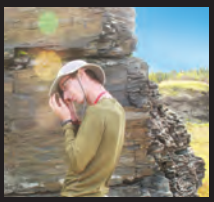
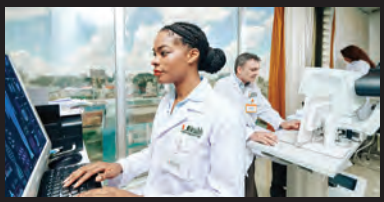
UNIVERSITY OF MIAMI

FROST INSTITUTE for DATA SCIENCE & COMPUTING

SERVICES + RESOURCES


Who can access IDSC?

IDSC services and resources are available to everyone: Students, faculty, researchers, the public and private sector, nonprofits, industry, and beyond.

Our collaborative approach brings together talented minds at the interface of disciplines to harness the University of Miami's AI-ready TRITON supercomputer.

As a member of UM's Frost Institutes of Science and Engineering, IDSC is focused on utilizing the extraordinary potential of data science to tackle society's greatest challenges.

From creative student projects to innovative industry-shaping ideas, IDSC services and resources can help you achieve your research, training, or business goals.

idsc.miami.edu

IDSC

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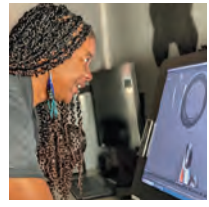

Triton Specs

IBM Power9/Nvidia Volta

IBM Declustered Storage

96 IBM Power 9 Servers

30TB RAM (256/node)

1.2 Pflop Double Precision

240 Tflp Deep Learning

64 bit Scalar

100 GB/sec Storage

150 TB Shared Flash Storage

400 TB Shared Home

2 @ 1.99TB SSD Local Storage

Advanced Computing

Through IDSC, the University of Miami maintains one of the country's largest centralized academic cyberinfrastructures. Since 2007, University researchers and their collaborators have contributed to an exponential growth in advanced computing investments amounting to mre than 240 TFLOPS and more than 3 PB of parallel storage. UM's computing facility currently supports more than 50 user groups across science, engineering, liberal arts, and medicine.

The TRITON supercomputer is the U's first GPU-accelerated High-Performance Computing (HPC) system, rated one of the top 5 US academic institution supercomputers in 2019, Triton supports a completely new approach to computational and data science for all UM campuses. Built using IBM Power System AC922 servers, this system was designed to maximize data movement between the IBM POWER9 CPU and attached accelerators like GPUs.

IDSC Advanced Computing collaborates with IDSC Systems and Data Engineering to provide a comprehensive set of services and training opportunities for a well-rounded research computing and data science experience.

HPC + Data Science Services

- **High-Performance Computing** Multi-core enabled computational research support services across both CPU to GPU environments, job scheduling and management, high-performance parallel storage and visualization services
- **Data Science and Analytics** Customized training sessions in harnessing data science tools for research and training. Areas of support include: imaging, pattern recognition, convolutional neural networks, and deep learning strategies

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HPC + Data Science Services (cont'd . . .)

- **Research Facilitation + Application Support** Support translation of science drivers into computational research and training opportunities. Services include research facilitation, configuration, installation, and optimization of home grown and community codes on native hardware and cloud environments supported through ACS.
- **User Training** Resource-specific user training and engagement opportunities are available upon request.
- **Grant Collaborations** Enable and support interdisciplinary and inter-campus grant collaborations in data-driven applications, CyberTraining programs that could gainfully exploit both high-performance computing and data science capabilities accessible through ACS.
- **Data Management** ACS provides 100GB/sec data rate scratch space for data staging and application management. Long-term and archival storge is accessible through UMIT research services. (https://it-resources.research.miami.edu/)
- **Special Projects** ACS provides support for special projects such as high availability research-specific hardware and storage technology hosting and support services. For further information, please contact ACS Director.

Please contact us for your specific needs.

305.243.4962 | hpc@ccs.miami.edu


gicLeap

Creative Technologies

The UM IDSC Creative Studio provides comprehensive XR software design and development consultancy services, supporting clients throughout the creation process, from conceptualization to release.

Our expertise ranges from crafting immersive experiences in augumented realty (AR), virtual reality (VR), and spatial computing to developing interactive installations. We specialize in creating state-of-the-art immersive software for a range of applications, including healthcare, pedagogy, wellness, research, and industry.

We are increasingly adding new resources across campuses to improve access to XR technologies for our students and faculty members. XR platforms and technologies are growing in number and are developing to match the needs of their disciplines.

Equipment and Technical Support—Creative Studio

The Creative Studio provides expert support and consultation in the use of digital media. The studio loans out Meta Quest 2 headsets as well as other brands of immersive hardware. It is also the best place to inquire about available XR resources around campus.

Learning with XR—Academic Technologies

Academic Technologies works closely with faculty members, students, and University stakeholders on projects related to teaching and learning, including labs, student technology support, instructional design, learning platforms, and potential business incubation. Previous XR projects have included leading faculty learning communities, hosting workshops, and partnering on course projects related to augmented reality, virtual reality, and spatial computing. To explore ways to meaningfully transform courses and teaching strategies that involve extended reality technologies, contact Thomas Merrick, txm2025@miami.edu.

Creative Technologies (cont'd . . .)

Learning and Research Labs—XR Studio

Located at the heart of campus, the XR Studio is a state-of-the-art studio space dedicated to the design and development of XR media. Specialized equipment is available for developing games, spherical films, volumetric capture, photogrammetry, 3D scans, and more, in addition to a suite of plug-and-play 6DoF VR gear.

RAD-UM Lab—School of Architecture

The RAD-UM Lab provides resources and expertise for project-based research on the spatial ramifications of embedded technology, ubiquitous computing, and mixed-reality. Thanks to increasingly proliferating microchips and ever-expanding information networks, computing is migrating from dedicated static appliances to mobile devices, mixed-reality headsets, objects of everyday life, and physical environments.

RAD-UM capitalizes on this potential, bringing research to bear on the built environment from various fields that exploit the spatial consequences of distributed computing: responsive and interactive systems, mixed-reality, embedded/situated technology, ambient intelligence, mobile computing, and locative media.

Let our team help you transform your concepts into reality.

305.243.4962 | idsc@miami.edu

Systems + Data Engineering

IDSC Systems and Data Engineering conducts research, hosts resources, and provides software engineering and development services to its collaborators.

Software Engineering

IDSC Software Engineering provides expertise for collaborators who need to include novel software systems as part of their projects (including expert personnel for inclusion in grant proposals) and the development of prototypes or initial analysis in preparation for proposal submission. The team has developed applications and software systems to support work in clinical research, drug discovery, genomics, mapping and urban planning, observational biology/ecology, and the digital humanities.

Data Engineering

IDSC Data Engineering provides expertise for collaborators who need data engineering support for their projects. This include requirements identification, analysis, design and construction of data processing systems, ETL, storage, and pre-data science operations pipelining. The Data Engineering group also seeks opportunities to work with collaborators in applying new and novel methods such and AI/ML within data engineering systems.

Geospatial Digital Special Collections (GDSC)

GDSC provides a non-proprietary platform to dynamically discover, publish, and/or consume geographic data as a service. The geographic data available through GDSC is a highly curated set of collections—or special collections—of geographic data with coverage in South Florida and the Global South of the western hemisphere.

Collaborators who have projects that generate or use geospatial datasets can collaborate with IDSC GDSC for assistance in acquisi-

Systems + Data Engineering (cont'd . . .)

tion, curation, storage and management. IDSC GDSC can also provided consulting services for geospatial visualization, the development of web-based maps and cartographic presentations.

Reality Capture and Spatial Surveying—Drones + LiDAR

IDSC GDSC has considerable expertise in applying UAS for low altitude aerial surveying to create 3D models and high resolution georerferrence imagery (for use in the construction of GIS databases, architectural drawings, and urban planning). IDSC also has advanced scanning LiDAR systems that can be used for reality capture applications, for example documentation of historical buildings, or the creation of assets for extended realty (or gaming) applications.

Please contact us for information about working together.

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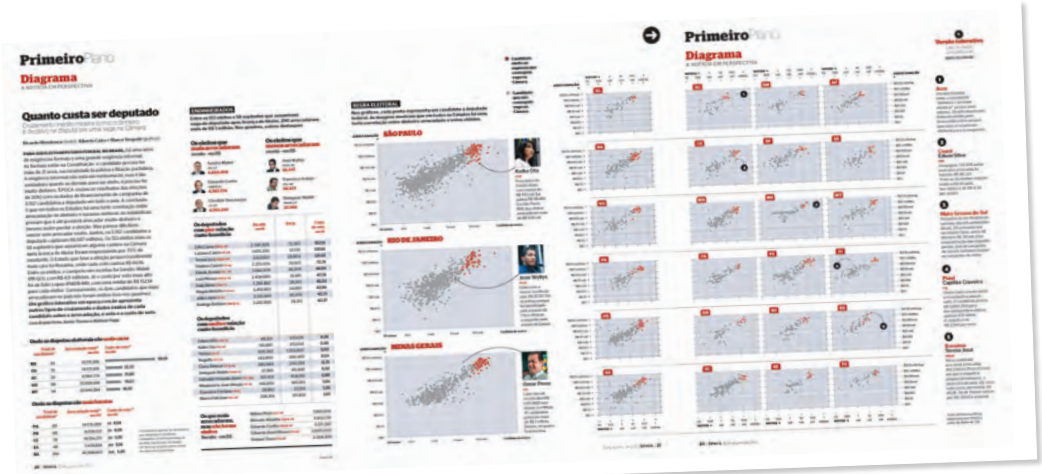

Primeiro Plano
Diagrama
Quanto custa ser deputado
SÃO PAULO
RIO DE JANEIRO
MINAS GERAIS

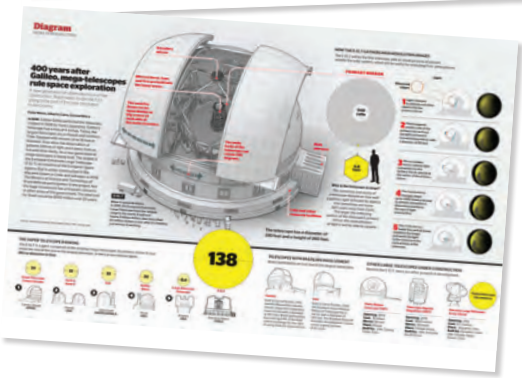
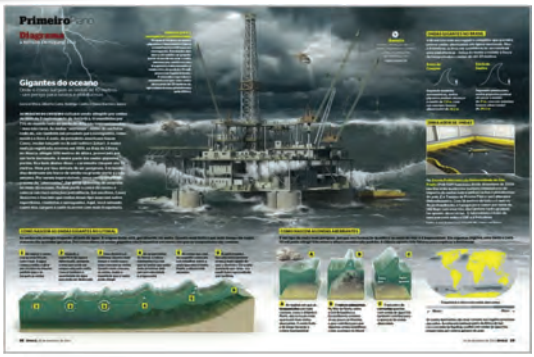
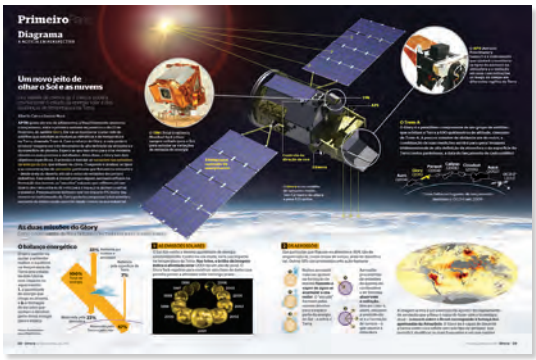


Diagram
400 years after Galileo, mega-telescopes rule space exploration
138


Primeiro Plano
Diagrama
Gigantes do oceano


Primeiro Plano
Diagrama
Um novo jeito de olhar o Sol e as nuvens
As duas missões do Glory
O balanço energético

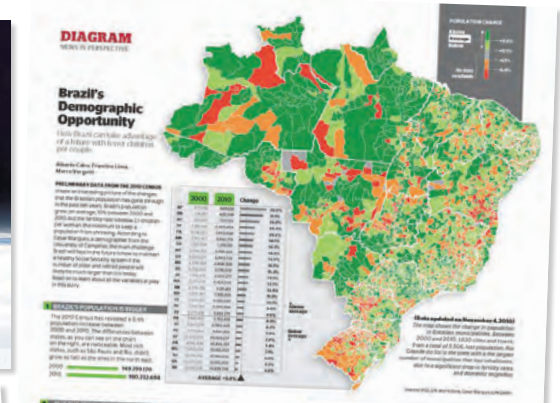
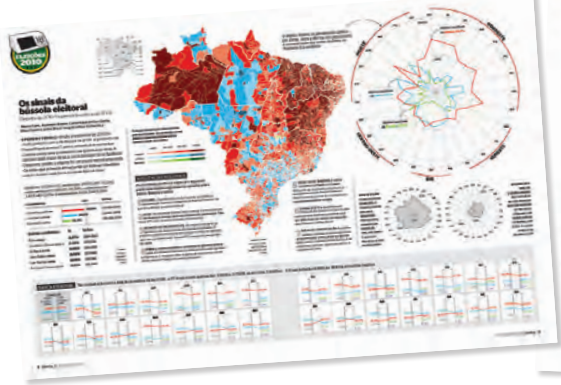
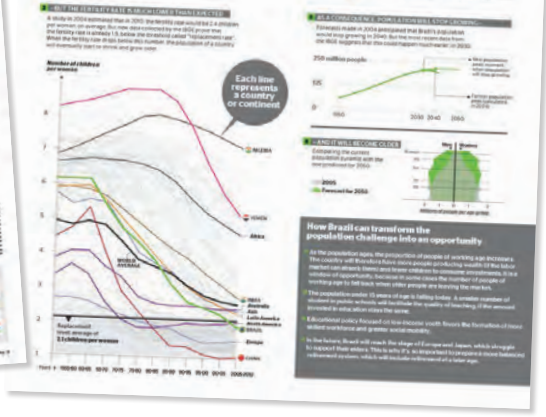


DIAGRAM
Brazil's Demographic Opportunity
POPULATION CHANGE


Os sinais da bossoleição eleitoral


Each line represents a country or continent
How Brazil can transform the population challenge into an opportunity

Visualization + Infographics

Data Visualization augments cognition to enable the exploration of complex data sets and illuminate scientific findings. IDSC's Human Centered Design and Computing program regularly collaborates with scientists in communicating their results to stakeholders and to the general public using multimodal media—from static infographics to interactive web presentations, and other products that take advantage of technologies like augmented, mixed, and virtual reality.

Visualization and Infographics Consulting offers guidance on visual design, user experience, and which tools or tutorials are best to bring your design to life. Visit: idsc.miami.edu/vizconsult.

Visualization Laboratory

The Viz Lab is a resource available by appointment to the UM community. Capable of accommodating 14 guests, the space offers an impressive venue to host a class or your next executive meeting. Located in the Arthur A. Ungar building Room #330D, with a direct connection to all UM computing resources, the Viz Lab features a Mechdyne 3D-Display and a Cyviz 2D-Wall. IDSC regularly offers demonstrations and orientation sessions for new users.

To book a tour, or for more information, email vizlab@miami.edu.

Contact us for advice on visual design, tools, tutorials, and UX.

305.243.4962 | idsc@miami.edu

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Selected Collaborative Projects

Displacement Vulnerability Mitigation Tool

dvmt.idsc.miami.edu

With this new tool, community organizations can select specific parcels targeted for development. The DVMT will then calculate the risk of displacement and present a set of mitigation options in different categories for highly vulnerable areas.

VIRTUAL REALITY (VR) | School of Law Environmental Justice Clinic, Office of Community and Civic Engagement, IDSC

Mangrove City App

https://www.youtube.com/watch?v=vtfgDmHFxHc

Users paddle through a coastal city of the future. The app illustrates the importance of mangroves in protecting our coastlines from erosion and storm surge, and invites students to consider environmental engineering as a future career path.

VIRTUAL REALITY (VR) | Interactive Media; Rosenstiel School of Marine, Atmospheric, and Earth Science; Frost School of Music; School of Architecture, IDSC

MAP The Miami Affordability Project

camp.idsc.miami.edu

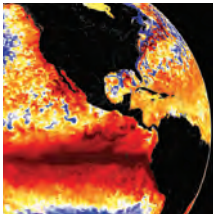
As part of the University's "Focus on Affordable Housing" initiative, the interactive MAP tool (a multi-tier web-based application) was designed to explore Miami's housing landscape, address needs, and promotes informed decisions on housing policy.

SEARCHABLE MAPS | Office of Civic and Community Engagement (OCCE), IDSC

UMVerse BPEI Digital Twin

This paradigm shift in medical education and health care uses a digital twin of the eye to enhance understanding of its intricate anatomy, physiology, and pathology. Digital Twins of exam rooms at Bascom Palmer Eye Institute (BPEI) include replicas of the slit lamps and retinal scanners for training in a risk-free environment.

VIRTUAL REALITY (VR) | Bascom Palmer Eye Institute, Miller School of Medicine, School of Communication Interactive Media Department + XR Initiative, IDSC



NSF Award for El Niño Intensity Study

The National Science Foundation (NSF) has funded a study that will look at the strength of the buildup of hot waters in the Pacific, known as "preconditioning," and other global weather patterns that influence El Niño to better predict intensity.

EARTH SYSTEMS SCIENCE | Rosenstiel School, NC State, IDSC

FDA Testbed for AI-ML Medical Devices

Ensuring the safety and effectiveness of medical devices falls on officials at the U.S. Food and Drug Administration. To help with methodologies and analytics, the FDA has partnered with IDSC to gain some actionable metrics.

AI + MACHINE LEARNING | FDA Office of Science and Engineering Labs (OESL), FDA Center for Devices and Radiological Health (CDRH), IDSC

World Health Organization (WHO) Guidance

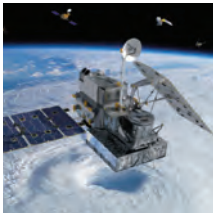
The WHO has included IDSC faculty in the drafting of key international guidance documents on AI for Health through the Miller School of Medicine Institute for Bioethics and Health Policy (a WHO Collaborating Center in Ethics and Global Health Policy, one of 14 in the world and the only one in the U.S.).

DATA ETHICS + SOCIETY | World Health Organization, Miller School of Medicine Institute for Bioethics and Health Policy, IDSC

Wildfire and Flooding Prediction Projects

The National Ocean and Atmospheric Administration (NOAA) has awarded two grants to study wildfire prediction while developing a real-time prediction model, and to study El Niño's relationship to coastal flooding that will provide local communities with detailed, daily, and long-term flood predictions.

EARTH SYSTEMS SCIENCE | NOAA, U.S. Forest Service, Rosenstiel School, IDSC



NASA Addresses Satellite Security

Looking for ways to protect its growing constellation of satellites, NASA has signed a contract the AI + Machine Learning team to help mitigate cyber risks. The team will developing a new computational platform that will be used to explore the security of satellite operations using a simulation environment.

AI + MACHINE LEARNING | NASA Advanced Information Systems Technolgy (AIST), NASA Earth Science Technology Office (ESTO), IDSC

Master of Science in Data Science

This degree provides interdisciplinary connections and experiential learning opportunities across all aspects of data science and computing, from machine learning to marine science, city planning, or communications.

Students from any academic discipline are invited to explore advancing their careers with foundational knowledge on the applications and implications of data in a variety of fields.

For more information, please contact the Office of Interdisciplinary and Professional Studies at 305.284.8783.

Data Scientist

"The sexiest job of the 21st century."
-HARVARD BUSINESS REVIEW

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