GRAY™
DECISION INTELLIGENCE

5 Emerging Programs for 2025



January 14, 2025

Leading-Edge Software for Higher Education

Gray DI's Program Evaluation System (PES) is designed to help educational institutions make data-informed decisions.



Economics and Outcomes

Optimize Performance



Markets

Inform Program Decisions



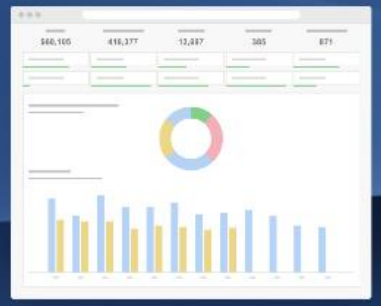
Academic Management

Data-Informed Evaluation



GeoTargeting

Increase Marketing ROI



Data Dashboards

Customizable Data Displays

Today's Presenters



MaryAnn Romans
AVP, Marketing



Elaine Millar Rowles
AVP, Research



Mary Pahissa Upchurch
EVP, Customer Success



Lorlei Boyd
Decision Intelligence Developer, II



Monica Bilson
Senior Project Manager



Youssef Aljabi
Manager, Data Science & Product



Jennifer Ziegler
Vice President, Customer Success & Compliance/HR

Speculative

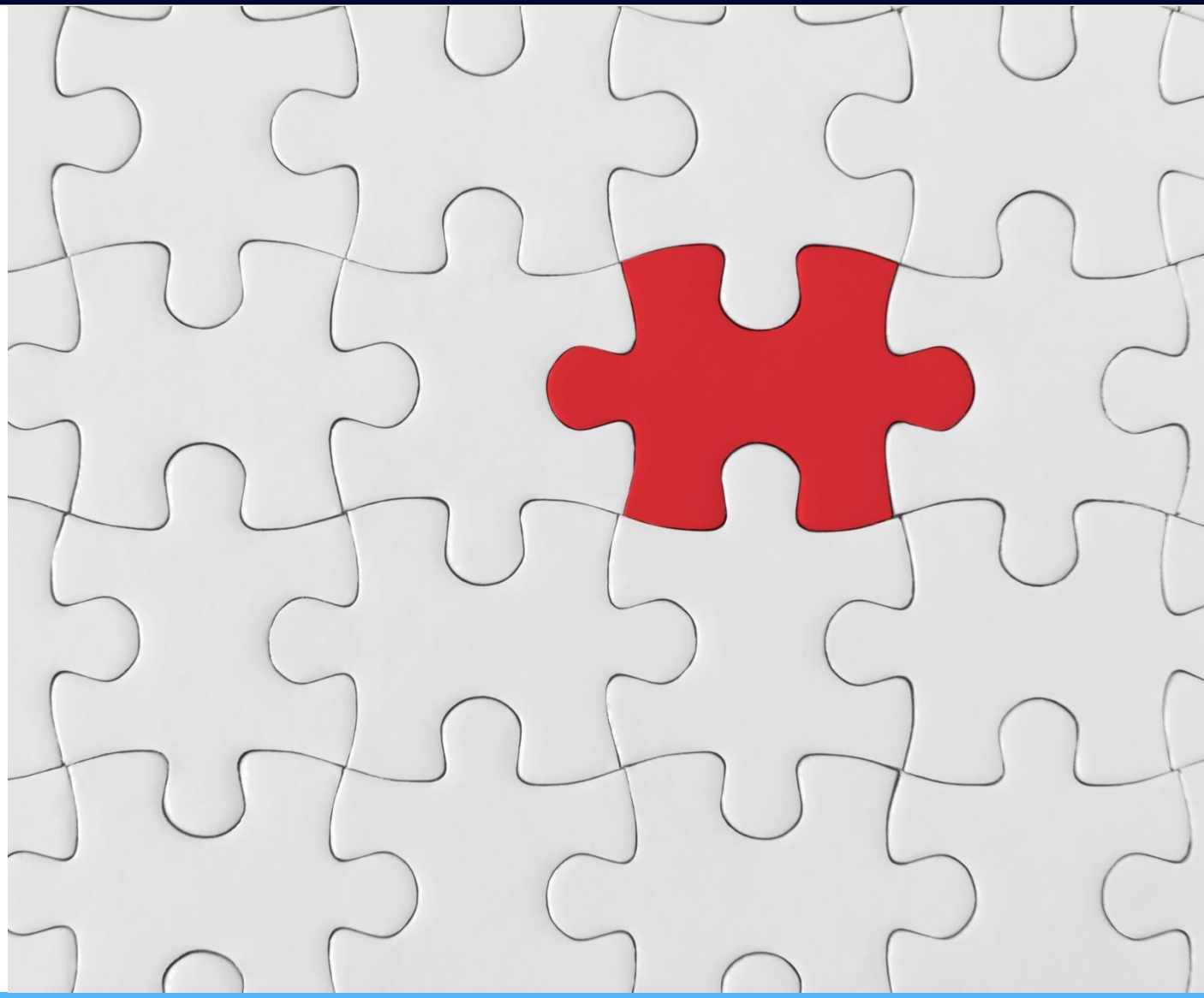
Forming

Early Stage



Elements to Consider

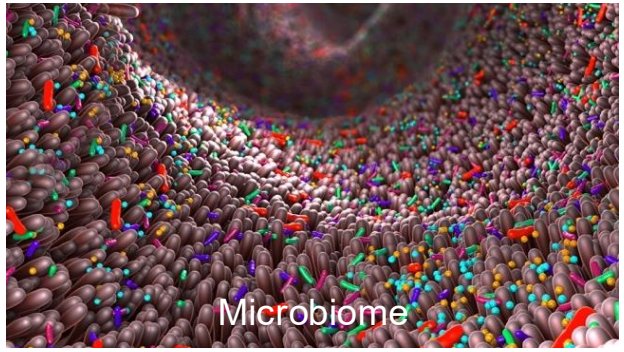
- Timing
- Size
- Mission
- Degree fit
- Difficulty
- Funding



Blasts from the Past









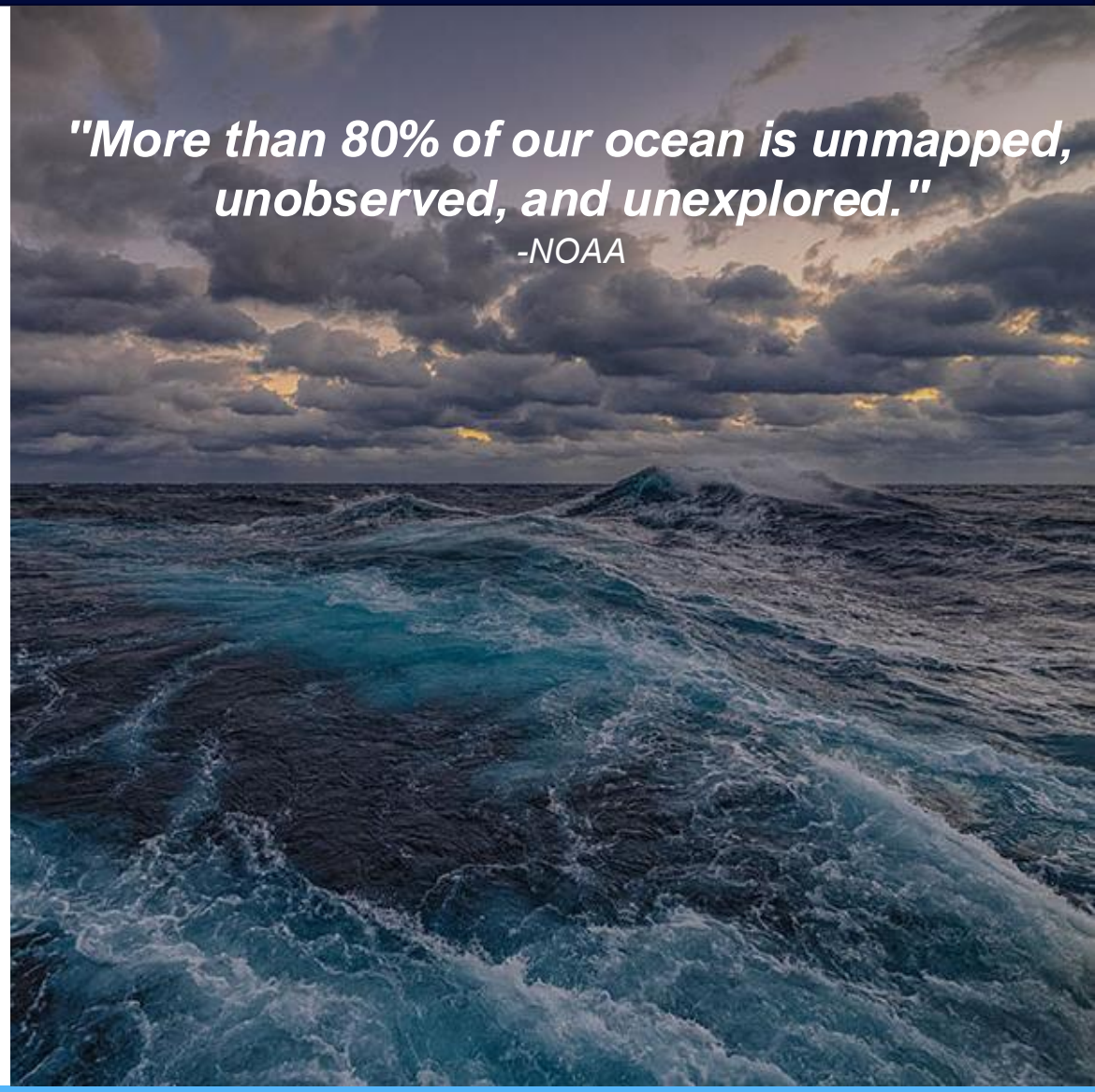



The Blue Economy

The Last Great Unknown

"It is a curious situation that the sea, from which life first arose, should now be the last part of the earth to be explored."

- 70% of the Earth's surface
- Largest livable space on our planet
- We know more about Mars and the Moon than we do the ocean floor.



A Resource Like No Other

- Fishing
- Trade
- Exploration
- Recreation
- Habitat



Under Pressure

Oceans play a vital role in regulating Earth's climate.

Oceans absorb heat from the atmosphere

↓

Ocean temperatures are rising

Oceans absorb CO^2

↓

Oceans are becoming more acidic



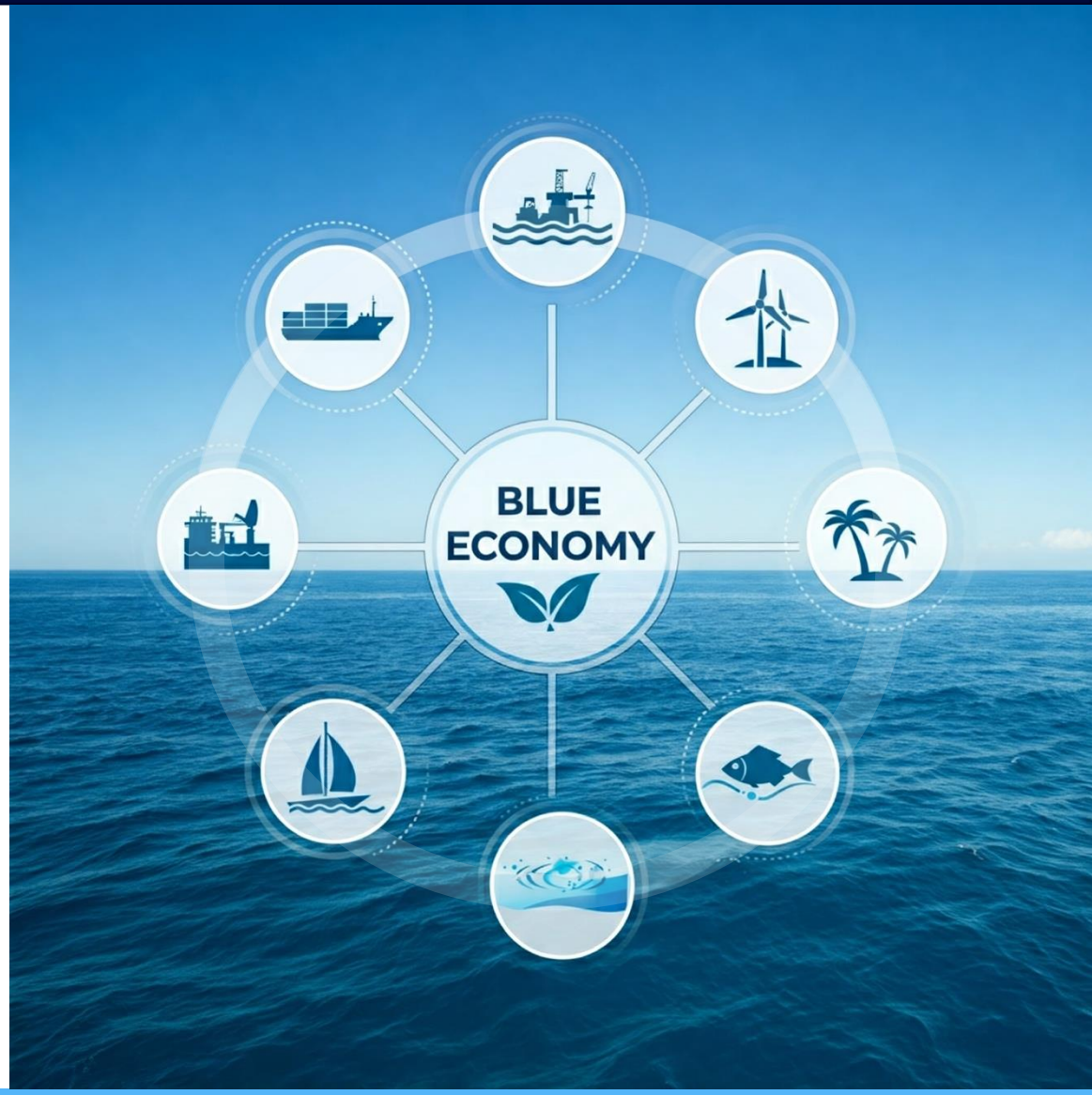
The Blue Economy

Sustainable use of ocean resources for economic growth

- Economic Growth
- Sustainability
- Social Inclusion

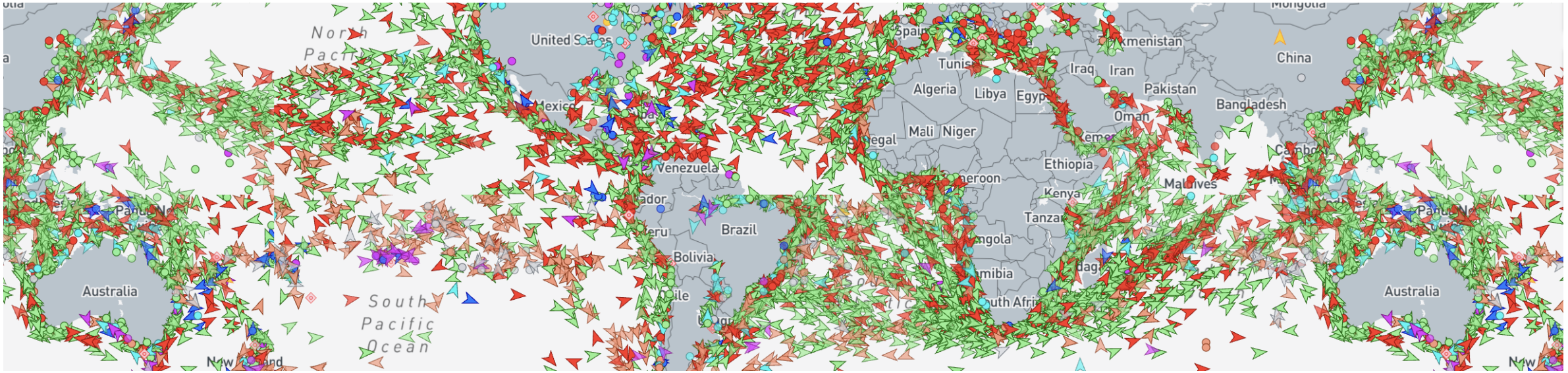
The "blue economy aims to move beyond business as usual and to consider economic development and ocean health as compatible propositions."

-World Bank, The Potential of the Blue Economy



Traditional Sectors

- Fisheries and Aquaculture
- Transport and Shipping
- Coastal Tourism
- Offshore Oil and Gas
- Defense



Source: Marine traffic.com, accessed 1/3/2025; https://www.marinetraffic.com/en/ais/home/centerx:-25.0/centery:23.6/zoom:2#google_vignette

Emerging Sectors

- Renewable Ocean Energy
- Marine Bioprospecting and Biotechnology
- Seabed Mining
- Carbon Sequestration



Center for Growing Ocean Energy Technologies and the Blue Economy (GO Blue)

- Collaboration between:
  - University of Michigan
  - Stevens Institute of Technology
  - Texas A&M University at Corpus Christi
- Focus on developing renewable marine energy
- Funding from the NSF



Middlebury College

Center for the Blue Economy

- At the Middlebury Institute of International Studies at Monterey
- Focus on economic and policy analysis
- Funds fellowships and graduate research



UNC Wilmington

Alliance for the Blue Economy

- “All Blue”
- Supports innovation and entrepreneurs
- Promotes region as Blue Economy hub
- Fosters collaboration across academia, industry, and government



Oregon State University

MS, MEng Coastal and Ocean Engineering

- Offered by the **College of Engineering**
- Interdisciplinary research in coastal climate change, natural hazards, marine renewable energy, and sustainable coastal communities.
- Hinsdale Wave Research Laboratory
- Public and private sector leadership roles

Oregon State University

Marine Studies major

- Offered by the **College of Liberal Arts**
- Interdisciplinary focus on humanities and social science aspects of ocean and coastal issues
- Emphasis on sustainability
- Careers in marine policy analysis, environmental policy, marine communications, and marine conservation

Unity Environmental University

Blue Economy Sustainable MBA

- Alignment with mission as “America’s Environmental University”
- Blend of business, marine science, coastal resilience, and blue economy principles
- Integrated within a sustainability emphasis
- Careers in marine resource management, coastal planning, sustainable tourism, environmental policy

University of South Florida

MBA, Blue Economy concentration

- Offered by the College of Business and the College of Marine Science
- Leverages university’s coastal location, strength in marine sciences, and strong MBA programs
- Required concentration courses:
  - Oceanography for the Blue Economy
  - Resilient, Sustainable, and Secure Port Operations and Infrastructure
  - Marine Aquaculture
- Targeted to maritime trade, coastal tourism, energy, and fisheries management professionals

Kentucky State University

MS in Aquaculture and Aquatic Sciences

- Offered by the School of Aquaculture and Aquatic Sciences
- Curriculum includes fish production, health, nutrition, and the business of aquaculture
- Prepare students for careers in the growing field of fish farming

Heriot Watt University

MSc Marine Renewable Energy

- Offered by the School of Energy, Geoscience, Infrastructure, and Society
- Focus on environment, technology, and governance
- Also covers topics related to policy and energy markets
- Develops technical, scientific, and managerial skills for professional roles in the marine renewable energy sector


Computational Social Science

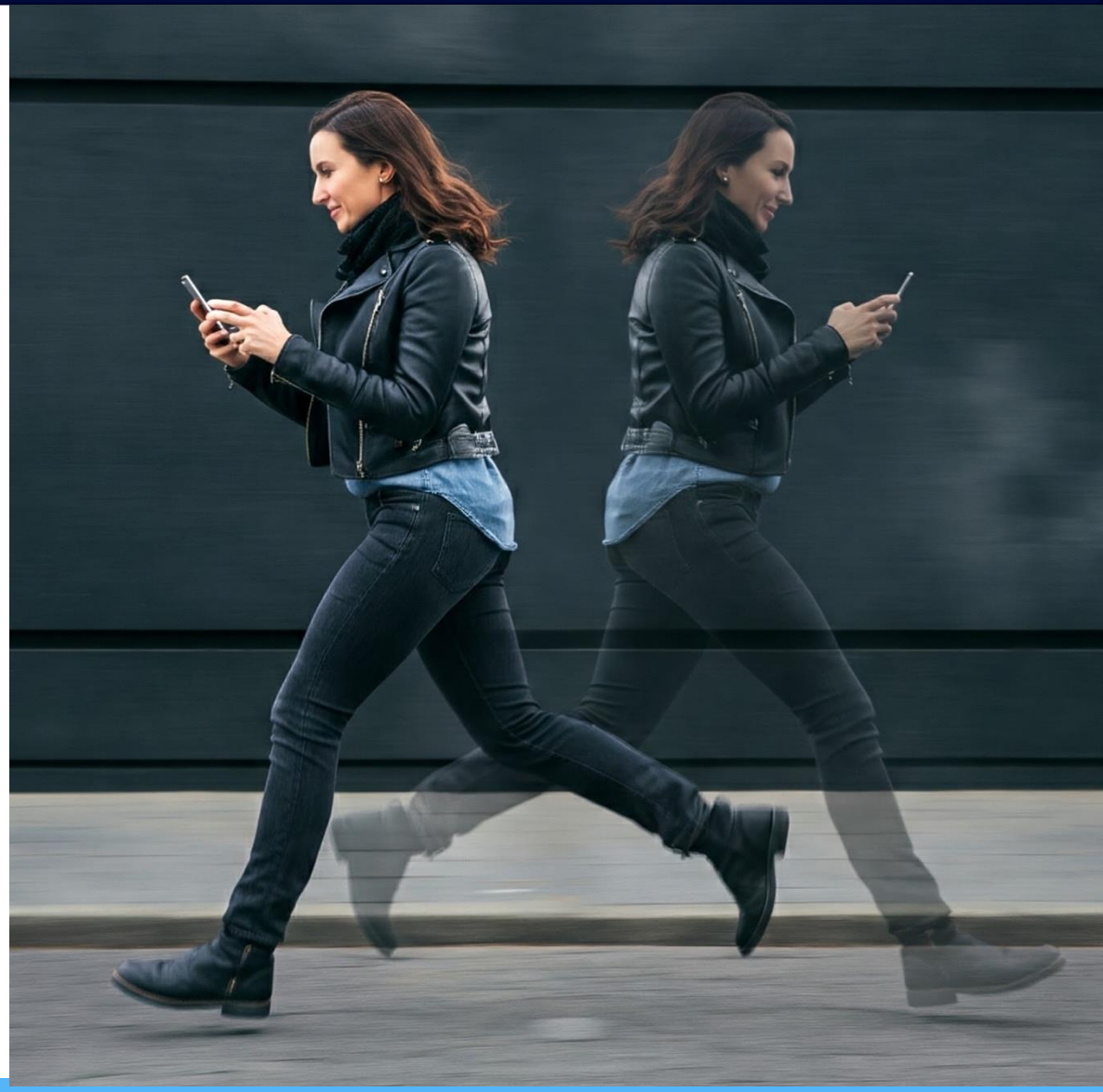
A World Immersed in Social Media

- 5.22 billion users worldwide
- 2H 19M typical daily use
- 12 billion hours every day worldwide



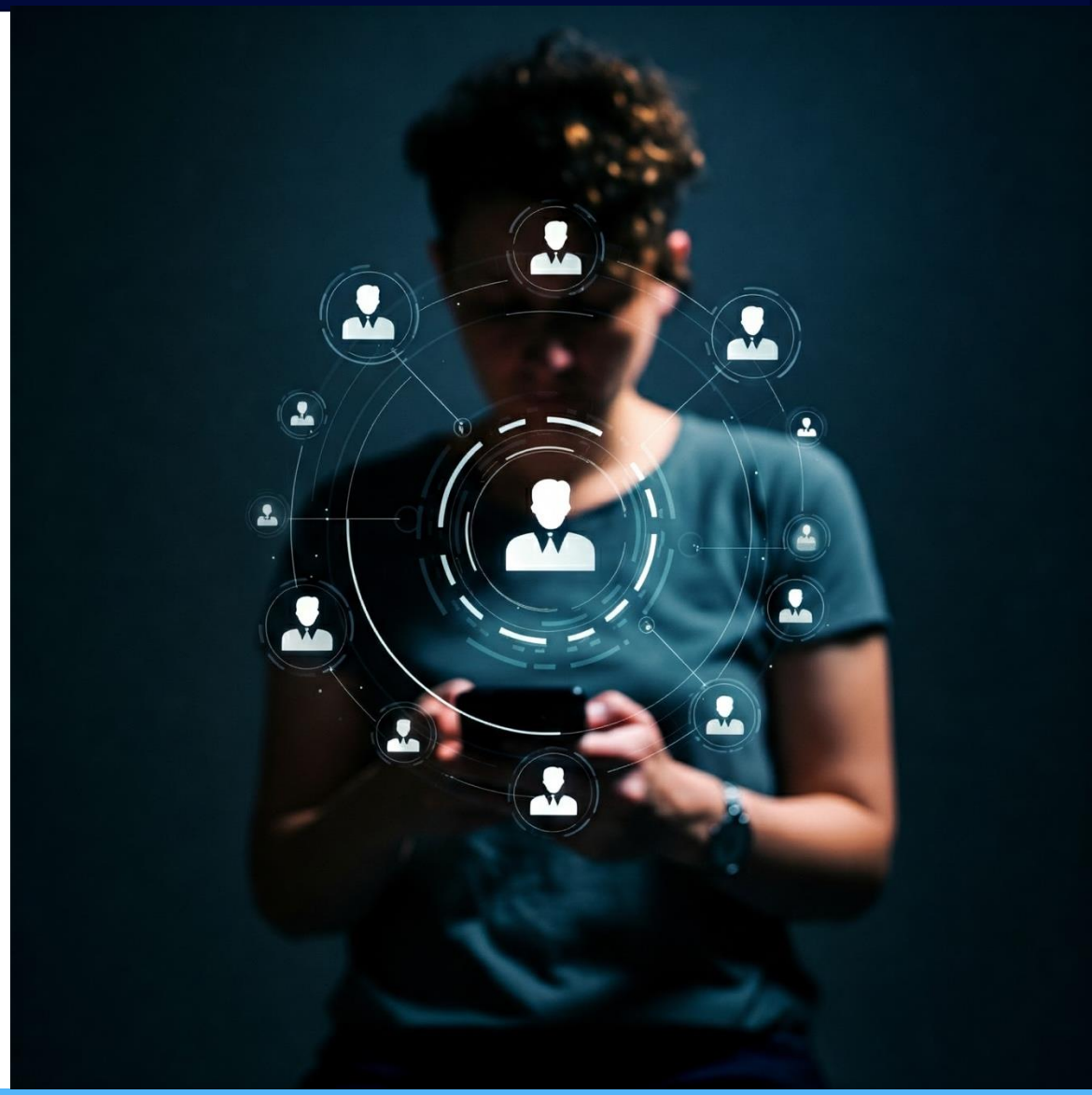
Social Media Influences Behavior

- Communication and Social Interactions
- Information Sharing and Consumption
- Political Engagement and Activism
- Work and Learning
- Purchasing Patterns and Sources
- Self-Perception and Identity
- Mental and Emotional Well-being



Social Media Influences Relationships

- Profiles and Networks
- Content Sharing and Interactions
- Algorithms and Feeds



Computational Social Science

Applying computational approaches to the study of people and their behavior within society.

- Intersection of computer science and social sciences
- Social media generates enormous amounts of data
- Modern computational methods enable analysis of massive data sets
- Provide insights into behaviors
- May help predict future behaviors to address societal issues



Bushfires Fuel Push for Climate Action

- Researchers analyzed 9,000 tweets to understand how the disaster affected perceptions around climate change
- The findings: social media interactions increased support for climate action

*"the very act of retweeting a tweet suggesting the bushfire crisis is indicative of the urgent need for broad climate action is, in a sense, contributing to the legitimisation of this discourse and countering the arguments of those who do not see the issues as linked."**



*Quote source: "Winning the discursive struggle? The impact of a significant environmental crisis event on dominant climate discourses on Twitter", abstract, University of Canberra; https://researchprofiles.canberra.edu.au/en/publications/winning-the-discursive-struggle-the-impact-of-a-significant-envir

Career Opportunities in CSS

- Data science and social science-focused roles
- Social Media/Tech/Analytics firms, NGOs, Government/Defense, Academia, Healthcare, Consulting

Research Scientist, Computational Social Science (PhD)

Meta · 4.1 ★

575 7th St NW, Washington, DC 20004

Meta

Full job description

Meta is seeking a Research Scientist to join the Computational Social Science team. Meta is committed to understanding and improving our impact on important societal topics, such as fostering healthy connection and community, social cohesion, youth experiences, civic discourse, elections and democracy, institutional trust, economic opportunity, and inequality. We are the computational social scientists dedicated to tackling these research problems at scale using quantitative and computational methods.

TikTok

Investigations Data Scientist, Deceptive Behaviors

Microsoft

Senior Researcher - Computational Social Science – Microsoft Research

UCDAVIS

Post-Doctoral Scholar in Computational Collective Behavior

University of Pittsburgh

BS in Computational Social Science

- Offered by the School of Computing and Information
- Combines core social science courses with computational tools and skills
  - Core Courses: Social science fundamentals (e.g., politics, international relations, research methods), programming, data analysis, ethics in computing
  - Specialization Courses: American politics, comparative politics, international relations
  - Advanced Skills: Data mining, machine learning, visualization, predictive analytics, social computing
- Focuses on addressing complex social challenges such as climate change, political violence, cybersecurity and privacy, social polarization, and inequality
- Prepares students for careers in data analysis, research, and technology

University of California San Diego

MS in Computational Social Science

- Housed in School of Social Sciences
- Targets social science undergraduates seeking knowledge in quantitative methods
- Introductory boot camp provides the foundational skills in statistics, linear algebra, calculus, and computer programming
- Up to 35 students per cohort at maturity

"This one-year MS program combines skills and techniques of large-scale data analysis, visualization, and modeling with social science questions and theories to ask, evaluate, and answer questions about society."



Image source: https://css.ucsd.edu/masters/index.html


Mars

What does “Mars” encompass?

The potential advantages and obstacles involved in creating a human presence on Mars

Why bother?

- Potential life beyond Earth
- Learn new things about Earth
- Alternative planet for humanity

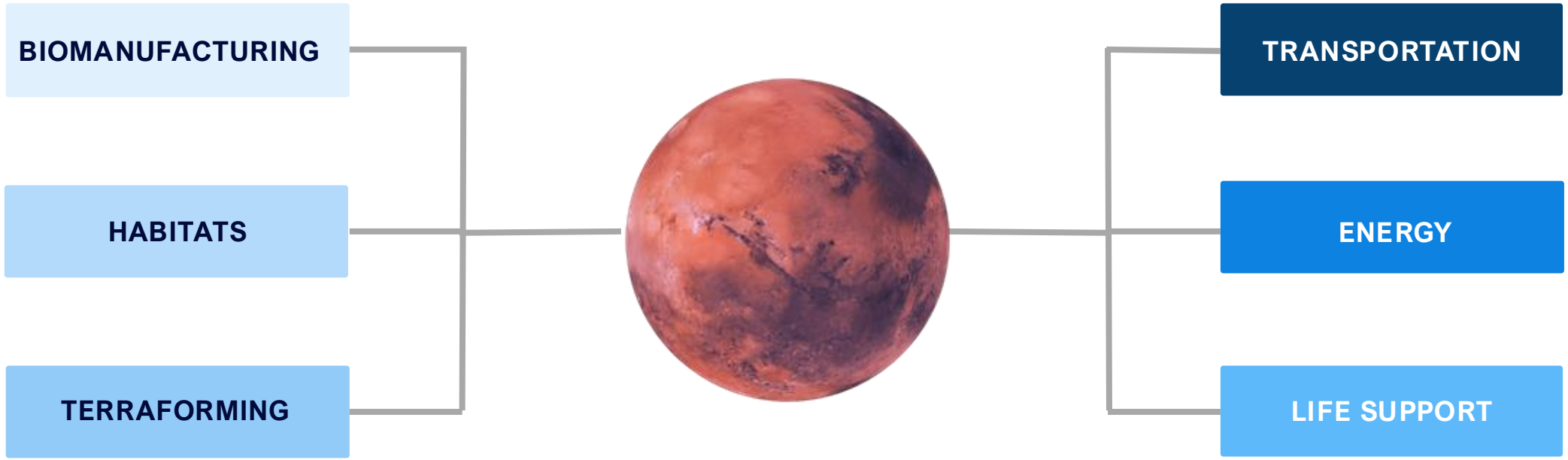
Why Mars?

- Travel time
- Rotation of Sun
- Atmosphere Potential



Image Credit: Peter Mountain, “The Martian movie not all that far-fetched,”, kold.com, 2018

Living on Mars presents significant challenges.



"If the oxygenator breaks down, I'll suffocate. If the water reclaimer breaks down, I'll die of thirst. If the hab breaches, I'll just kind of implode. If none of those things happen, I'll eventually run out of food and starve to death. So, yeah... "

– Mark Watney, The Martian

Transportation and Life Support

The Journey to Mars

- How will we get there?
  - NASA's Artemis III Mission
  - SpaceX's Reusable Starship

- How will we survive the journey?



Image Credit: SpaceX

Biomanufacturing

DARPA - B-SURE:
Biomanufacturing - Survival, Utility, and Reliability beyond Earth

- Resilient Supply Chains
- Technological Dominance
- Asset Protection

DARPA - Cornucopia:
Leveraging the power of microbes to make food

- Three ingredients — air, water, and electricity
- Engineered microbes for fat, carbohydrates, and proteins
- Portable System



Terraforming

- Creating Earth-like soil
- Self-sufficient food production
- Mars dust particles to warm the planet



Habitats

- NASA's Crew Health and Performance Exploration Analog (CHAPEA)
- Georgia Tech's Habitats Optimized for Missions of Exploration (HOME)



Aerospace programs are taking off – and so are jobs

Aerospace/Defense Industry

Year-to-Date Job Postings: 131,481

YoY Change: 9%

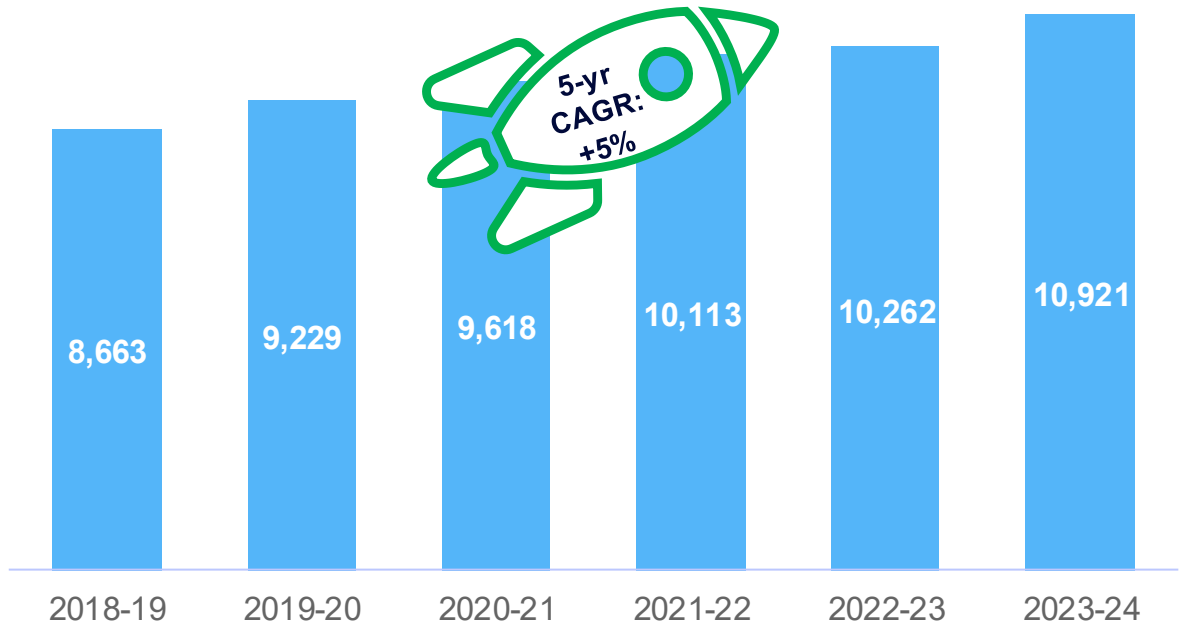
Aero/Astro/Space Engineering Program (CIP 14.0201)

BLS Current Entry-Level Employment (All Award Levels): 122,088

Median Salary w/ Bachelor's (post entry-level): $100,322

Median Salary w/ Master's: $124,925

New Enrollment, Aero/Astro/Space Engineering
All Award Levels, 2018-19 to 2023-24**



Source: Gray DI's Program Evaluation System

**Excludes Summer New Enrollment

Employment

From 2018-2023, 60,785 college grads at all award levels were employed in the space and defense and aviation and aerospace industries.

- The most common degree was in business, followed by various types of engineering degrees, computer science, cybersecurity, and supply chain management and logistics.

Current Opportunities

- NASA Jet Propulsion Laboratory
  - Section Manager, Strategic Communications, Planning, and Campaigns
  - Advanced Dynamics Modeling for Autonomous Space and Robotics Systems
- SpaceX
  - Life Support Engineer (Crew Starship)
  - Supply Chain Planning Manager (Starship)
  - Environmental Technician

Source: Gray DI's Program Evaluation System, Indeed.com

Academic Programs

ASU's School of Earth and Space Exploration

Majors

Earth and Space Exploration:

- Astrobiology and Biogeosciences, BS
- Exploration Systems Design, BS

Instrumentation:

- Sensor Networks, MS
- Earth and Space Sciences, MS

Research: ASU Interplanetary Initiative (Selection):

- Laboratory and fellowship
- Space Futures Forward
  - Humanity as an interplanetary species
- ASU Space Collective
  - For businesses with commercial space objectives

Projects (select)

- Mars on the Field
  - Virtual Reality Experience of Mars
- Port of Mars
  - Mars Madness Tournament

University of North Dakota
MS in Space Studies

Major Topics:

- Planetary science
- Space engineering
- Life support systems
- Space history, policy, and law
- Space-related aspects of business and management

UND is the first institution in the nation to become a part of the U.S. Space Force's University Partnership Program.

Research Initiatives

- Spacesuit Research/Planetary Surface Habitation (with NASA)
- Planetary Industrial Operations (Space Mining)
- Spacecraft Simulator
- Space Law and Policy

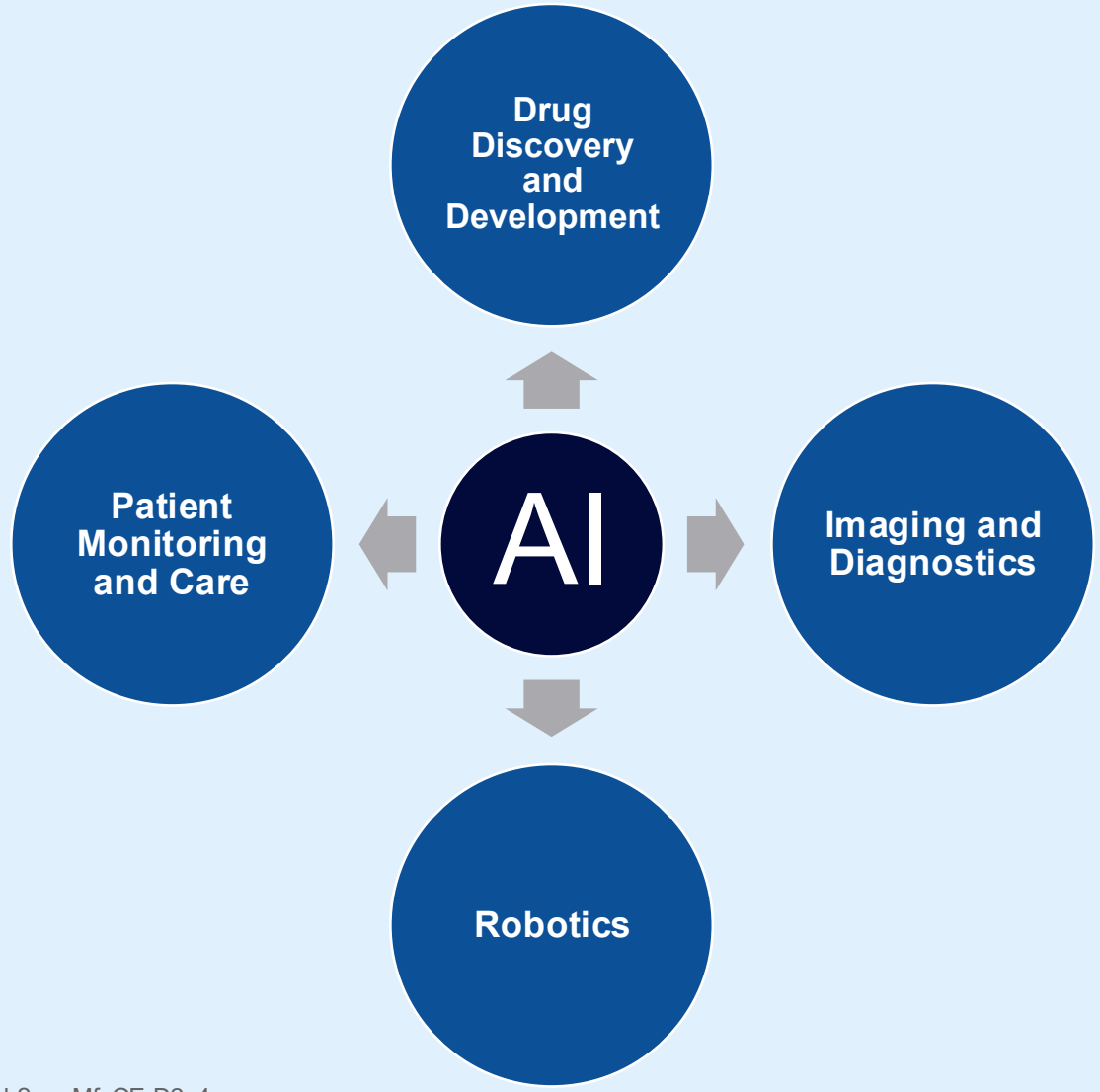


AI In Healthcare

Artificial Intelligence is Transforming Healthcare

"AI is perhaps the most transformational technology of our time, and healthcare is perhaps AI's most pressing application."

-Satya Nadella, Chief Executive Officer, Microsoft



Quote source: Satya Nadella announces strategic collaboration with Novartis. You Tube, 2019. https://www.youtube.com/watch?v=wMfsQE-D2q4

Drug Discovery and Development

- Target identification and validation
- Clinical trial optimization
- Repurpose existing drugs



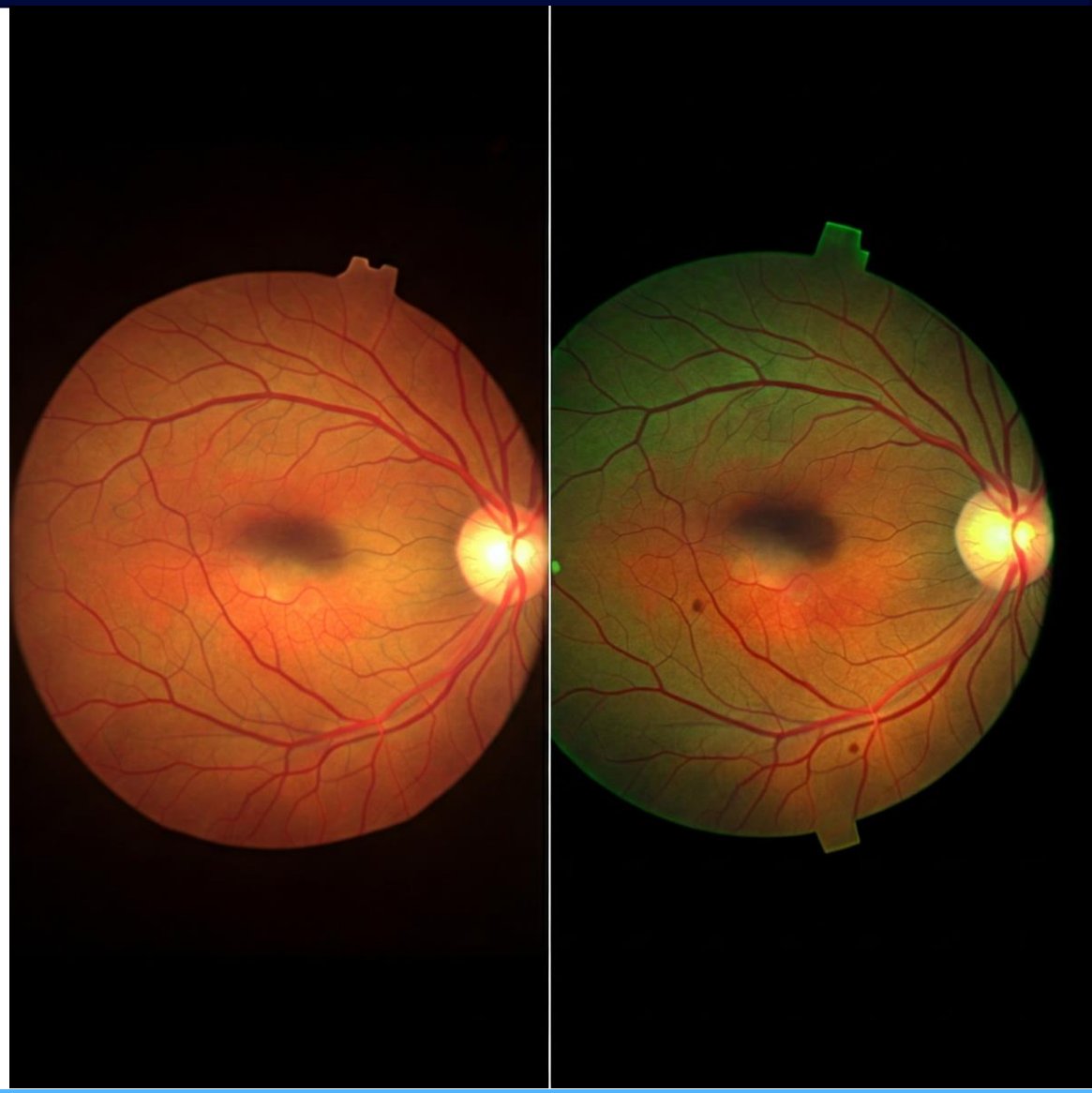
University of California San Francisco

MS in Artificial Intelligence and Computational Drug Discovery and Development

- Administered by the School of Pharmacy
- Trains students to leverage computational approaches to accelerate the discovery and development of new drugs and therapies
- Interdisciplinary curriculum combines computer science, data science, statistical analysis, machine learning, and pharmacology.
- Targeted to students with degrees in life sciences, computational sciences, pharmacology, and mathematics/statistics
- Launched in fall 2024.
- Program billed as “the first of its kind in the United States.”

Medical Imaging and Diagnostics

- Early diagnosis and disease detection
- Predictive analytics for personalized treatment
- Automated image analysis



University College London

Artificial Intelligence and Medical Imaging MSc

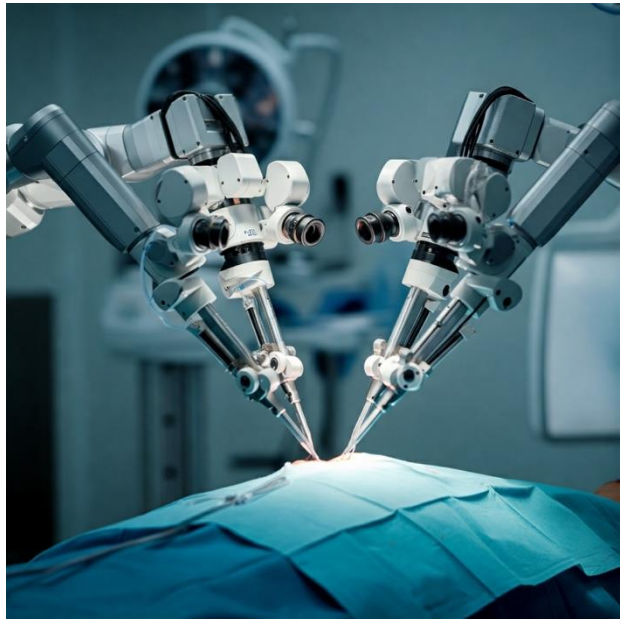
- Collaboration between the departments of Medical Physics and Biomedical Engineering and Computer Science
- Focuses on the application of AI techniques to medical image analysis
- Targeted to students with a background in computer science, engineering, physics, or related fields

Radiological Society of North America

Imaging AI Certificate Programs

- Upskilling for practicing radiologists
- Teaches the knowledge and skills to use AI in a medical imaging setting
- Foundational, Advanced, and Emergency certificates
- Billed as the “first and only radiology-specific AI program”

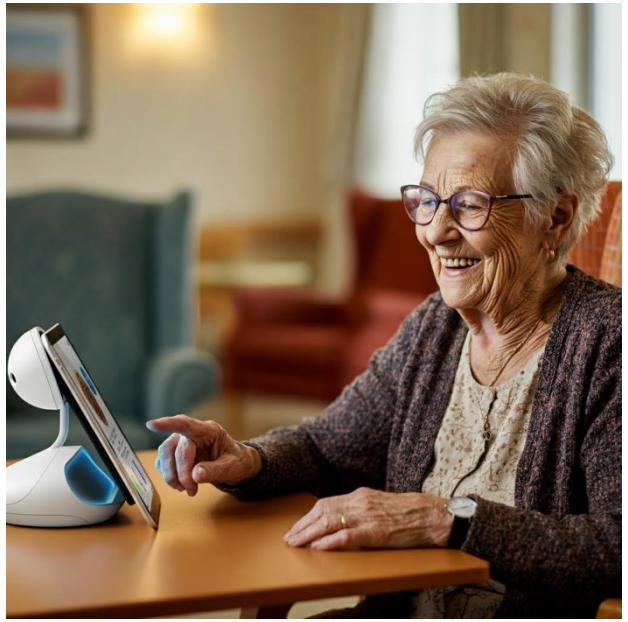
AI-Assisted Robotics



Surgery



Rehabilitation



Elder Care

Johns Hopkins Univ

Master of Science in Engineering - Robotics

- Offered by the Laboratory for Computational Sensing and Robotics (LCSR)
- Specialization track in Medical Robotics
- Targeted to students with STEM backgrounds
- Also offered as a five-year BS/MSE Degree

Carnegie Mellon Univ

Robotics Institute

- **Quality of Life Technology Center** focuses on technologies to improve the quality of life for older adults and people with disabilities
- AI-powered exoskeletons, assistive robots, surgical robots

University of Toronto

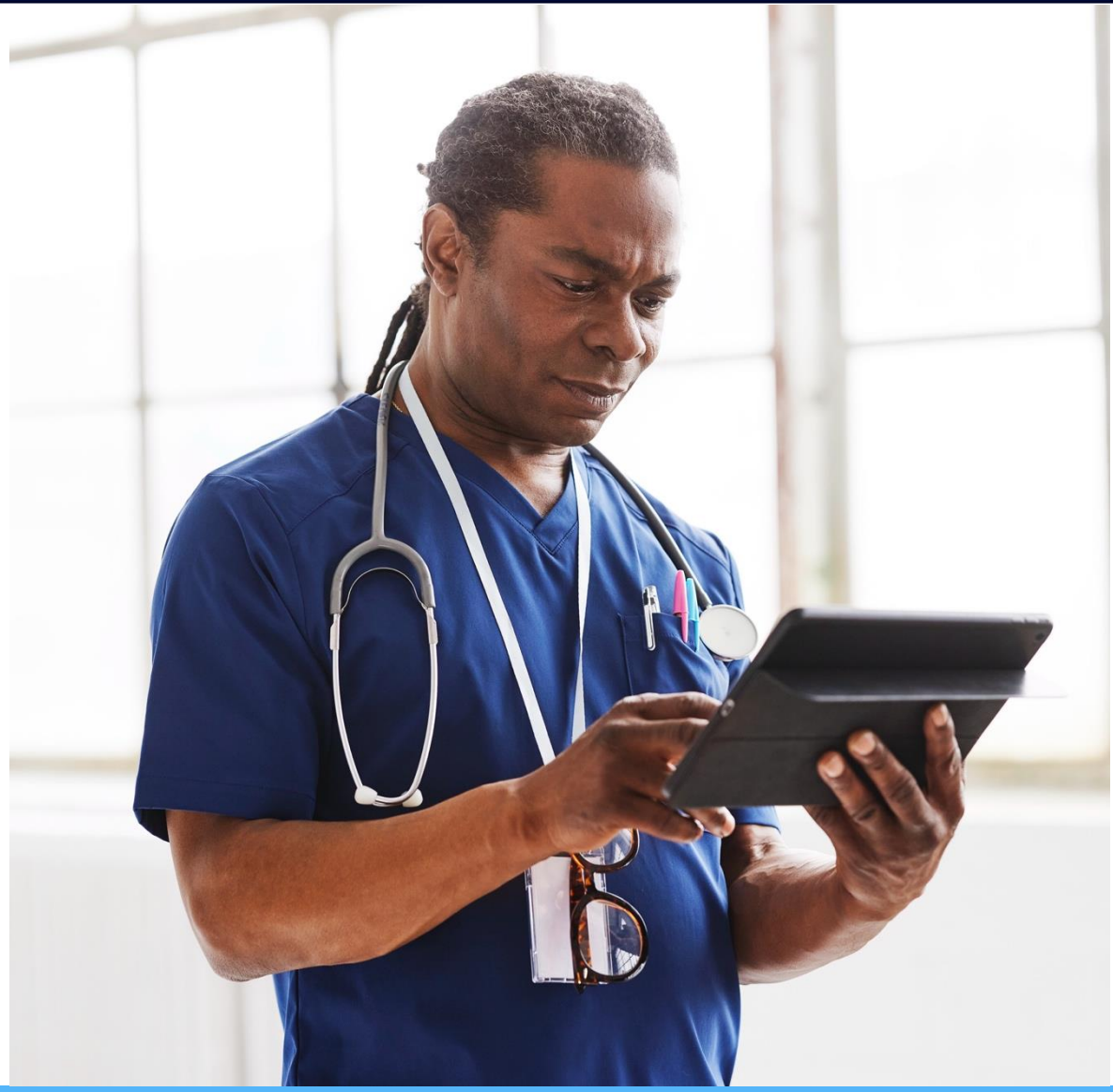
Healthcare Robotics Graduate Training Program

- Robotics for surgery, assistance, and rehabilitation
- Integrates AI, machine learning, and computer vision into robotics research
- Prepares graduates for careers in research, industry, or healthcare

Patient Monitoring and Care

AI-enhanced clinical applications

- Smart wearables for patient monitoring
- Medication management software
- Clinical decision support systems
- Predictive analytics for patient risk assessment
- Process automation for administrative tasks



Florida Atlantic University

BSN to MS in Artificial Intelligence

- Training new nurses in cutting-edge technology
- College of Nursing and the College of Engineering and Computer Science

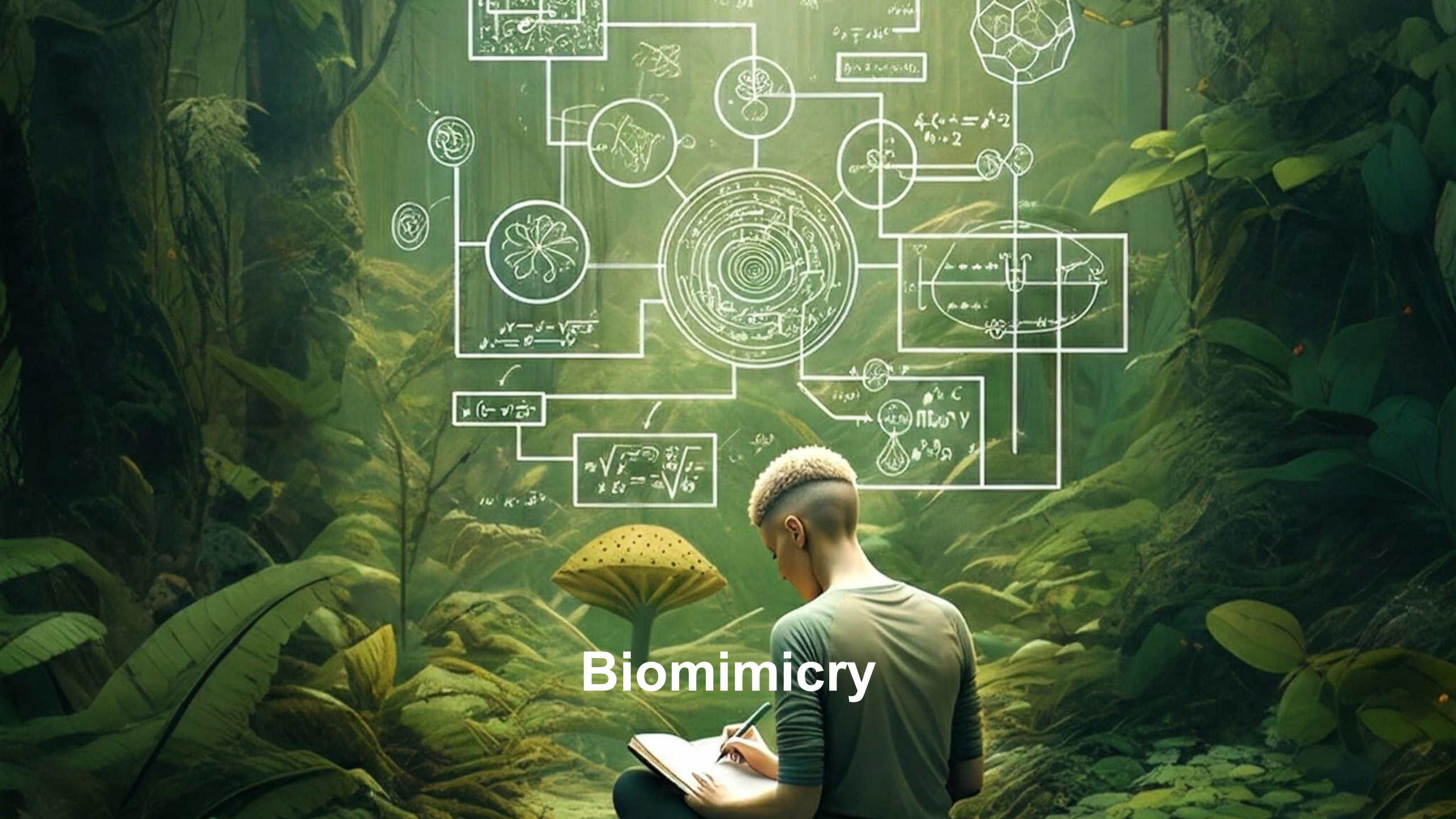
"The combined degree programs will provide FAU Bachelor's in Nursing (BSN) graduates with a leading edge in artificial intelligence, which includes algorithms, pattern matching, deep learning, and cognitive computing to learn how to understand complex data."
-FAU News Desk

Florida State University

MSN with AI Applications concentration

- AI training and skills for practicing RNs
- Launching spring 2025; cohorts of 35 students

Quote source: *New Degree Programs Combine Nursing with AI and Biomedical Engineering*, FAU News Desk, Gisele Galoustian, 6/21/2021; https://www.fau.edu/newsdesk/articles/nursing-engineering-degrees.php


Biomimicry

Nature-Inspired Solutions

- From DaVinci's flying machine to VELCRO®
- Biomimicry is an old concept with renewed interest

"Study nature, love nature, stay close to nature. It will never fail you."

- American architect and designer Frank Lloyd Wright

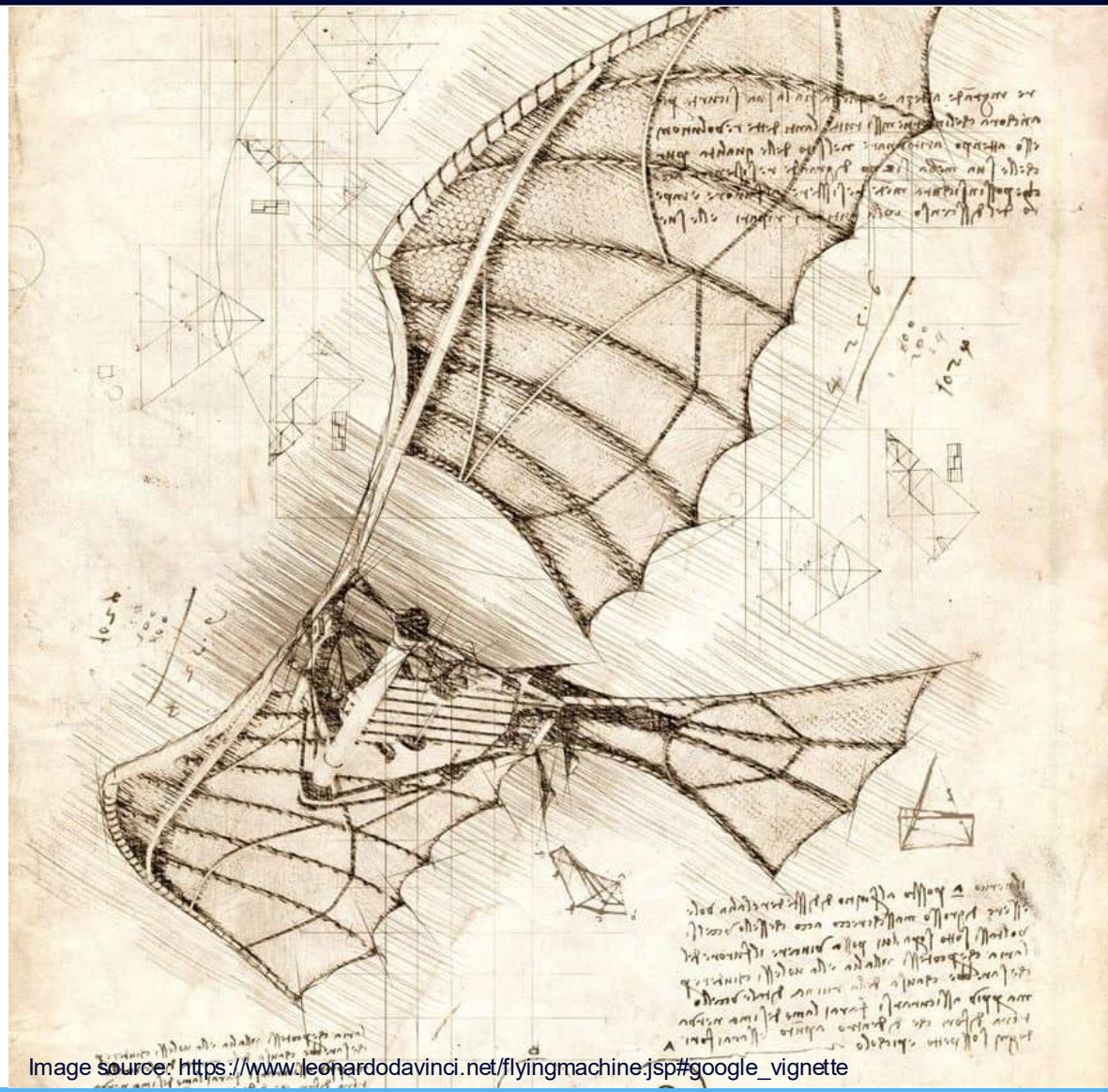


Image source: https://www.leonardodavinci.net/flyingmachine.jsp#google_vignette

Applications: Materials Science

- Lotus leaf inspires self-cleaning bioplastic for food packaging and antibacterial metal surfaces for food preparation



- Smart fabrics inspired by pinecones that react to moisture to regulate temperature



Applications: Built Environment

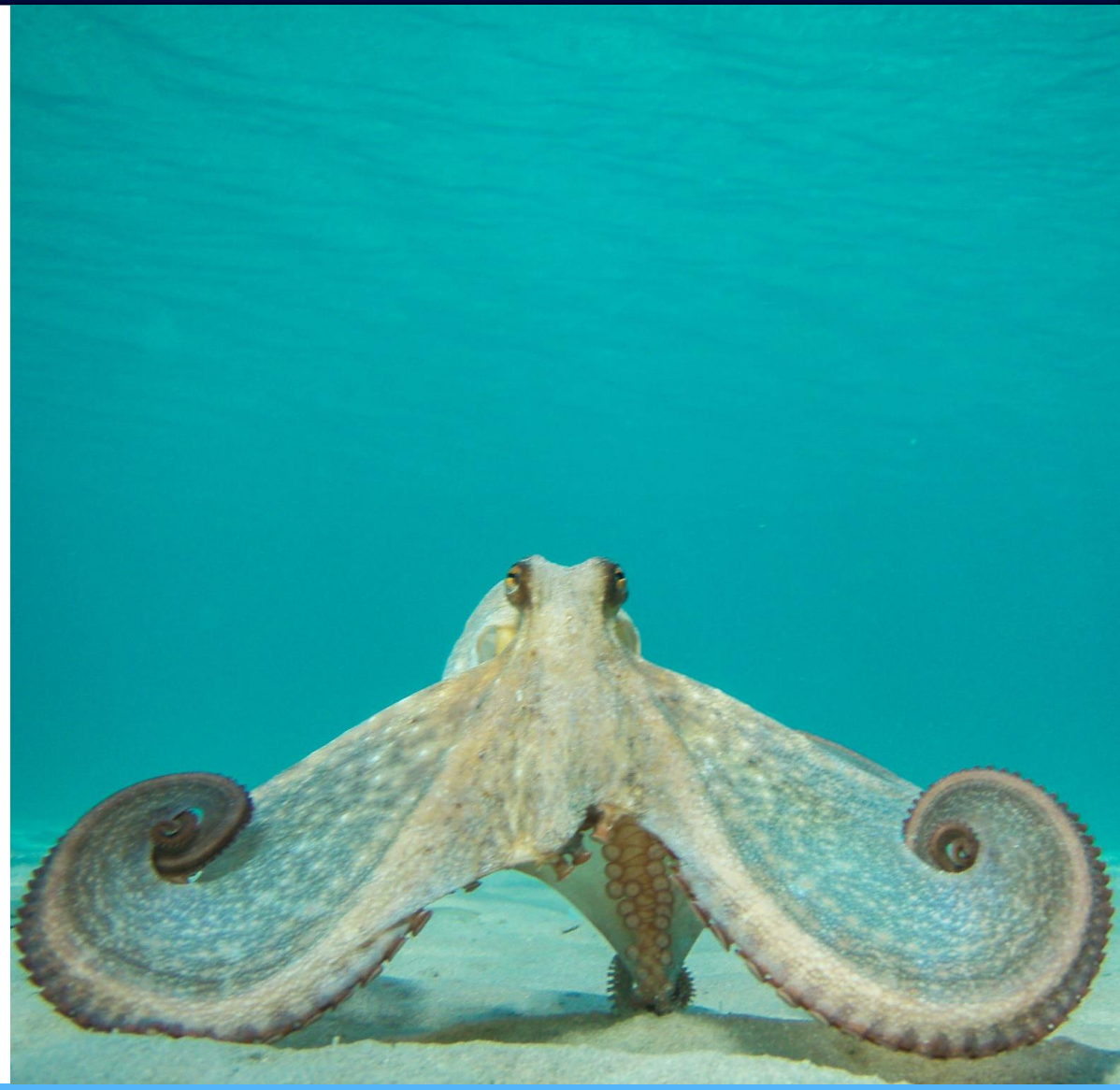
- Coral-inspired cement-making process turns a pollutant into a valuable building material

- Carbon dioxide is captured from power plants and bubbled through seawater to create calcium carbonate cement



Applications: Robotics

- The octopus as a muse
- Soft, adaptable robotic arms mimic the flexibility, dexterity, extensibility, and grasping ability of octopi



Applications: Design

- The “silent hunter” inspires a quieter EV fan
- Fan blades mimic the comb-like serrations on owls’ wings to minimize air turbulence and noise



Arizona State University

Master of Science in Biomimicry

- Offered by the ASU Biomimicry Center in collaboration with Biomimicry 3.8
- Curriculum includes sustainability, design, life sciences, materials engineering, and business
- Graduates have worked in transportation, product design, architecture, economics, nonprofits
- Also offers a graduate certificate in Biomimicry

University of Akron

Biomimicry Research and Innovation Center, Biomimicry Undergraduate Certificate

- Collaborates with Great Lakes Biomimicry
- 9-credit undergraduate certificate open to all majors
- Awarded $1 million NSF EAGER grant to study mechanics of underwater walking

"connecting artists, businesspeople, designers, engineers, and scientists to catalyze biomimicry-based innovation"
- BRIC program brochure

Minneapolis College of Art and Design

Biomimicry Certificate

- Professional development certificate
- Non-credit or credit-bearing
- Courses in:
  - Biomimetic Design
  - Fundamentals of Sustainable Design
  - Systems Thinking
  - An Introduction to Biomimicry: A Sustainable Design Methodology

Gray Decision Intelligence Resources

Coming in March – Master Class Series

Date	Topic
Tues., March 4	Foundations of Academic Program Evaluation
Tues., March 11	Fiscal Fitness to Fund Growth
Tues., March 18	Market Demand: The Key to Program Growth and Relevance
Tues., March 25	Managing and Sustaining Program Evaluation
Tues., April 1	Embracing Innovation: The Future of Program Evaluation

Register here:
https://www.graydi.us/2025-master-class-series

Monthly Webinars

Topic	Date
Demand Trends Webcast: Community Colleges	Wednesday Jan. 22nd at 2 PM ET
Demand Trends Webcast: Bachelor's and Above	Thursday Jan 23rd at 2 PM ET

