush Combat Development Complex (BCDC) was appropriated to TEES by the 2019 Texas Legislature. Some of the planned use-cases include:

- **Autonomous Vehicles and Roadside Safety—**Research in this area will have direct impacts in a variety of fields, including ground and aviation transportation. Researchers will test the use of smart intersection grids that allow sensors and human factors for decision-making on the road; precision navigation so a vehicle knows its surroundings for safe operations; and precision agriculture to help farmers determine when and how to fertilize, plant, and harvest.

- **Augmented Reality (AR) and Virtual Reality (VR)—** Researchers will focus on the military and manufacturing fields. Within military training environments, AR/VR is expected to be used to deliver timely and efficient information to soldiers in real-time environments and in training areas. In manufacturing, researchers will explore how a machine works with AR for efficient learning and problem diagnosing.

- **Robotics—**Robotic applications continue to grow in the consumer, manufacturing, and healthcare industries. Use cases will focus on how robots function in daily life with physical barriers, such as doors and stairs, and in human interactions. Within healthcare, researchers will examine how to improve access to quality healthcare and surgery in rural areas or other countries.

> "The 5G testbeds at RELLIS are yet another opportunity for our customers to explore the potential that AT&T 5G can bring to help revolutionize the future of multiple industries."
>
> **Jason Porter**—*President of AT&T Public Sector and FirstNet*

Within the 5G testbeds, Texas A&M will also conduct proactive and reactive cybersecurity testing to identify vulnerabilities and to help secure and protect data against outside threats.

"Because RELLIS will soon have 5G capabilities that cover such a large portion of this campus, RELLIS can provide opportunities to complete testing and evaluation across all of those domains in a protected environment," said Kelly Templin, Director of the RELLIS Campus. "For a company looking to become a research partner, RELLIS is very much the gateway to all of this and everything else the Texas A&M System has to offer."

The RELLIS Campus is 2,000-plus acres that is home to several Texas A&M System research facilities, a testing and evaluation site for the George H. W. Bush Combat Development Complex, as well as facilities for everything from workforce training to four-year university degrees.

"The 5G testbeds at RELLIS are yet another opportunity for our customers to explore the potential that AT&T 5G can bring to help revolutionize the future of multiple industries," said Jason Porter, President of AT&T Public Sector and FirstNet. "Their capabilities to bring to life innovative 5G solutions and applications are transformative. We expect AT&T 5G—one of the outcomes of our investment of more than $110 billion in our wireless and wireline networks from 2016 to 2020—will help power the future of defense, government, commercial industry and society."

What are people saying?

"5G is a real game-changer. Access to ultra-fast wireless speeds is critical to our economic future for business and residents of our state. The work with AT&T is another step in setting the groundwork for future capabilities that will help unlock new economic development opportunities for Connecticut and UConn Stamford."

Ned Lamont—*Connecticut Governor*

"Our collaboration with AT&T helps make the University and the state stronger and enhances our focus on entrepreneurship, innovation and business partnership. We are honored to work with AT&T to explore the future of 5G and MEC-powered innovations."

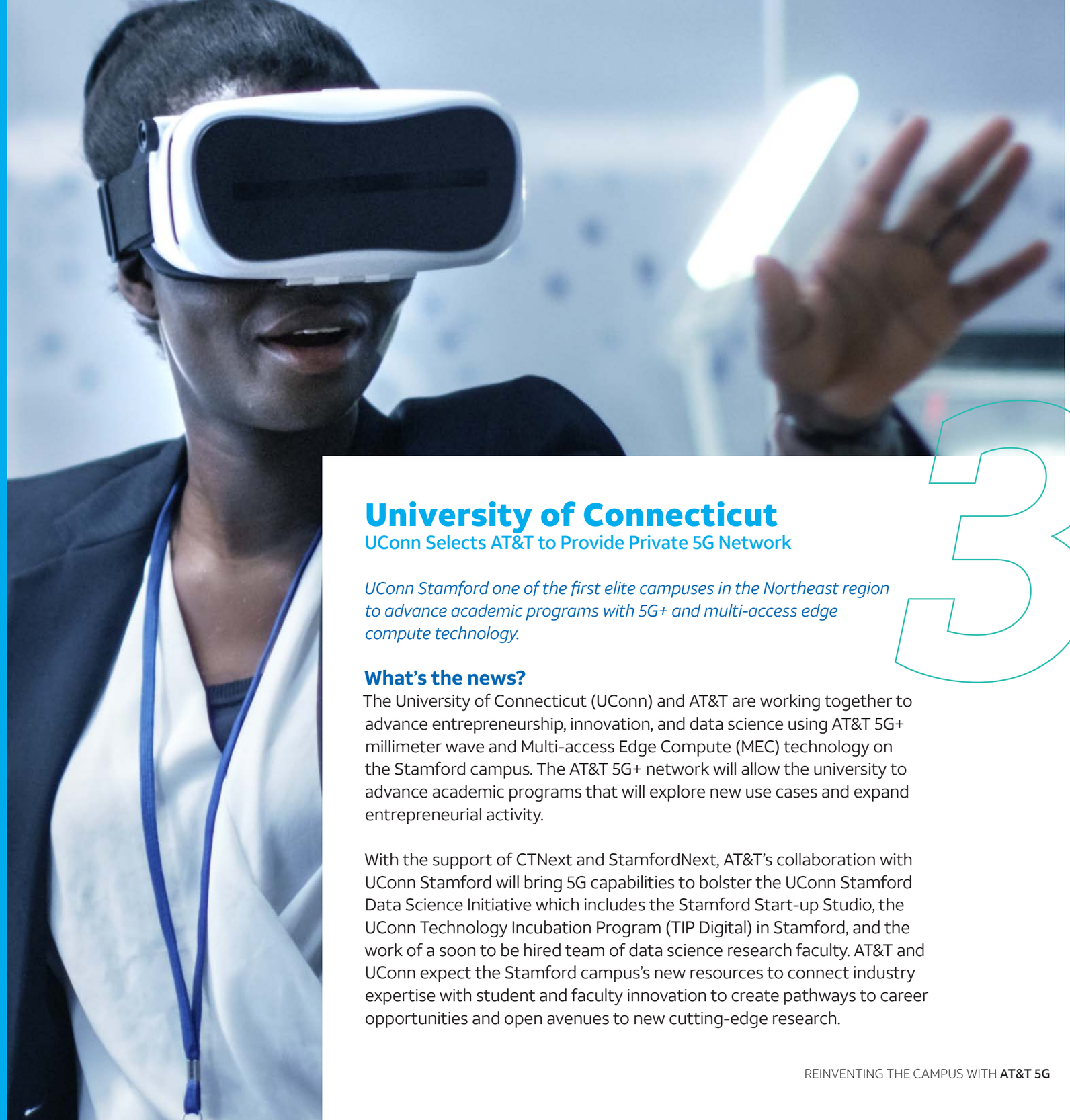
Thomas Katsouleas—*President, University of Connecticut*

"5G opens the door to new business models, products, services, and solutions. The widespread adoption of 5G technology can transform the business world across all sectors and bring exponential benefits. Leading universities like UConn Stamford are utilizing 5G to empower students and faculty to innovate and make learning come alive in the most extraordinary ways. There's no better place for 5G to be explored than on college campuses with our next generation of leaders."

Anne Chow—*CEO, AT&T Business*

"With UConn-Stamford and AT&T 5G together, the possibilities are as exciting as they are limitless. In UConn's hands, ultra-fast, reliable connectivity will open doors of opportunity for students, businesses, and the community, enabling innovation in countless areas. We are grateful to the entire team at UConn Stamford for their collaboration. And we applaud Governor Lamont for taking his vision for a modern, connected, and cutting-edge Connecticut and making it a reality."

John Emra—*President, AT&T New England Region*



University of Connecticut

UConn Selects AT&T to Provide Private 5G Network

UConn Stamford one of the first elite campuses in the Northeast region to advance academic programs with 5G+ and multi-access edge compute technology.

What's the news?

The University of Connecticut (UConn) and AT&T are working together to advance entrepreneurship, innovation, and data science using AT&T 5G+ millimeter wave and Multi-access Edge Compute (MEC) technology on the Stamford campus. The AT&T 5G+ network will allow the university to advance academic programs that will explore new use cases and expand entrepreneurial activity.

With the support of CTNext and StamfordNext, AT&T's collaboration with UConn Stamford will bring 5G capabilities to bolster the UConn Stamford Data Science Initiative which includes the Stamford Start-up Studio, the UConn Technology Incubation Program (TIP Digital) in Stamford, and the work of a soon to be hired team of data science research faculty. AT&T and UConn expect the Stamford campus's new resources to connect industry expertise with student and faculty innovation to create pathways to career opportunities and open avenues to new cutting-edge research.

Why is this important?

AT&T 5G infrastructure will provide wireless high-speed connectivity at UConn Stamford. MEC computing is essentially a cellular network architecture that when used with 5G+ allows near real-time, ultra high-bandwidth, and ultra-low latency access to latency dependent mobile applications. 5G and MEC will help connect students, faculty, and university partners via a private network. In other words, the technology will enable UConn Stamford to deliver advanced experiences and outcomes to students, faculty, and research communities without data having to travel to remote data centers.

The addition of AT&T's 5G+ mmWave service will enhance UConn Stamford's ability to serve the state, region, and university by strengthening and expanding Connecticut's innovation ecosystem. Academic programs and student life should also benefit, while the socio-economic impact of this development stands to tangibly benefit University partners and stakeholders.

AT&T and UConn expect the new 5G lab to support a broad array of technology tools and innovations that can help the university expand its work in entrepreneurship and data science. UConn use cases powered by AT&T 5G+ will include:

- **Entrepreneurship & Innovation Co-op—**The program will help budding entrepreneurs learn how to build early stage products and technology for the real estate and construction industries. The 5G infrastructure will help student entrepreneurs unleash innovation and transform business operations. The program also supports women and minority-owned business innovators by connecting and building a network of relationships within the university and across the state.

- **Data Science Tech Incubator—**5G will help TIP Digital startups to monitor and analyze data fast and more efficiently. Use cases include real-time analysis of patient data so that care can be administered sooner as well as improved monitoring of severe weather so that utility companies can respond faster to power outages. Having access to 5G technology helps enable TIP Digital companies to innovate faster and attract top talent to the area.

- **Data Science Faculty Fellows—**The program will use 5G for analytics and data visualization research across engineering, liberal arts, fine arts, and business. These data science faculty fellows will work to produce cutting-edge research in collaboration with industry partners, with the potential for commercialization.

The initiative complements UConn's commitment to Stamford and the business community. When the lab opens, UConn anticipates working with regional companies to expand student experiences and opportunities.

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University of Missouri

MU and AT&T Collaboration Brings 5G Technology to Campus

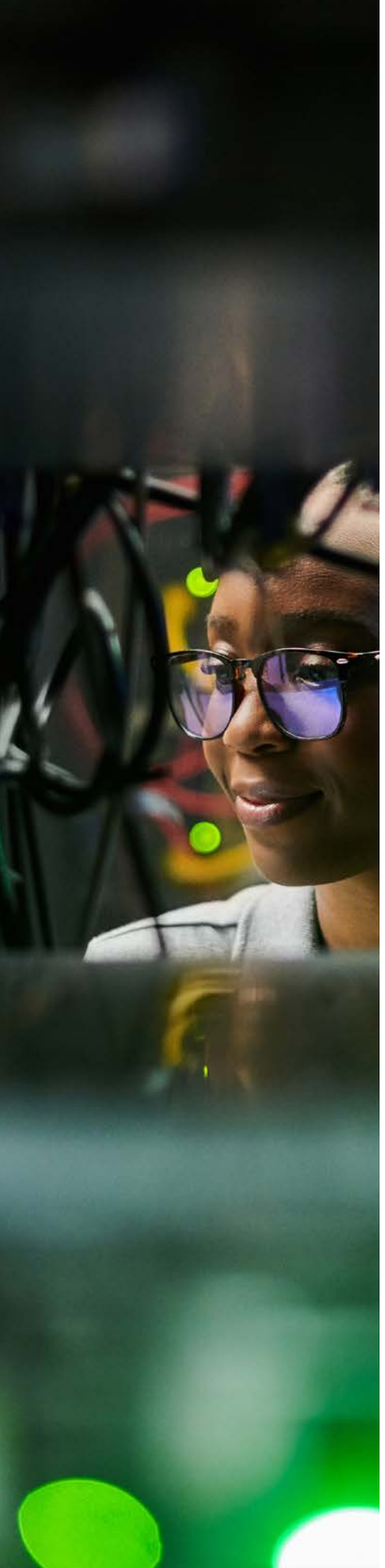
The new emerging technologies lab will help students, faculty, and industry partners develop powerful solutions that can change the world.

The University of Missouri and AT&T are collaborating on an innovation lab in Cornell Hall that will bring full 5G+ millimeter wave capability to MU's campus. The research and teaching space will feature the bandwidth and the capacity for students and faculty to be on the forefront of innovation.

"5G is not just for phones," said J. Scott Christianson, an associate teaching professor in the Trulaske College of Business. "Drones and autonomous vehicles need data connectivity, and 5G provides wireless speeds that help move computing power to the edge of the network."

Christianson added that 5G opens opportunities to explore new use cases that could create value and transform experiences for consumers, enterprises and society."

Ajay Vinzé, dean of the Trulaske College of Business, said he was enthused with the potential this lab presents and expects it to contribute to future discoveries and an innovative set of hands-on learning opportunities at Mizzou. "5G is not the answer, it's a catalyst," he said. "It will be an enabler for innovation in both the delivery and consumption of higher education."



A powerful team

The lab is part of an ongoing collaboration between Mizzou and AT&T to share technology and help craft the future of 5G-enabled devices and applications. The relationship has already generated an interdisciplinary course on 5G innovation called "Connectivity and 5G." That course, taught in spring 2020, brought students and faculty from five different colleges together with AT&T representatives. Using in-depth research and access to AT&T resources, including a visit to AT&T headquarters in Dallas, students created proposals for 5G-powered solutions in fields such as health care and campus security.

Future interdisciplinary opportunities will use the lab's powerful resources to connect industry expertise with Tiger innovation. One course in development will explore the potential of creating kiosks around Mizzou's campus that use immersive technologies to reduce anxiety and improve mental health. The idea for the kiosks originated in past student proposals to AT&T.

"The innovation catalyzed by the intersection of education and technology is what makes our future so bright," said Anne Chow, CEO, AT&T Business. "We saw with the 5G course, students were able to create new solutions around healthcare and campus security. Bringing 5G to Mizzou's emerging technology lab and campus will further enable students to explore new experiences, solve complex problems and create new ideas to change the world."

Bimal Balakrishnan, associate professor of architectural studies in the College of Human Environmental Sciences, and a lead contributor to the spring course, said, "With this new lab on campus, ideas can quickly transfer from experimentation to implementation. It opens a lot of doors for students to go beyond state of the art and it pushes us into emerging technology well ahead of many other schools."

A wide variety of potential 5G applications are already being explored by MU students and faculty, including how they could transform telemedicine by enabling remote surgeries and how reporters could use augmented reality to create immersive journalism.

"Bringing 5G to Mizzou's emerging technology lab and campus will further enable students to explore new experiences, solve complex problems and create new ideas to change the world."

Anne Chow—*CEO, AT&T Business*

"The University of Missouri is a vibrant academic community with a strong focus on leadership and real-world skills. It is of one of only six public universities in the country with schools or colleges of medicine, veterinary medicine, agriculture, arts and science, law, and a powerful research reactor—all on one campus," said Alyson Woodard, vice president and general manager for AT&T. "Our collaboration is all about taking innovation across different disciplines and creating solutions that can be used in the real world. We are excited about the opportunities that 5G will create to increase the pace and capacity for innovation at the university."

Looking ahead, changing the world

The lab is the latest initiative from the University of Missouri Institute for Experiential Education, Innovation and Entrepreneurship. The institute unites members of schools and colleges from across Mizzou to facilitate collaboration, knowledge sharing and entrepreneurship—all with the larger goal of creating innovations that contribute to student success and address the challenges facing Missouri and communities around the world.

Jim Flink, associate professor of strategic communication in the Missouri School of Journalism and a leader in this effort, said that the institute is founded on a principle of interdisciplinary collaboration. "If you look at what the economy wants, you need both depth of knowledge in a discipline and the ability to cross-connect dots with other disciplines," he said.

Vinzé summarized: "Mizzou's unique position as a comprehensive university with 13 schools and colleges makes it an attractive partner for AT&T. Working with an industry leader like AT&T opens up a world of possibilities for our students and the institute."

5

University of Missouri

AT&T and University of Missouri Deliver 5G Course to Students

5G course explores campus use cases and interdisciplinary learning.

AT&T and the University of Missouri launched "Connectivity and 5G," a new immersive 5G course that will explore the impact of advanced wireless technology on campus environments. Students will earn course credit for projects that could inform new use cases and user experiences in industries like education, healthcare, public safety, sports, entertainment, and more.

The course opens new opportunities for technology to enhance higher education. Four teams of students will focus on solving complex problems facing the student body, alumni, campus administration, employees, and visitors using 5G and edge computing.

"The University of Missouri is consistently finding new ways to integrate technology into our teaching and scholarship as we tackle grand challenges and enhance the exceptional, hands-on education our students come here for," MU Chancellor Alexander N. Cartwright said. "This partnership is a tremendous example of that commitment. By aligning our university with a world-class industry leader, we can innovate higher education while discovering more solutions to rural health care, broadband accessibility and so much more."

The curriculum uses an interdisciplinary approach with students and instructors from a variety of fields of study including arts & sciences, business, engineering, journalism and education. The combined strengths of each academic discipline are meant to inspire innovation and creative problem solving. The students also have access to AT&T mentors, who will provide support and input as the semester progresses.

"5G is increasing the possibilities of technology and will expand business opportunities across industries," said Mo Katibeh, executive vice president and chief marketing officer, AT&T Business. "Our work with universities is helping create new visionary approaches to innovation and problem solving that will pave the way for the future."

The course began in January and will run through the spring 2020 semester. The semester's final project will end with a competition among the four teams. Each team will present their research findings to Mizzou faculty and AT&T mentors. The winning team will receive a cash award.

"Our collaboration with Mizzou demonstrates the strength of university-industry relationships," said Kevin Petersen, senior vice president, AT&T Wireless. "Universities offer an enormous knowledge foundation for next generation solutions to develop. And, when business and academia team up, it can help enhance the process and translate discovery to commercial success."

Some of the world's greatest innovations come to life on college campuses. 5G, the next generation of wireless technology, will revolutionize the way people, devices, and experiences are connected. AT&T brings together the power of our network—our employees, our technology and organizations—to collaborate with universities to enable a future where vision and discoveries collide.

Purdue University

Indiana 5G Zone Opens 5G Research and Commercialization Lab

AT&T 5G and multi-access edge technologies used for new innovations in manufacturing, agriculture, and public safety.

AT&T teamed with Purdue College of Engineering to create one of the first 5G research and development testbeds in the U.S. The lab opened with a virtual event and its first 5G demonstration.

Researchers will conduct a cybersecurity-focused demo over 5G millimeter wave (mmWave) using quantum cryptography, which takes the quantum properties of photons rather than computer code to provide a highly secure method for sending information. The demo is expected to show how communications can be encoded and securely sent across commercial networks. These solutions can be used by financial institutions, law firms, government agencies, and others.

The testbed, located in the Indiana 5G Zone, is home to AT&T's 5G mmWave and multi-access edge computing (MEC) technologies. The MEC combined with 5G will power near real-time data collection and analysis to advance state-of-the-art technology development.

The Indiana 5G Zone will drive innovation through projects with a commercial focus. The lab is expected to attract a diverse group of entrepreneurs across a broad range of technology companies, universities, and government and other research facilities to develop 5G use cases outside of smartphones. AT&T will continue its collaboration to help develop and launch new applications to advance 5G networks.

"We are proud to collaborate with Purdue College of Engineering and Indiana 5G Zone. Some of the world's greatest innovations come through collaborations with world class universities," said Bill Soards, president, AT&T Indiana. "5G is revolutionizing the way in which we interact with our physical environment, by connecting people, devices, and experiences."

AT&T brings together the power of our network—our employees, our technology and organizations—to collaborate with universities and industry to enable a future where vision and discoveries collide.

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Purdue University

Purdue's College of Engineering Conducting Research with AT&T 5G

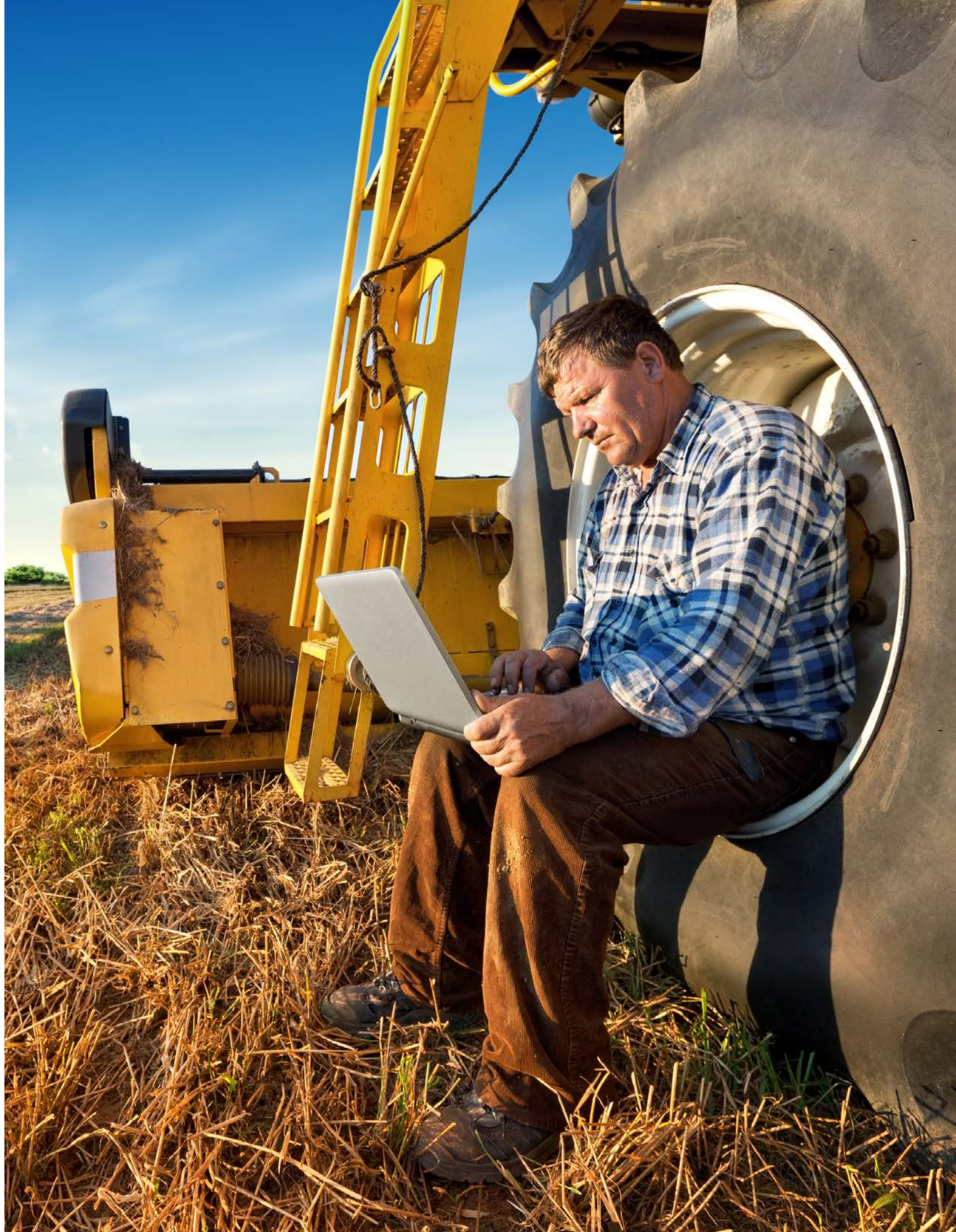
Research centered on advanced manufacturing, smart cities, agricultural technology, and rural broadband

Purdue University's College of Engineering is working with AT&T to create a test bed for 5G-based research and development at its Purdue Research Lab. Located in the newly launched Indiana 5G Zone, the lab will use AT&T's 5G+ millimeter wave (5G+) and commercially available Multi-access Edge Computing (MEC) technologies to help solve societal challenges like disaster recovery in rural, agricultural areas and explore new use cases for where business and community intersect—like smart cities.

"Purdue Engineering is very excited to work with the public-private ecosystem in Indianapolis on the Indy 5G Zone. Indy is speedy! This is a unique, open environment in the nation where innovators using 5G for consumer and industrial applications can test out their ideas," said Dr. Mung Chiang, dean of the College of Engineering, Purdue University. "As a researcher in wireless networks and, for the past decade, in edge computing, I am also delighted to see the collaboration with AT&T to advance research in edge technologies as part of the Zone."

Build-out for the Purdue Research Lab is expected to be complete as early as Spring 2020. Once complete, the Lab will accelerate academic research already underway. Areas of focus include 5G's potential in advanced manufacturing, smart cities and IoT, and rural broadband and agricultural technology for disaster response.

External collaborators—like businesses and outside researchers—will be invited in to help further exploration and build new applications or products that could help move forward technology in these areas. AT&T's MEC technology combined with 5G+ will power near real-time data collection and analysis to better support this innovative work. The technology is also more scalable and flexible, which is critical for today's businesses.



> “Bringing 5G and edge computing into a university lab creates an ideal environment for innovation.”
>
> **Chris Penrose**—*Senior Vice President, Advanced Mobility and Enterprise Solutions, AT&T Business*

“Bringing 5G and edge computing into a university lab creates an ideal environment for innovation,” said Chris Penrose, senior vice president, Advanced Mobility and Enterprise Solutions, AT&T Business. “These technologies have the potential to solve real problems and make meaningful impacts to the world around us. We look forward to seeing the exciting new ideas that emerge from Purdue’s early adoption and leadership in this space.”

The Indiana 5G Zone is located inside the new downtown Indianapolis headquarters of the nonprofit Eleven Fifty Academy. The space serves as a 5G hub to attract businesses, universities, government and research institutions with lab space to develop next-generation 5G-enabled technology advancements.

“Indianapolis has become a leading city for technology, innovation and 5G deployment. AT&T launched our mobile 5G network in the Greater Indianapolis market offering a powerful, consistent, and highly secure 5G experience to consumers and businesses,” said Bill Soards, president, AT&T Indiana. “With both state and local leaders leaning into the digital economy, Indiana is demonstrating its leadership in attracting investments that power our tech ecosystem and create economic growth.”

Some of the world’s greatest innovations come to life on college campuses. 5G, the next generation of wireless technology, will revolutionize the way people, devices, and experiences are connected. AT&T brings together the power of our network—our employees, our technology and organizations—to collaborate with universities to enable a future where vision and discoveries collide.

8

University of Miami

University of Miami 5G

The University of Miami will be the first college campus in the United States to adopt AT&T's 5G+ and Multi-access Edge Compute technology, powering its Magicverse to unlock new scholarly pursuits.

The University of Miami and AT&T are rolling out a 5G and Multi-access Edge Computing (MEC) environment on the Coral Gables campus to help support innovative teaching and research methods. This makes the University the first college campus in the nation to adopt AT&T's 5G using millimeter wave ("5G+") and commercially available MEC technology, allowing students and faculty to more efficiently pursue scholarly activities through Magic Leap's spatial computing platform.

"In collaboration with AT&T, the University of Miami will soon be able to support 5G+ and Edge technology on its Coral Gables campus, placing the University at the forefront of digital transformation impacting every field," said Ernie Fernandez, vice president of Information Technology and chief information officer for the University. "It will allow students, faculty, and staff to develop, test, and use the next generation of digital apps, including Magic Leap's mixed reality platform, in new and exciting ways."

AT&T's 5G+ technology uses millimeter wave spectrum, providing ultra-fast speeds, lower latency and the ability to connect a massive number of mobile devices. Multi-access Edge Computing will let the University shift from using remote data centers to processing information in localized servers. This transition leads to faster access to data processing and could mean new machine learning opportunities and more types of connected devices.

"Combining 5G and edge technology at the University of Miami powers a new category of educational experiences that we haven't seen before. Then when paired with Magic Leap, we can ultimately provide unprecedented digital learning and development opportunities," said Anne Chow, CEO, AT&T Business. "These powerful next-generation networking solutions will help change how students learn, research and interact with the world around them. And, it will impact the way administrators conduct everything from campus operations to the safety of students."

AT&T will begin rolling out AT&T 5G+ service and AT&T MEC at the University of Miami before the end of this year and is expected to be completed by Spring 2020. Access to the 5G+ network will initially be in high-traffic computing locations, such as at the College of Engineering, the Otto G. Richter Library and in the School of Architecture, with plans to add more 5G+ zones throughout campus.

"The computing power of your handheld device will increase tremendously by allowing really complicated applications and analyses to be performed at the edge and answers or solutions returned to your device as part of the 5G+ and Edge environment. The beautiful part also is the extension beyond to the arts and humanities. We are proud to be the pioneering University in this new arena," Jeffrey Duerk, executive vice president of academic affairs and provost, added.

The 5G+ and edge compute technologies will power the University's Magicverse, a spatial computing platform from Magic Leap that blends virtual content with the physical environment. People can see and interact with virtual objects in the authentic space around them while wearing Magic Leap One headsets.

Last fall, Magic Leap and the University invited faculty and students to experience the Magicverse, generating ideas for using spatial computing technology across academic disciplines. Since then, more than 30 applications that use the Magic Leap technology have been developed on the University's campuses.

"Magic Leap and the University of Miami are committed to implementing the Magicverse. Realizing this requires a level of data infrastructure that supports the highest fidelity digital experiences with ultra-low latency," said Omar Khan, chief product officer, Magic Leap. "Our collaborators at AT&T have always seen the potential of the Magicverse, and their 5G+ infrastructure is a crucial component to the success of this project on the University's campus."

AT&T 5G

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