



UNIVERSITY OF MIAMI
INSTITUTE for DATA SCIENCE
& COMPUTING



IDSC

enabling
DISCOVERY

Research Focus Areas/

/// **Artificial Intelligence (AI) + Machine Learning**

AI encompasses machine learning (ML), natural language understanding (spoken/written), computer vision, data mining, human-computer interfaces, data visualization, and deep learning. The application of AI and ML is ushering in crucial advances in medicine, business, and even the arts, humanities, and social sciences, assisting humans in decisionmaking and in solving complex problems.

/// **Creative Computing**

Interdisciplinary in nature, Creative Computing explores a world of expressive possibilities using code and design to shape the world. It coalesces computing with other disciplines centering around the intersection of computing and research design.

/// **Data Ethics + Society**

In conjunction with UM's Ethics Programs and the Institute for Bioethics and Health Policy, IDSC is identifying, addressing, and resolving research challenges from the appropriate uses and users of intelligent machines, to privacy challenges raised by data collection, analysis, surveillance, and secondary use.

/// **Digital Health+ Biological Sciences**

With access to massive amounts of patient data across a wide range of data sources, data-driven discovery can aid in: diagnosis, new therapeutics, matching treatment with best outcomes, and predicting risk levels for disease. UM is well positioned to harness the power of data of millions of patients—combining impressive academic programs with one of the most extensive health care systems in Florida.

/// **Earth Systems**

Machine learning (ML) and big data analytics are highly effective tools for developing models and making predictions in atmosphere, ocean, and earth science where data are sparse, and uncertainty high. The pairing of ML with Bayesian Statistics is rendering multiple prediction tools that provide more reliable forecasts and a detailed understanding of inherent uncertainties in extreme weather events.

/// **Information Design**

IDSC Visualization, Data Communication, and Information Design fulfills a key educational role in raising awareness about Data Science and its applications. The use of multimodal media from static infographics to interactive technologies helps students and scientists illuminate their data and communicate their findings.

/// **Smart Cities + Urban Lab**

Smart Cities research tackles data collecting technology, data analytics, and innovation and utilization in both hardware and software applications. The Urban Lab builds on this research, providing design services for the implementation of smart cities around the world. This combination leverages the U's computational resources and expertise in physical computing and data analytics to design the next generation of smart cities.



Platforms/

/// **Advanced Computing** Rated one of the Top 5 Academic Institution Supercomputers in the US for 2019, Triton is UM's first GPU-accelerated system, representing a completely new approach to computational and data science. Built using IBM Power Systems AC922 servers, Triton was designed to maximize data movement between the IBM POWER9 CPU and attached accelerators like GPUs, and to accommodate traditional HPC, interactive data science, big data AI, and machine learning workloads. Addressing the U's ever-expanding needs of data-driven research, Triton represents a quantum leap in the computing infrastructure.

/// **Systems + Data Engineering** IDSC Systems and Data Engineering team offers expertise for collaborators who need to include novel software systems as part of their projects, expert personnel in grant proposals, and the development of prototypes or initial analysis in preparation for proposal submission. The team are professional software engineers who actively seek innovative software application and systems development projects. The team has developed apps and software systems that support work in clinical research, drug discovery, genomics, mapping, and urban planning, observational biology/ecology, and the digital humanities.

Innovation/

The Innovation Office oversees IDSC's collaborative efforts with other entities seeking funding for innovative intradisciplinary research. IDSC Innovation provides support for the development and acceleration of viable business models into innovation solutions or startups.

Master of Science in Data Science/

The Master of Science in Data Science (MSDS) offers tailored curricular paths to study big data applications in multiple fields. IDSC leverages state-of-the-art resources and provides student internship opportunities with industry partners. Students from any academic disciplines are invited to explore to possibilities of this degree program. For more information, visit msdatascience.miami.edu.

UM Institute for Data Science and Computing

1320 S Dixie Hwy, Suite 600, Coral Gables, FL 33146-2930

305.243.4962 | idsc@miami.edu.



IDSC

DATA SCIENCE and COMPUTING

The University of Miami Institute for Data Science and Computing (IDSC) is dedicated to solving pressing societal challenges by empowering data science research, education, ethics, community engagement, and commercial ventures.

IDSC's world-class team takes a collaborative approach to deploying powerful tools of data science to uncover hidden patterns, find fresh insights, and advance STEM education at every level. We link academic research to real-world problems with the flexibility to respond quickly to emerging scientific issues.

Learn more about our educational opportunities and how IDSC can become your partner in the powerful field of data science and computing.



305.243.4962 | idsc@miami.edu



idsc.miami.edu