



» The Institute for Data  
Engineering and Science

# THE INSTITUTE FOR DATA ENGINEERING AND SCIENCE

Data science foundations. Data-driven discovery.



The Institute for Data Engineering and Science (IDEaS) is the unifying entity for Georgia Tech's data science research, applications, and education. It connects government, industry, and academia to advance foundational research, accelerate the adoption of data science technology, and educate future data science leaders.

## » Connect and Inform

IDEaS leverages expertise and resources from throughout Georgia Tech and external partners to define and pursue challenges, create meaningful partnerships, and offer accessible resources. IDEaS provides the connectivity necessary to keep pace with evolving problems, research, and discovery.

## » Drive and Amplify

IDEaS advances foundational research in areas such as machine learning, high-performance computing, and algorithms. It also drives research within disciplines such as precision medicine, materials science, energy, and smart cities. IDEaS gives researchers the resources they need to innovate and pursue challenges on a much bigger scale than would otherwise be possible.

## » Analyze and Solve

IDEaS equips researchers to pursue the most important problems, often connecting with industry to drive innovation and speed adoption to achieve economic and societal impact. IDEaS provides partners with direct access to experts at the leading edge of research and applications who possess deep knowledge and vision of the path ahead.

## » Educate and Inspire

IDEaS is dedicated to developing and promoting innovative educational and training programs. Georgia Tech is a research leader in computing, engineering, and data science, and offers a master's in analytics and a master's in quantitative and computational finance. A Ph.D. in machine learning is in development. Other academic and co-curricular opportunities include FLAMEL (From Learning, Analytics, and Materials to Entrepreneurship and Leadership doctoral traineeship program), the Data Science for Social Good internship program, and a student-run data analytics center.

The scale and scope of IDEaS gives researchers and industry partners the resources to innovate and pursue opportunities to a much greater extent than would otherwise be possible.

# EXPANDING DATA SCIENCE HORIZONS

## **MACHINE LEARNING**

Machine learning underpins the transformation from data to knowledge to actionable insights. Research in unstructured and dynamic data, deep learning, data mining, and interactive machine learning is advancing foundations and big data applications in many domains.

## **HIGH-PERFORMANCE COMPUTING**

High-performance computing is critical for big data analysis. High-performance systems, middleware, algorithms, applications, software, and frameworks support data-driven computing at all levels.

## **ALGORITHMS AND OPTIMIZATION**

Algorithms, optimization, and statistics lay the foundation for large-scale data analysis. Streaming and sublinear algorithms, sampling and sketching techniques, and high-dimensional analysis support processing and utilizing data.

## **HEALTH AND LIFE SCIENCES**

Big data sets abound in genomics, systems biology, and proteomics. Advances in electronic medical records, computational phenotyping, personalized genomics, and precision medicine are driving predictive, preventive, and personalized health care.

## **MATERIALS AND MANUFACTURING**

Large-scale data sets that provide microscopic views of materials, along with scalable modeling and simulation technologies, are paving the way for accelerated development of new materials.

## **ENERGY INFRASTRUCTURE**

Advances in sensors and the Internet of Things enable energy infrastructure monitoring, while data analytics brings unparalleled efficiencies to energy production, transmission, distribution, and utilization.

## **SMART CITIES**

Greater safety, affordability, and quality of life can be achieved through efficient use of resources and improved services. Transportation, access to basic amenities, emergency services, energy efficiency, resilience to natural hazards, and other aspects of urban planning can all be informed by big data.



# IDEaS INDUSTRY ALLIANCE

The IDEaS Industry Alliance (IIA) program works with members to target their specific needs and keep them at the forefront of research-based solutions.

IIA members work directly with experts to address shared problems, participate in rapidly advancing research, and benefit from our unique methods of accelerating industrial adoption. Members help meaningfully shape the future workforce and keep pace with research, discovery, and insight.

## IIA BENEFITS AND OPPORTUNITIES INCLUDE:

- » Learn about the latest IDEaS research and forge relationships with researchers and students via members-only events and communication.
- » Connect with the workforce of the future. Interact with students, find the best interns, and learn about our analytics or data science curricula.
- » Become a research collaborator and receive dedicated expert assistance with pressing problems on-site at the industry.
- » Gain broad visibility and interact with the Georgia Tech community.



IDEaS makes it easier to connect companies with students and faculty to support short- or long-term collaborative projects.

- » Sponsor a named biweekly or distinguished lecture series, or create a named fellowship.
- » Shape the future of IDEaS by participating on the Industrial Advisory Board.

IDEAS.GATECH.EDU

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Georgia Tech is one of the largest, most respected science and engineering research institutions in the world, with more than 100 interdisciplinary research centers that consistently contribute vital knowledge and innovation to American government, industry, and business. Georgia Tech is also adjacent to the Southeast's premier innovation neighborhood, where opportunities abound.

#### TECH SQUARE

Tech Square, Georgia Tech's "main street," connects the intellectual capital of Georgia Tech with the thriving business community in Midtown Atlanta. It is a magnet for tech startups and university spinoffs and has attracted industry innovation centers that include AT&T Mobility, Panasonic Automotive, Southern Company, Delta Air Lines, The Home Depot, Coca-Cola Enterprises, NCR, and ThyssenKrupp Elevator Americas. Along with the new NCR world headquarters under development and Tech Square Labs, the eight-block Tech Square campus will soon total 3 million square feet of commercial space and more than \$1 billion invested.

#### CODA

Coda is an upcoming 750,000-square-foot mixed-use facility located in Tech Square, representing a \$375 million investment in Atlanta's growing innovation district. The development, which will house the headquarters of IDEaS as well as many research neighborhoods associated with IDEaS, will feature approximately 620,000 square feet of office space designed to enable unparalleled collaboration between research and industry, 40,000 square feet of retail space, an 80,000-square-foot data center, and a plaza.

#### SOUTH BIG DATA HUB

The South Big Data Regional Innovation Hub, located within IDEaS, is part of the National Science Foundation's four Big Data Regional Innovation Hubs. Co-directed by Georgia Tech, it serves 16 states and the District of Columbia — from Texas to Delaware — with more than 500 members from universities, corporations, foundations, and cities committing their support. The South Big Data Hub builds innovative partnerships between groups in business, academia, and government who apply data science and analytics to solve regional and national challenges.

# CREATING THE NEXT®

**Georgia** Institute for Data  
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