Industry Brief

The Roadmap to Becoming an AI University

Image courtesy of University of Florida

Amplifying AI Across Higher Education and Beyond

From creating the metaverse to predicting climate change, accelerating drug discovery, and deploying autonomous machines, AI has begun to permeate products and processes in every industry. It's supporting our daily routines and is integral to building solutions for society-level challenges.

It's become a priority for nations that want to remain competitive. Many have launched national initiatives that prioritize developing an AI-skilled workforce and are making investments in training and tools, such as computational platforms, that support their initiatives.

Fifty-six percent of recent McKinsey survey respondents reported that their organization had adopted AI applications for at least one function. Per Deloitte, **94 percent of business leaders** believe that AI will be critical to success over the next five years.

To prepare the next generation of workers for the future, universities across the globe are building AI into their curriculums, investing in computing infrastructure, and supporting research initiatives, not just in traditional STEM fields, but also in the arts, social sciences, and nearly every other domain on campus.

Drawing on NVIDIA's experience and partnerships with more than 1,500 universities, this report shares how to develop an AI-focused curriculum, support research programs to attract top talent and funding, and accelerate your path to becoming an AI university.

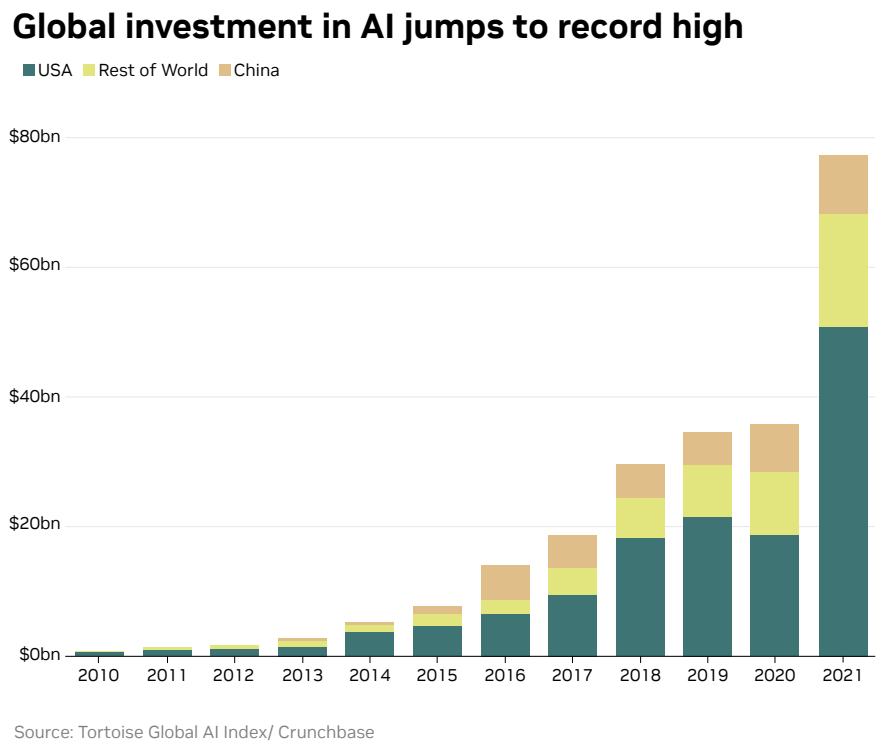


Figure 1. The U.S. and China are global leaders in AI investment, followed by the U.K., Canada, and Israel. The massive growth in AI investment indicates an economy shifting to AI tasks and innovation, which will require an AI-savvy workforce.

A Challenging Environment

A global tech talent shortage is projected to reach **85 million people** by 2030, leaving roles unfilled and research projects understaffed. This trickles down to the education sector, where demand for skilled AI and data science academics is already outstripping supply. With this demand for tech talent across industries, many would-be university professors and researchers are choosing lucrative job offers outside of academia, adding to the challenges universities are already facing as they try to accelerate new and enhanced curriculums.

Higher education institutes are struggling with employee retention and student enrollment. In large part due to the COVID-19 pandemic, U.S. colleges and universities lost 650,000 jobs in 2020. Meanwhile, U.S. undergraduate **enrollment is down 6.5 percent** since Q3 2019, leaving many universities with budget shortfalls. Even more concerning, research suggests many Americans are questioning the value of a college degree altogether.

As K–12 curriculums introduce basic AI literacy lessons and software programming skills, universities are falling behind, ill-equipped to continue AI education at the level students expect.

There's a growing skill gap. Only six in 10 employers believe that new graduates possess the knowledge and skills necessary to succeed in entry-level positions.

According to an **American Association of Colleges and Universities (AACU) survey**, employers report preparedness gaps in the following areas:

- Critical thinking skills
- Data analysis and interpretation
- Complex problem solving
- The ability to apply skills in the real world

While the environment is certainly challenging, education institutions can use the circumstances as motivation to accelerate AI strategies and plans—creating new prestige and recognition as forward-looking institutions.

By enhancing curriculum, enabling research with the tools needed to attract the most funding, and even modernizing administrative tasks with chatbots or technologies to support student success, colleges and universities can position themselves to attract and retain faculty and researchers, combat downward enrollment trends, and equip their students for future jobs.

Strategic AI Implementation

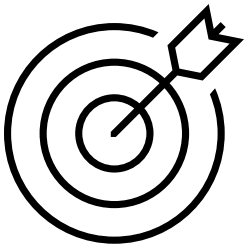
When developing and implementing a serious plan around AI, it should reflect the goals that align with your university's mission. Examples include providing every student with AI literacy, expanding the availability of more advanced AI instruction and qualifications, and investing in AI-powered innovation and research to attract funding and collaboration from outside of the university.

NVIDIA has experience helping universities elevate their educational and research offerings through hands-on technology courses and workshops paired with accelerated computing infrastructure.

Drawing from learnings with our partner universities, in the next section we present five key strategies any institution can apply to its own journey toward AI-centric education.

Five Key Strategies to Get Started

1. Articulate Realistic Goals and Priorities



Setting specific goals tied to the university's mission and strengths helps to contextualize the AI effort and provide a target for progress. Goals should be designed to distribute benefits across disciplines and stakeholders, including colleges, deans, and partner universities.

As your institution maps out its AI ambitions, consider these goals other universities have used to guide their path to AI education:

- Ensure AI tools, including access to computing resources, are available to every college for use in their unique curriculum.
- Launch a core credit for AI literacy across the university.
- Design programs and training opportunities to engage the local community that may include community or technical colleges, alumni, and K-12 programs.
- Improve university rankings (e.g., the Carnegie Classification system, Niche's Top Public Universities)

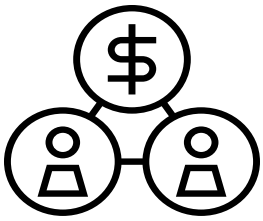
Just as resources and benefits should be shared, accountability for driving AI adoption should extend to the collective university leadership.

A Success Story

The University of Florida (UF) Extends AI Across Disciplines

UF has implemented an AI certificate program available to all undergraduate students enrolled in any college. To obtain the certificate, a student must complete an AI fundamentals course, an AI ethics course, and a domain-specific course offered by their college.

2. Foster Buy-in and Support



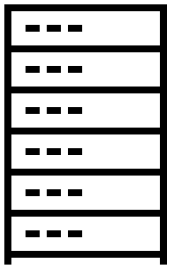
Seek to garner support and buy-in with a plan that shares responsibility and resources for cross-department adoption.

A plan co-created by representatives from each college can serve as a communication strategy that emphasizes how AI investments will yield shared benefits with positive impacts on learning across departments. With a collaborative approach, deans may agree to contribute budget resources in exchange for access to computing hardware and influence over initiatives that will be relevant to their students, faculty, and researchers.

To drive consensus, unite stakeholders, and ensure momentum continues, consider appointing an AI champion to lead a university steering committee. You may also consider a full-time leadership position with the required staff to support your objectives. A steering committee should include individuals with significant authority such as the provost or chancellor, senior vice president of academic affairs, chief technology officer, vice president of research, and college deans.

The steering committee should construct the AI plan with an accompanying budget proposal to relevant funding bodies. At a private university, this may be the board of directors. At a public university, funding may come from the relevant federal and local government offices.

3. Build or Increase AI Computing Capacity



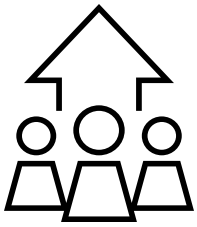
AI and any research requiring high-performance computing (HPC) require access to powerful computers and expansive processing power. To launch new initiatives, apply AI to existing datasets, and enhance student and staff experiences with automation, most universities will need to build or expand their computing capacity either on premises or in the cloud.

There are multiple approaches to building compute capabilities. To optimize budgets, universities often choose to build centralized compute infrastructure to be shared throughout campuses and colleges. With adequate funding, individual departments can also buy their own infrastructure for dedicated programs. However, this is less cost-effective and compromises the principle of collaboration.

Think Outside Traditional Funding

In addition to traditional funding strategies, universities can seek support from local corporate partners. Local and regional industries may have an interest in developing AI education to feed current and future talent needs or to access accelerated computing infrastructure for their own R&D. To pursue industry support, universities can consider research projects that benefit current donors or corporate partners, commercialize university IP, or extend the curriculum to local industries and their staff. Leverage your alumni network and existing partnerships to elicit this support.

4. Attract the Right Talent



Attracting the right talent consists of recruiting experienced researchers, hiring qualified faculty, and enrolling the most motivated students. Each plays a critical role in the construction and longevity of an AI university. Given the global shortage of AI talent, universities need to ensure they have a competitive environment that provides the right tools and support to attract—and keep—the top talent.

Researchers

Researchers on campus apply AI to new and existing projects, helping your institution to attract funding and innovate solutions that address technical or societal challenges. Hardware, software, and funding support for research can help universities compete for top researchers.

Faculty

Professors ensure that the student body learns and applies data science and AI knowledge. Faculty integrate skills and training into existing courses and create more enriching experiences for students to better prepare them for the technology-driven future.

By prioritizing AI education, universities can attract academic professionals seeking their next opportunity to make an impact while helping the university meet its AI goals.

Students

Ambitious, tuition-paying students are vital. Students are the workforce of tomorrow, and companies favor certain schools for recruitment based on the caliber of graduating students. From industry partnerships to institution rankings, awards, and funding, student success brings broad benefits to universities. Universities that support students with a robust AI education can expect an alumni network filled with successful professionals across an array of industries.

5. Evaluate and Measure Success

To measure progress, celebrate wins, and maintain support for AI initiatives, program leaders should develop suitable metrics.

Metrics will be unique to each university but should correspond to the goals and priorities laid out in the first strategy explored in this report.

Make the Most of Your Current Talent

To supplement recruiting efforts, universities should seek to retrain existing faculty. The **NVIDIA Deep Learning Institute (DLI) Ambassador Program** offers educators the opportunity to become DLI-certified instructors at no cost. The program includes access to NVIDIA technology and hands-on workshops to learn about accelerated computing and its applications. Once certified, instructors are provided with course materials, GPU-accelerated workstations, instructor assessments, and other tools such as **NVIDIA DLI Teaching Kits** to deliver training to their students.

Consider these trackable sample metrics. Iterate and make them your own.

- The number of students gaining AI literacy and advanced skills
- The dollar amount of funding for AI and HPC projects (internal and external sources)
- The impact on student enrollment and staff recruitment
- Researcher retention rate
- AI program ranking
- The number of companies recruiting on campus
- The number of alumni employed in AI-specific roles (e.g., developer, software programmer)
- The number of research publications

To effectively use metrics, select a base year to create a set of benchmarks and measure change over time.

Bring Benefits to Students, Local Communities, and Beyond

An AI university deploys data science, HPC, and AI across curriculums and administrative tasks to advance student success, engage the local community, and tackle the most important social and environmental issues of our time. Institutions that want to help build the future strive to make an impact in the three following areas:

- Empowering the next-generation workforce
- Conducting groundbreaking research
- Extending benefits and resources to the local community

Empowering the Next-Generation Workforce

Avoid siloed technology knowledge and infrastructure islands that privilege select departments. Instead, aim to prepare the entire student body for future-proof employment by building your program based on the principle of AI for all. Driving engagement across disciplines more accurately represents real-world uses of AI technology. For example, building AI skills in law school or philosophy departments enables healthy engagement around AI ethics in research projects.

> "We believe that AI shouldn't be limited to the computer science department or to one institution. Making sure that students across the curriculum learn about AI gives us the opportunity to train people at scale for tomorrow's jobs."
>
> **Joseph Glover,** Provost, the University of Florida

AI is playing an important role in every industry, so it's critical to integrate AI across colleges and disciplines by designing courses that explore the impact and applications of AI in non-technology fields. Some examples include:

- Machine learning and data visualization for biomedical applications
- AI for agriculture where autonomous machines support workforce shortages to harvest crops or to optimize watering, fertilizer, and pesticide uses
- AI and machine learning for architecture to achieve both quality and efficiency

Forge partnerships on campus and beyond to further expand hands-on opportunities.

Create opportunities for networking, internships, and employment by partnering with private industry on training workshops, informational conferences, and recruitment fairs.

NVIDIA provides a number of resources to help your students achieve AI excellence, including:

- **NVIDIA® Jetson™ AI courses and certifications**
- **NVIDIA grant programs**
- **NVIDIA educational webinars**
- **NVIDIA internship opportunities**
- **NVIDIA GTC developers conference**

Conducting Groundbreaking Research

To become a destination for AI research and study, part of your plan can include impactful research addressing the world's most pressing problems. Think of generation-defining issues such as climate change, healthcare, food insecurity, aging populations, data security, or urban transportation.

To further encourage impactful research and innovation, pooled budget resources can be used to create a catalyst fund for research. Allow students and faculty from any department to submit proposals for access to budget and resources for research projects.

As a shortcut to impactful research, leverage existing portfolios and datasets. Here are a few examples from other universities.

Enhance agriculture methods and food security.

With its number-one-ranked Institute of Food and Agricultural Sciences, UF applied AI to further advance its research of parasitic nematodes—a type of microscopic worm that causes more than **170 billion dollars of damage** to crops each year.

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Restore communication to the voiceless.

To **decode brain signals** directly into computer-generated writing, researchers from the University of California, San Francisco (UCSF) applied deep learning methods and GPUs to previous research. In a world-first demonstration, the team created speech-detection and word-classification models that provided a means of communication to patients who had lost the ability to speak. Models achieved 93 percent accuracy at a rate of 18 words per minute.

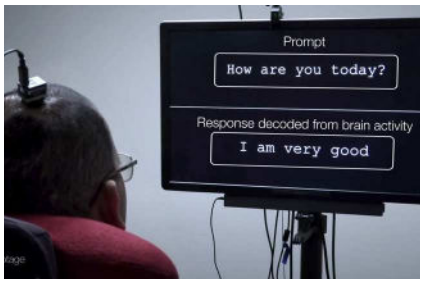

Image courtesy: Edward F. Chang, MD, UCSF Health

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Improve audio detection for the hearing impaired.

Researchers from Columbia University developed a deep learning-based system that amplifies specific speakers in a group. Using a dataset of over 30 hours of voice, the team trained a deep neural network to create a feasible solution for a brain-controlled hearing device that can pick out specific speakers in a crowd.

Predict new COVID variants.

Researchers from the University of Chicago and partners used HPC and large language models (LLMs) to track genetic mutations and predict variants of concern in SARS-CoV-2. The project was one of the first models trained on raw nucleotide sequences—the smallest units of DNA and RNA. The LLM was able to distinguish between genome sequences of the virus's variants and generate its own nucleotide sequences to predict potential mutations of the COVID genome. The project was awarded the **Gordon Bell Special Prize for High-Performance Computing-Based COVID-19 Research.**

Big problems tend to inspire the brightest and most ambitious minds. By boosting your institution's research profile with projects like these, you can attract top talent and become a destination for students and staff eager to make an impact.

Using HPC and LLMs, researchers from the University of Chicago won the Gordon Bell Special Prize for High-Performance Computing-Based COVID-19 Research.

Extending Benefits to the Local Community

Just as resources can be extended beyond the computer science department, an AI university should seek to bring benefits to its local community and economy.

Share access to resources with partner institutions and K–12 programs—especially those with historically underserved communities or demographics. The University of Florida has taken this approach, providing 12 other public universities with access to its supercomputer, including the largest historically black college and university (HBCU) in the country.

In partnership with state governments and school boards, universities can support AI education in K–12 programs by helping develop new curriculums, providing resources for the professional development of teachers, and launching community-based initiatives with hands-on experiences.

Open enrollment for bootcamps, certificate programs, and other alternative credentials benefits people of all ages in the community.

Support local startups with AI incubators. A university-organized incubator can offer startups:

- Physical space
- Access to AI-enabled infrastructure and field-specific databases
- Support for conducting market research
- Support for navigating federal and commercial funding opportunities
- Consultation opportunities with mentors, subject matter experts, and entrepreneurs

A vibrant startup community draws in investment to the local economy and provides ample employment opportunities for young professionals—all of which benefit higher education institutions.

Finally, an AI university can seek partnerships with transportation, aviation, or other public authorities to bring the benefits of advanced computing to civic employees and public works projects.

University Spotlight—AI Ed Models for Success

Southern Methodist University (SMU)

SMU has ambitious plans to make Dallas, Texas, a hub of AI development. The university is investing in a new data center that will produce 100 petaflops of computing power—enabling researchers to perform 100 quadrillion operations per second. This will provide SMU with 10X the power of its current supercomputer.

With these new capabilities, SMU will accelerate the integration of AI education and research into subjects ranging from computational biology to human performance, national defense, and digital humanities.

To share its resources more broadly, SMU recently launched an online MS of computer science with a specialization in artificial intelligence. This makes training available to students all over the world, as well as opens up new sources of revenue for the university.

> "Through research collaborations built on SMU's capabilities in artificial intelligence, we have the potential to boost our city's booming economy, improve our workforce, and learn to solve major challenges that we face."
>
> **Eric Johnson,** Mayor, Dallas, Texas

Oregon State University (OSU)

OSU has launched an MS degree in artificial intelligence and has announced plans for a new $200 million data center. Once complete, students, faculty, and researchers will be able to plug in to one of the world's fastest supercomputers.

Accompanying the data center will be a new facility that includes an extended reality theater, a robotics and drone playground, a DIY maker space, and labs for scientists.

Researchers will leverage existing datasets to build AI programs and accelerate work at the university's top-ranked programs in agriculture, computer science, forestry, oceanography, robotics, material sciences, and more.

For additional funding, OSU has requested support from the State of Oregon as well as philanthropic investment to expand research, support hiring, and achieve diversity goals.

> "We look forward to NVIDIA DGX™ H100 systems powering our collaborative research tackling grand challenges in climate science, sustainability, and microelectronics. The systems are key groundwork for AI infrastructure we'll deploy in the new Jen-Hsun and Lori Huang Collaborative Innovation Complex, enabling Oregon State University to drive innovation, solutions, entrepreneurship, and partnerships with industry and other higher education institutions to benefit Oregon, the nation, and the world."
>
> **Edward Feser,** Provost and Executive Vice President, Oregon State University

Monash University

Monash University is Australia's number-one university for engineering and technology. In addition to its master's degree in artificial intelligence, Monash offers an "Artificial Intelligence for Everyone" course, which explores AI fundamentals and use cases and requires no background in computer science.

Students in the master's of AI program learn to design, develop, and operate products and intelligent systems, as well as apply knowledge in the real world while working with internationally recognized researchers.

Monash now hosts ten NVIDIA BlueField®-2 DPUs in its private **Research Cloud,** which is a node in the Australian Research Data Commons (ARDC) federated research cloud. This powerful platform of distributed computing services and infrastructure facilitates cross-institutional research collaboration.

Monash University uses its computing power to host research projects in healthcare, social and environmental issues, and technology development. This includes targeted DNA sequencing to improve the detection of cancer and the risk of diabetes.

As an extension of the DNA project, researchers collaborated with public and private entities to commercialize a secure online database for the storage and dynamic analysis of genotype and phenotype data to meet the requirements of both clinical and genomic data processing.

Monash University researchers are also leveraging accelerated AI computing platforms to design super drugs to combat antibiotic-resistant infections.

> "As we continue to push the boundaries of research technology, it's important that we explore new and innovative ways that utilize bleeding-edge technology to protect both our research data and underpinning infrastructure. This partnership and the exploratory use of DPUs is exciting for both Monash University and the industry more broadly."
>
> **Dan Maslin,** Chief Information Security Officer, Monash University

Linköping University

Linköping University is home to BerzeLiUs, Sweden's fastest supercomputer, which boasts 300 petaflops of compute power. Linköping also hosts Sweden's National Supercomputer Center, which already houses six traditional supercomputers on campus.

BerzeLiUs is taking on projects to improve wireless communication, cybersecurity, large-scale Internet of Things (IoT) and efficiency programming, life sciences discoveries, and quantum technology initiatives. Swedish researchers are using the system to collaborate with industries and national and international academics and researchers at partner universities. **And with plans to upgrade to the latest technology,** it will continue to drive advances in machine learning, healthcare, and more.

Drawing on its AI research experience, Linköping University is coordinating the EU project TAILOR, an initiative for developing trustworthy AI to guide researchers, funding bodies, and decision-makers.

Beyond its many external research partnerships, Linköping University offers robust AI education to its student body. This includes over 100 AI-related courses open to all students, a bachelor's and master's degree in cognitive science, and a master's degree in statistics and machine learning.

The university's world-class Division of Artificial Intelligence and Integrated Computer Science administers numerous research labs, including:

- Knowledge Processing Lab
- Natural Language Processing Lab
- Representation, Learning, and Planning Lab
- Reasoning and Learning Lab
- Theoretical Computer Science Lab
- Unmanned Aircraft Systems Technology Lab

> "We need many new explorers in the universe of AI, because it will infiltrate and transform all disciplines of research."
>
> **Niclas Andersson,** Technical Director, National Supercomputer Centre at Linköping University

The Future of Education and Work

AI is changing how teaching and learning occurs, which skills are in demand, and the career paths of young professionals.

To prepare students for jobs that will intersect directly or indirectly with data science, HPC, and AI, higher education institutes should create opportunities for AI training and research in every department.

Colleges and universities that integrate AI into education can overcome current enrollment and retention challenges, build a reputation as a destination for AI research and investment, and offer students the training and experience they need to create a professional advantage.

Accelerate Your Journey

To help bring this advanced education to colleges, universities, and their communities, NVIDIA works to lower the cost of AI infrastructure by offering special pricing on hardware. NVIDIA also provides **free educator programs, DLI Teaching Kits, grant programs,** and more.

Bring your university a step closer to AI education by applying for the **NVIDIA Deep Learning Institute Ambassador Program.** Once certified, Ambassadors have access to hands-on AI workshops, course materials, and GPU-accelerated workstations to facilitate AI teaching.

From on-prem to cloud infrastructure, from hardware and software to training resources, NVIDIA is ready to help propel innovation, education, and research at colleges and universities for a lasting impact.

Ready to Get Started?

Learn more about building an AI-enabled university, visit:
www.nvidia.com/ai-university

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