Board of Regents
Committee on Economic Development and Technology Commercialization

February 2, 2023
Virtual (public listen only access at 443-353-0686, Conference ID: 502 658 205)
Committee Members will be sent Zoom information
Materials can be found here: https://www.usmd.edu/regents/agendas/

Public Session Agenda

(1) Research and Economic Development Highlights (Information Item)

(2) Featured Program: Applied Research Laboratory for Intelligence and Security (ARLIS), a University of Maryland Department of Defense University-Affiliated Research Center (UARC) – Dr. Regli, Director, ARLIS (Information Item)

(3) Current Activities of the Office of the Vice Chancellor for Research and Economic Development (Information Item)

UNIVERSITY SYSTEM
of MARYLAND

BOARD OF REGENTS

SUMMARY OF ITEM FOR
INFORMATION

TOPIC: Research and Economic Development Highlights, Featured Program: ARLIS, and Current OVCRED Activities

COMMITTEE: Economic Development and Technology Commercialization

DATE OF COMMITTEE MEETING: Thursday, February 2, 2023

SUMMARY:

Updates across the System will be provided in the areas of Research and Economic Development. The featured program will be the Applied Research Laboratory for Intelligence and Security (ARLIS), a University of Maryland Department of Defense University-Affiliated Research Center (UARC). Dr. Regli, Director, ARLIS will present. The Office of the Vice Chancellor for Research and Economic Development (OVCRED) will also report on current activities.

FISCAL IMPACT: This item is for information purposes.

CHANCELLOR'S RECOMMENDATION: n/a

COMMITTEE RECOMMENDATION: DATE:

BOARD ACTION: DATE:

SUBMITTED BY: Michele Masucci 410-409-2236
                           mmasucci@usmd.edu

Office of the Vice Chancellor for Research and Economic Development

Board of Regents Committee on Economic Development and Technology Commercialization

Update

February 2, 2023

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Agenda

1. Research and Economic Development Highlights

2. Featured Center: ARLIS, Executive Director, William Regli, Ph.D.

3. Current Activities of the Office of the Vice Chancellor for Research and

   Economic Development

4. Q and A

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1. Research and Economic Development Highlights

- **NSF HERD Data for USM for FY 2021 Released**

  ✓ Increase from **$1,279,710,000** in FY 2020 to **$1,316,935,000** in FY 2021 **(3%)** systemwide* USM Institutions reporting include: UMD-UMB, UMBC, UMCES, UMES, UBalt, SU, TU, BSU

  ✓ Notable increases:

  USMD-UMB + 39M (3.5%)

  UMBC + 500K (1%)

  UMES + 500K (7%)

  SU + 1 M (11%)
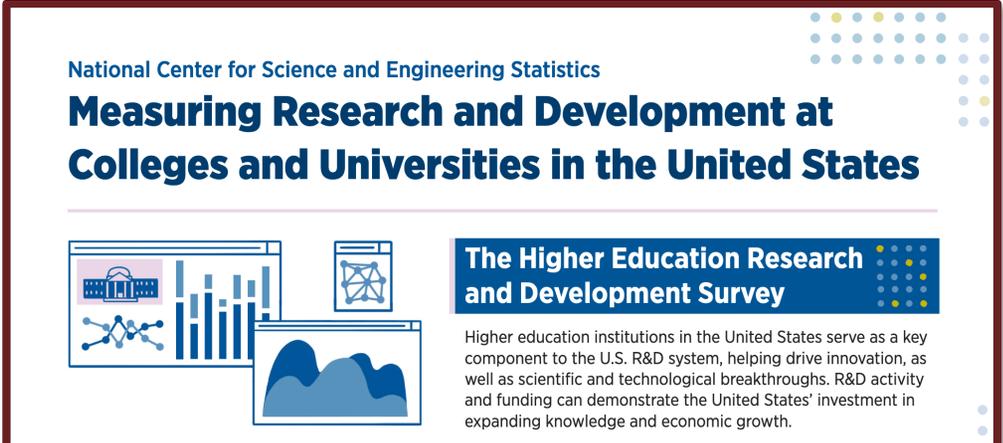
National Center for Science and Engineering Statistics

Measuring Research and Development at Colleges and Universities in the United States

The Higher Education Research and Development Survey

Higher education institutions in the United States serve as a key component to the U.S. R&D system, helping drive innovation, as well as scientific and technological breakthroughs. R&D activity and funding can demonstrate the United States' investment in expanding knowledge and economic growth.

Research and Economic Development Highlights

USM Research Expenditures at a Glance

UNIVERSITY SYSTEM of MARYLAND

Institution	NSF Herd FY 2021	HERD Rank	Basic Carnegie Designation	US News and World Rankings	Notes
Bowie	$ 1,398,000	581/384	Master's Colleges & Universities: Larger Programs	133-175 Regional North 46-63 Top Public North	48th HBCUs HERD 18 HBCU USN
Coppin	N/A	N/A	Master's Colleges & Universities: Small Programs	133-175 Regional North 46-63 Top Public North	DNR Herd 35 HBCU USN
Frostburg	N/A	N/A	Master's Colleges & Universities: Larger Programs	113 Regional North 40 Top Public North	DNR Herd
Salisbury	$ 10,552,000	339/247	Master's Colleges & Universities: Larger Programs	63 Regional North 14 Top Public North	
Towson	$ 3,794,000	453/315	Master's Colleges & Universities: Larger Programs	33 Regional North 9 Top Public North	
UBalt	$ 14,672,000	315/231	Special Focus Four-Year: Research Institution	90 Regional North 28 Top Public North	
UMB	$ 1,142,264,000	17/11	Special Focus Four-Year: Research Institution	268 Global Universities 9 Nursing in US	In FY 2019, the UMB and UMD began reporting as one research unit to reflect their new strategic partnership. This relationship was codified through the University of Maryland Strategic Partnership Act passed by the Maryland General Assembly in 2016. Prior to FY 2019, both campuses reported to the survey as separate institutions.
UMCP			R1 - Doctoral Universities: Very High Research Activity	55 National 19 Top Public National	
UMBC	$ 84,418,000	171/123	R1 - Doctoral Universities: Very High Research Activity	137 National 64 Top Public National	9 Undergrad Teaching - USN
UMCES	$ 51,201,000	202/147			
UMES	$ 8,636,000	357/261	R2 - Doctoral Universities: High Research Activity	334-440 National 169-227 Public National	24th HBCUs HERD; 16 HBCUs USN
UMGC	N/A	N/A	Master's Colleges & Universities: Larger Programs	133-175 Regional North 49-63 Public North	
Total	$ 1,316,935,000	All/Public			More information on USM Rankings: https://www.usmd.edu/newsroom/news/2274

Research and Economic Development Highlights

- ## Awards

  ### Freeman A. Hrabowski III

  President Emeritus, UMBC

  Member, National Academy of
  >   Engineering

  Selected as the National Academy of
  >   Sciences recipient of the
  >   **Public Welfare Medal**

This is the highest NAS honor, awarded for his outstanding leadership in transforming U.S. science education and increasing cultural diversity within the science workforce. The medal is the Academy's most prestigious award, established in 1914 and presented annually to honor extraordinary use of science for the public good.

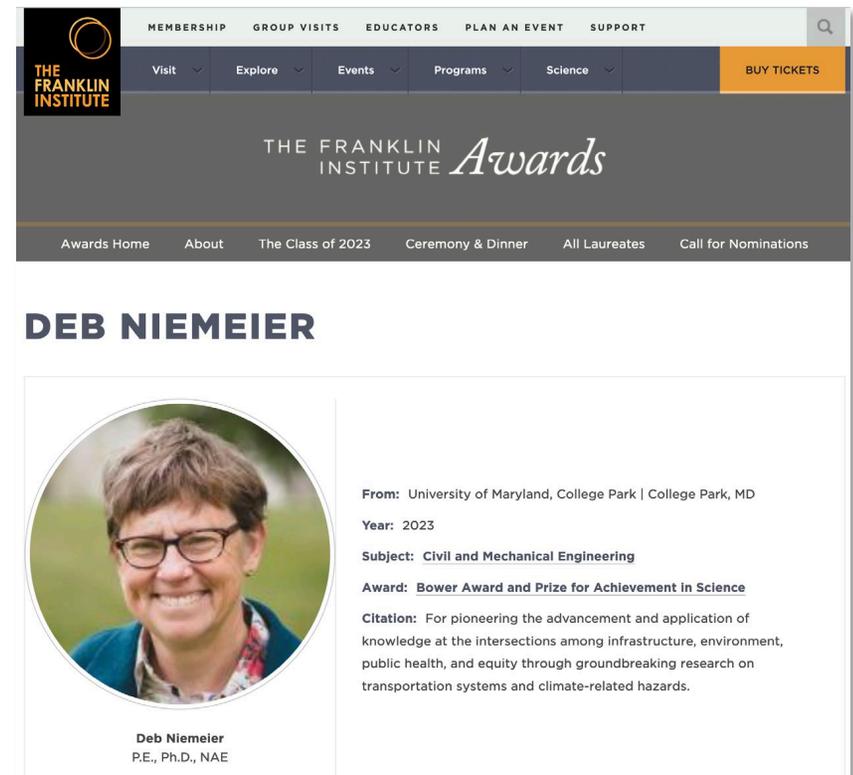**Research and Economic Development Highlights**

Deb Neimeir

Clark Distinguished Chair of Civil and Mechanical Engineering and Director, Center for Disaster Resilience

University of Maryland, College Park

Member, National Academy of Engineering

Selected as the recipient of the **Franklin Institute's Bower Award and Prize for Achievement in Science**

This award recognizes Professor Niemeier's "pioneering the advancement and application of knowledge at the intersections among infrastructure, environment, public health, and equity through groundbreaking research on transportation systems and climate-related hazards."

Research and Economic Development Highlights

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- **USAF UARC Program focused on Autonomy and DOD STEM Pipeline**

  - ✓ $90M contract to led by Howard University, first ever UARC led by an HBCU; **Bowie State University** is part of the collaboration team along with Jackson State University (MS); Tuskegee University (AL), Hampton University (VA), Norfolk State University (VA), Delaware State University (DE), Florida Memorial University (FL), and Tougaloo College (MS)

  - ✓ **15 UARCs total, two in MD, including this one and ARLIS at UMDCP**

AFRL ONE AFRL / TWO SERVICES

HOME > NEWS > ARTICLE DISPLAY

US Air Force selects Howard University for science research partnership

Published Jan. 23, 2023

American Forces Press Service

WASHINGTON (AFNS) -- The Department of the Air Force has selected **Howard University** as the first historically black college or university to lead a university affiliated research center.

The center will be focused on tactical autonomy technology for military systems and Howard University will receive $12 million per year for five years to fund research, faculty and students.

"Autonomous systems make our military faster, smarter and more combat-credible," said Secretary of Defense **Lloyd Austin**. "They equip commanders with the best possible information to support life-and-death decisions. And I have no doubt that the advancements that will come out of Howard's new research center will do even more to protect our most precious asset-our men and women in uniform."

The Department of Defense currently has 14 university affiliated research centers. Such centers are responsible for providing dedicated facilities and sharing space with Defense Department officials and industrial participants to conduct basic, applied and technology demonstration research.

"We need a team of decision-makers, researchers, scientists, engineers, and leaders who are committed to security and liberty

Research and Economic Development Highlights

- **NSF Convergence Research Awardees at UMDCP and UMBC**

  ✓ P.I. Stephanie Lansing, Professor of Agriculture and Natural Resources, UMDCP, Mid-Atlantic Food Resiliancy Network, $750K

  ✓ P.I. Lauren Clay, Associate Professor and Chair of Emergency Health Services, UMBC, $624K, Convergence Towards a Disaster Resilient Food System

Research and Economic Development Highlights

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- ## Coppin State University

  ✓ New Award for $3.9 M from U.S. Department of Commerce for Developing Broadband program to support university and West Baltimore community infrastructure needs

  ✓ Aims to:

  - Improve access to Internet through services, technology use support, and equipment

  - Provide skills training

  - Empower communities through access to information and services

Research and Economic Development Highlights

- **NSF Funded Harnessing the Data Revolution (HDR) program award for $13M to UMBC**

  ✓ Led by P.I. Vandana Janeja, Professor and Chair, Information Systems Department, UMBC

  ✓ UMBC leads national team including: Dartmouth, UC Boulder, Amherst College, University of Alaska Fairbanks, University of Minnesota, University of North Texas, UT Austin and Morgan State in project to develop deep integration of big data to provide physics-based discovery and support for response to climate change at polar regions

Research and Economic Development Highlights

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- **Commercial Successes: MarinaLife**
  - ✓ Maryland Momentum Fund invested in Series A of MarinaLife
  - ✓ Baltimore-based technology company with solutions for boaters and marinas
  - ✓ Local and non-local co-investors
  - ✓ Leverages Maryland's strong boating industry
  - ✓ CEO Jen Leroux and team will use funding to scale operations in Maryland, expand offerings
  - ✓ Founder Dan Cowens is a lifelong boater who undertook revolutionizing the marina industry while in the UMD Smith School's executive MBA program
  - ✓ Dan is also a Salisbury University alumnus and received early capital and mentoring support through Salisbury University's Shore Hatchery in 2014-2015

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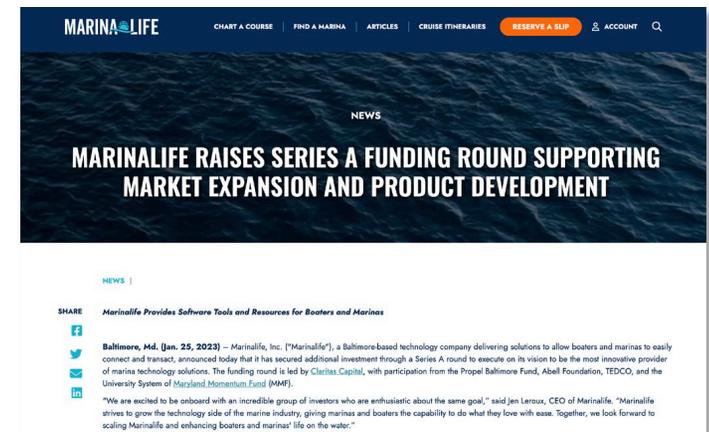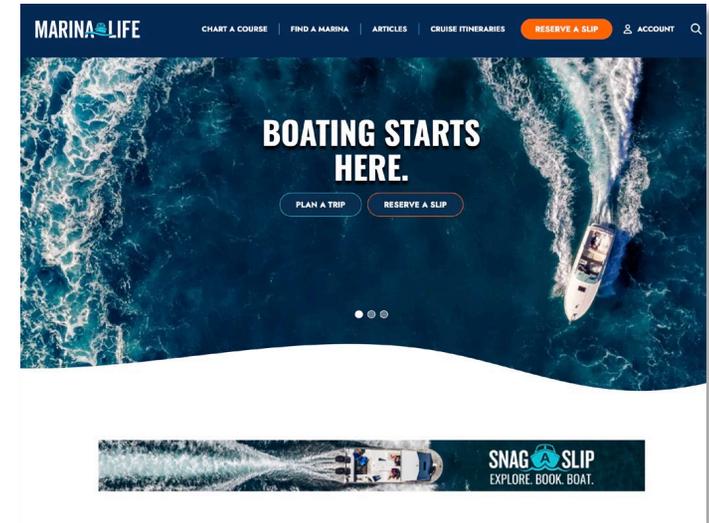
2. Featured Center: ARLIS

Applied Research Lab for Intelligence and Security

University Applied Research Center – UARC

Sponsored by the Office of the Under Secretary of Defense for Intelligence and Security

University of Maryland, College Park

https://www.arlis.umd.edu

William Regli, Ph.D.

Executive Director and Professor of Computer Science

University System of Maryland

3. Update on Ongoing Activities of OVCRED

- Early Capitol Pilot

- USM Institution Outreach

- Outreach to partners

- Grant support and writing activities

- Technical support to system communities in research administration, research, commercialization, and research parks

4. Q and A

Contact OVRED

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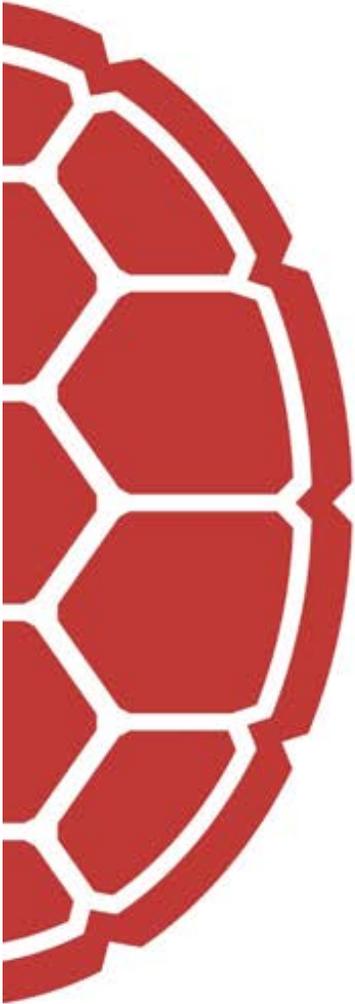lryan@usmd.edu
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ARLIS: The UARC for the Intelligence and Security Enterprise

Brief to the Board of Regents

February 2, 2023

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From #DefenseCharts

About ARLIS

Relevant Mission Areas

Human & Social Systems
- Influence & Cognitive Security
- Modeling and Mitigating Insider Risk
- Securing Sociotechnical Systems and Supply Chains

AI, Autonomy & Augmentation
- Applied Artificial Intelligence & Autonomy
- Human-Computer Interaction & Performance Augmentation

Advanced Computing & Emerging Tech
- Testbeds, Data Lakes, & Computational Infrastructure
- Emerging Technologies
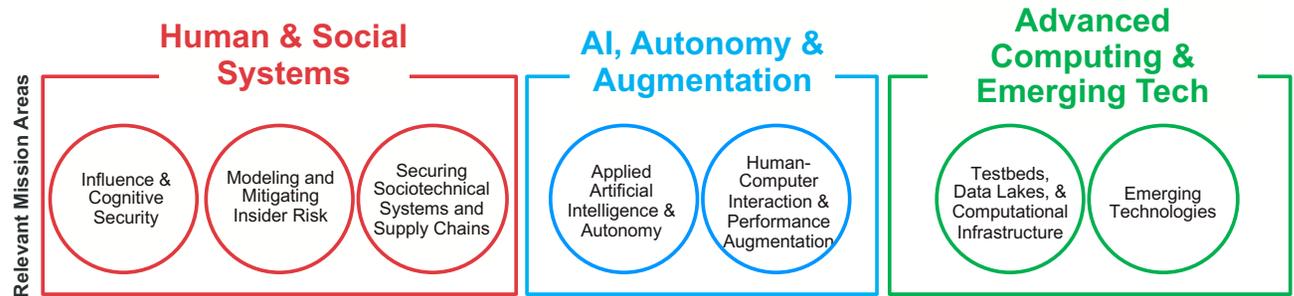
ARLIS is a DoD University Affiliated Research Center:
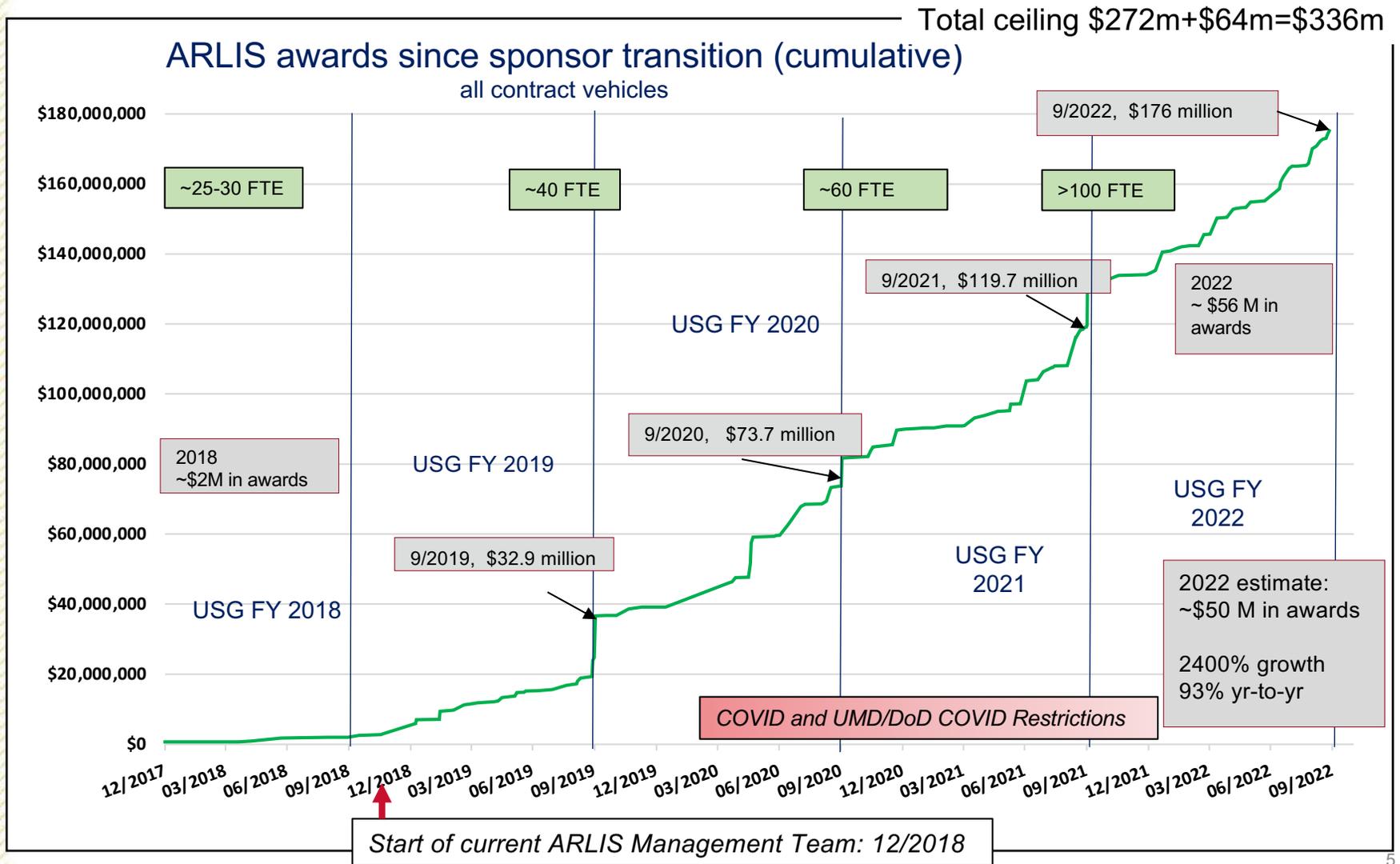- Trusted Agent of the government
- Establishes and maintains essential S&T Core Competencies

- The UARC with competency in Human & Social Systems

- The UARC reporting to Intelligence & Security Enterprise

- Primary ARLIS I&S Mission Areas include:

  Insider Threat, Personnel Vetting, Technology Protection, Social Science Counterintelligence, AI, Autonomy and Human/Machine Teaming, Technology Protection, Acquisition & Supply Chains, Language & Cultural Analytics, Wargaming, Information & Influence

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The Spectrum of Work at a UARC

Research	Engineering and Development	Test and Evaluation	Mission Integration
"Help me understand the phenomenon."	"Help me get the capabilities that I need."	"Help me know which capabilities to trust."	"Help me employ new capabilities in more impactful ways."
Studies and Analysis	Systems & Prototypes	V&V and T&E, Trusted Assessments	Operational Support, Tactics, Techniques, and Tradecraft

4

4

Total ceiling $272m+$64m=$336m

ARLIS awards since sponsor transition (cumulative)
all contract vehicles

SCO · **OUSD(I&S)** · **OUSD(R&E)** · **ODNI** · **DARPA**

ONR · **IARPA**

DoS GEC · **OUSD(A&S)** · **SAF/CDM**

ARLIS understands both S&T and Operational needs and requirements for Intelligence & Security

DIA · **CYBERCOM** · **J8 & J39** · **PEO STRI** · **INDOPACOM**

DCSA · **SOCOM** · **NSA** · **CIA** · **USASOC** · **NGA**

Applied Research Laboratory for Intelligence and Security — University of Maryland

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Core Competencies & Mission Areas: Spanning the Human-Machine domain

Mission Area

Cognitive Security/ Information & Influence
— IO/IW, influence, cyber

Insider Threat, Trust & Risk
— counterintelligence, personnel vetting, countering influence, radicalization

Acquisition & Industrial Security
— tech protection, supply chain assurance, 5G

Autonomy, Augmentation and AI (AAA)
— human-in-the-loop, T&E/IV&V, HCI, collective intelligence

Core Competency

Human and Social Systems

Intelligent Human-Machine Systems

Adv Computing & Emerging Tech

Human & Social Systems
Influence & cognitive security
Modeling & mitigating insider risk
Security sociotechnical systems & supply chains

AI, Autonomy & Augmentation
Applied artificial intelligence & autonomy
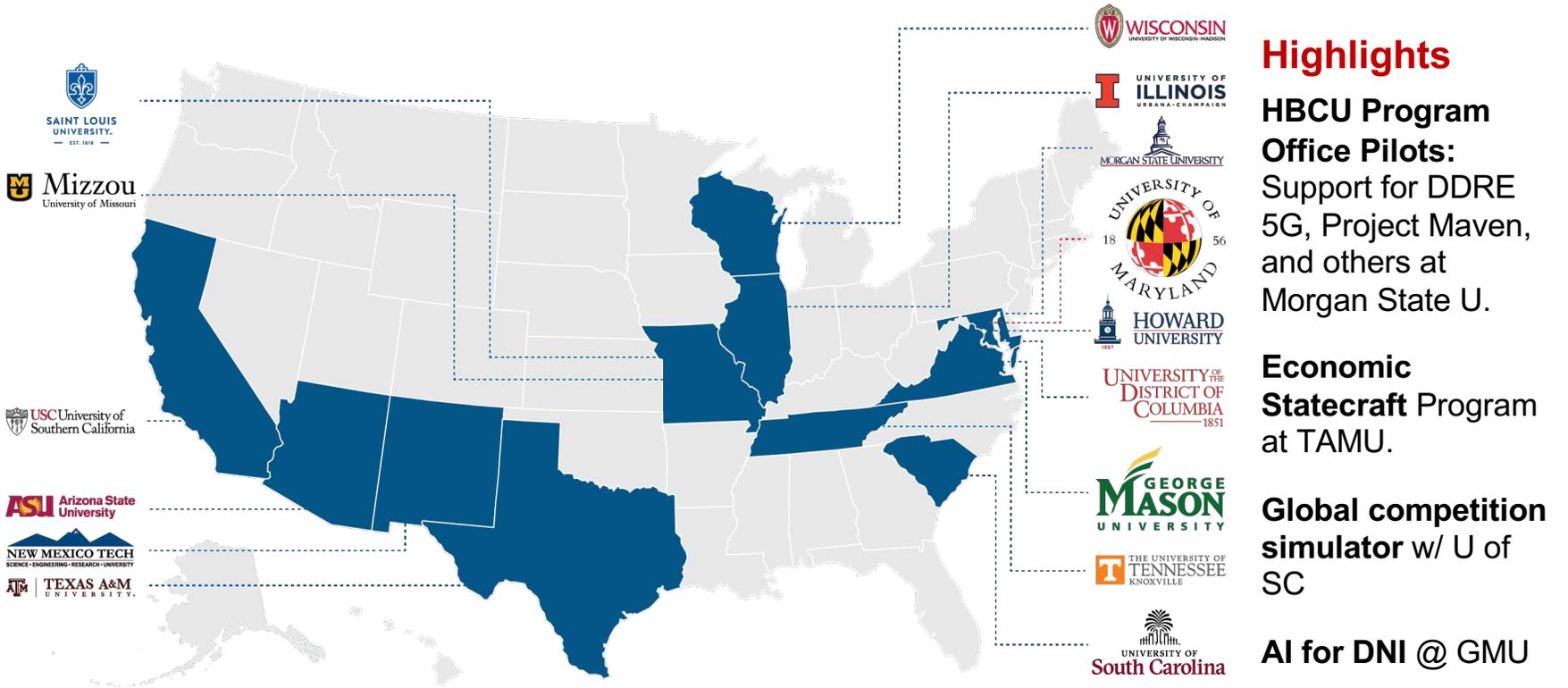Human-computer interaction & performance augmentation

Advanced Computing & Emerging Technology
Testbeds, Data Lakes & computational infrastructure
Emerging technologies

THE HUMAN(-MACHINE) DOMAIN

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INSURE: Strengthening the Intelligence and Security University Research Enterprise

Highlights

HBCU Program Office Pilots: Support for DDRE 5G, Project Maven, and others at Morgan State U.

Economic Statecraft Program at TAMU.

Global competition simulator w/ U of SC

AI for DNI @ GMU

15 member institutions in 13 states ♦ **4** HBCU/MSIs ♦ **8** w/ secure facilities + cleared researchers
Total of **33,610** faculty ♦ **481,603** students ♦ over **$6.7 B** in federal research expenditures

RISC: Delivering a Talented and Experienced Intelligence and Security Workforce

Teams worked virtually over 10 weeks on DoD/IC-requested projects and gain exposure to the community and problem space

- 40 projects benefiting 14 DoD/IC agencies
  - Across STEM and social science fields
  - INSURE network as talent source
- Topics from **CFIUS Over the Horizon Forecasting for Critical and Emerging Technologies** to **Modeling Downstream Unintended Consequences of Embedded AI** to **Computational Cultural Understanding**

PROGRAM GROWTH BY # INTERNS

■ BA/BS ■ MA/MS ■ PhD

FY20	16	1	17 interns
FY21	26	7 5	38 interns
FY22	64	29	103 interns

77 cleared by program's end (90 today)

UNIVERSITIES ENGAGED

- UMD 35%
- Other Universities 29%
- In NCR 15%
- INSURE members 15%
- HBCUs 6%

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ARLIS Fall 2022

- > 120 people; Hiring 5 S&T FTE/mo

- >50 active projects

- Strategic program development ($70M in pending!)
  - Quantum sciences
  - Defense Information Advantage Lab
  - Global Competitive Analysis Center
  - Research & Technology Protection

- D eepening relationships with OUSD(I&S), OUSD(R&E), ODNI, NGA, DIA

- Operational engagement / Phoenix Challenge

- +$80m on current IDIQ ($272m); pending on $500m new IDIQ

- Focus on Trusted Service: Test & Evaluation and Verification & Validation
  - Information & influence
  - AI hardware/microelectronics
  - Human-centered AI systems
  - Language & culture

- Hiring for new organizational structure focused on core competencies

- Space in River Road and NoVa

- Developing new models for budgeting, operations, and administration in concert with the UMD VPR

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ARLIS Relevance to the Regents

- ARLIS is a resource for the whole USM and State of Maryland
  - We are the DoD security agent for the whole USM
- ARLIS is a jobs catalyst for the State of Maryland
  - Jobs at ARLIS, jobs at ARLIS-affiliated institutions and related companies supporting national security needs; creating a classified employee pipeline
  - Economic development that can leverage federal national security R&D $
- ARLIS is a key part of the Land Grant Mission
  - Cultivating students that able to work on national security problems for federal agencies and corporate employers in the State of Maryland
- ARLIS is a gateway to increased applied research and development funding for UMCP and (possibly) anyone in UMS
- ARLIS enhances academic impact (more students, support for faculty, etc)

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For more information:

William Regli
ARLIS Executive Director
Professor of Computer Science
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APPLIED RESEARCH LABORATORY FOR
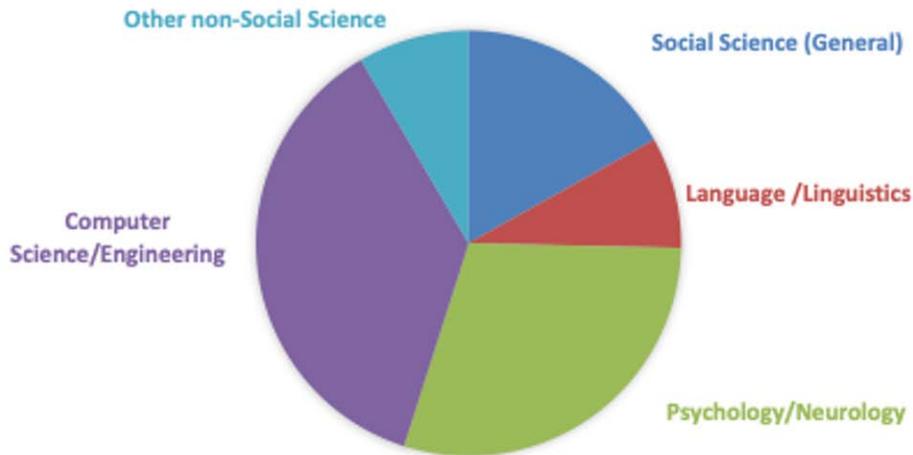**INTELLIGENCE
AND SECURITY**
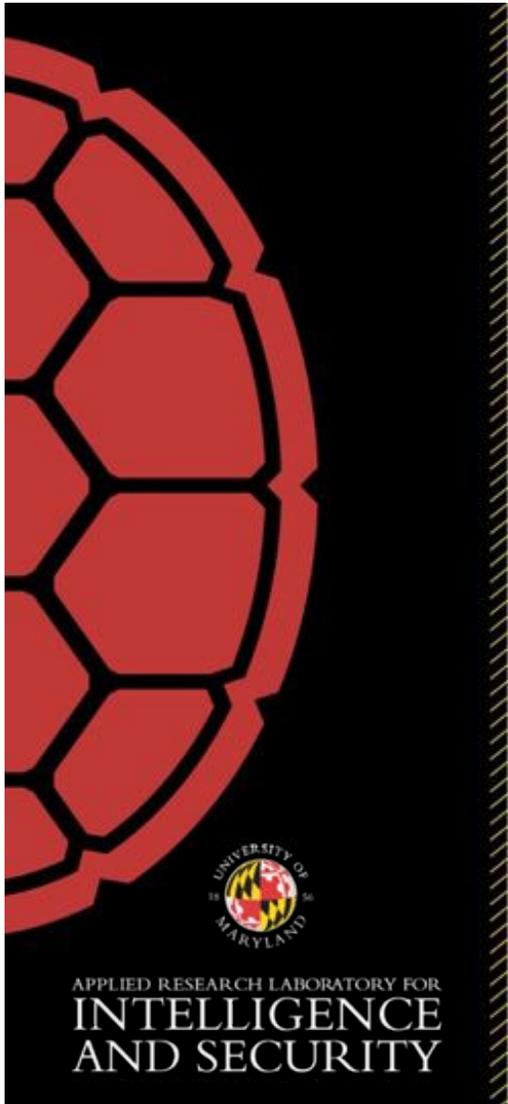
ARLIS Demographics

Over 40 different degrees and disciplines

Aerospace Engineering
Arabic Language & Literature
Biomedical Engineering
Business Administration
Chemistry
Civil Engineering
Clinical Psychology
Cognitive Psychology
Computer Science
Cultural Anthropology
Economics
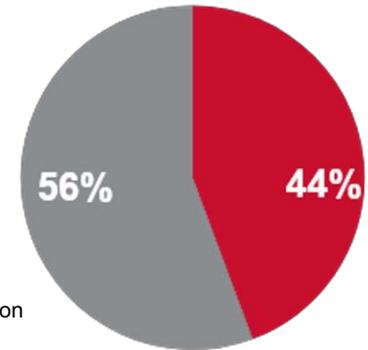Measurement, Statistics & Evaluation
Electrical Engineering

Experimental Psychology
French
Government, Politics & Strategic Studies
History
Human Factors/Human Computer Interaction
Industrial Engineering
Information Systems
Intercultural Studies
International Relations
Japanese
Linguistics
Mathematics

Mechanical Engineering
Neuroscience
Nuclear Physics
Physics
Political Science
Psychology
Public Administration
Public Policy
Rhetoric & Professional Communication
Russian
Social Anthropology
Space Science & Applied Physics
Spanish
Visual Communications

Gender Diversity

■Female ■Male

56% 44%

Race Diversity

■Asian ■Black ■White

6% 15% 79%

Other non-Social Science
Social Science (General)
Language /Linguistics
Psychology/Neurology
Computer Science/Engineering