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)
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
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Office of the Vice Chancellor for Research and Economic Development

Board of Regents Committee on Economic Development and Technology Commercialization

Update

February 2, 2023
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
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%)

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*Systemwide includes all USM institutions reporting.
## USM Research Expenditures at a Glance

<table>
<thead>
<tr>
<th>Institution</th>
<th>NSF Herd FY 2021</th>
<th>HERD Rank</th>
<th>Basic Carnegie Designation</th>
<th>US News and World Rankings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowie</td>
<td>$1,398,000</td>
<td>581/384</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>133-175 Regional North 46-63 Top Public North</td>
<td>48th HBCUs HERD 18 HBCU USN</td>
</tr>
<tr>
<td>Coppin</td>
<td>N/A</td>
<td>N/A</td>
<td>Master's Colleges &amp; Universities: Small Programs</td>
<td>133-175 Regional North 46-63 Top Public North</td>
<td>DNR Herd 35 HBCU USN</td>
</tr>
<tr>
<td>Frostburg</td>
<td>N/A</td>
<td>N/A</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>113 Regional North 40 Top Public North</td>
<td>DNR Herd</td>
</tr>
<tr>
<td>Salisbury</td>
<td>$10,552,000</td>
<td>339/247</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>63 Regional North 14 Top Public North</td>
<td></td>
</tr>
<tr>
<td>Towson</td>
<td>$3,794,000</td>
<td>453/315</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>33 Regional North 9 Top Public North</td>
<td></td>
</tr>
<tr>
<td>UBalt</td>
<td>$14,672,000</td>
<td>315/231</td>
<td>Special Focus Four-Year: Research Institution</td>
<td>90 Regional North 28 Top Public North</td>
<td></td>
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<tr>
<td>UMB</td>
<td>$1,142,264,000</td>
<td>17/11</td>
<td>Special Focus Four-Year: Research Institution</td>
<td>268 Global Universities 9 Nursing in US</td>
<td>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.</td>
</tr>
<tr>
<td>UMCP</td>
<td>$84,418,000</td>
<td>171/123</td>
<td>R1 - Doctoral Universities: Very High Research Activity</td>
<td>55 National 19 Top Public National</td>
<td>9 Undergrad Teaching - USN</td>
</tr>
<tr>
<td>UMBC</td>
<td>$51,201,000</td>
<td>202/147</td>
<td>R2 - Doctoral Universities: High Research Activity</td>
<td>334-440 National 169-227 Public National</td>
<td>24th HBCUs HERD; 16 HBCUs USN</td>
</tr>
<tr>
<td>UMES</td>
<td>$8,636,000</td>
<td>357/261</td>
<td>R2 - Doctoral Universities: High Research Activity</td>
<td>334-440 National 169-227 Public National</td>
<td></td>
</tr>
<tr>
<td>UMGCG</td>
<td>N/A</td>
<td>N/A</td>
<td>Master's Colleges &amp; Universities: Larger Programs</td>
<td>133-175 Regional North 49-63 Public North</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$1,316,935,000</td>
<td>All/Public</td>
<td></td>
<td></td>
<td></td>
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</table>

More information on USM Rankings: [https://www.usmd.edu/newsroom/news/2274](https://www.usmd.edu/newsroom/news/2274)
• 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.
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.”
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
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 Resiliency 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

• 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
• **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
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
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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ARLIS: The UARC for the Intelligence and Security Enterprise

Brief to the Board of Regents

February 2, 2023
Evolution of Warfare

- World War I—The Chemists’ War

- World War II—The Physicists’ War

Evolution of Warfare

- World War III—The Information Researchers’ War

- World War IV—The Social Scientists’ War

From #DefenseCharts
About ARLIS

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
The Spectrum of Work at a UARC

<table>
<thead>
<tr>
<th>Research</th>
<th>Engineering and Development</th>
<th>Test and Evaluation</th>
<th>Mission Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Help me understand the phenomenon.”</td>
<td>“Help me get the capabilities that I need.”</td>
<td>“Help me know which capabilities to trust.”</td>
<td>“Help me employ new capabilities in more impactful ways.”</td>
</tr>
<tr>
<td>Studies and Analysis</td>
<td>Systems &amp; Prototypes</td>
<td>V&amp;V and T&amp;E, Trusted Assessments</td>
<td>Operational Support, Tactics, Techniques, and Tradecraft</td>
</tr>
</tbody>
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February 2, 2023 Committee on Economic Development & Technology Commercialization - Public Session
ARLIS awards since sponsor transition (cumulative)

all contract vehicles

Start of current ARLIS Management Team: 12/2018

COVID and UMD/DoD COVID Restrictions

USG FY 2018

2018

~$2M in awards

USG FY 2019

9/2019, $32.9 million

~$2M in awards

USG FY 2020

9/2020, $73.7 million

USG FY 2021

9/2021, $119.7 million

USG FY 2022

9/2022, $176 million

2022

~$56 M in awards

2022 estimate:

~$50 M in awards

2400% growth

93% yr-to-yr

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

~25-30 FTE

~40 FTE

~60 FTE

>100 FTE

~25–30 FTE

~40 FTE

~60 FTE

>100 FTE
ARLIS understands both S&T and Operational needs and requirements for Intelligence & Security
Core Competencies & Mission Areas: Spanning the Human-Machine domain

Mission Area

Core Competency

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
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](chart.jpg)

- **FY20**: 16 BA/BS, 17 interns
- **FY21**: 26 BA/BS, 7 MA/MS, 9 PhD, 38 interns
- **FY22**: 64 BA/BS, 29 MA/MS, 10 PhD, 103 interns

77 cleared by program’s end (90 today)

![Universities Engaged](donut.jpg)

- **UMD**: 35%
- **HBCUs**: 6%
- **INSURE members**: 15%
- **In NCR**: 15%
- **Other Universities**: 25%
- **Universities Engaged**: 100%

![Applied Research Lab for Intelligence and Security](group.jpg)
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
- Deepening 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
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)
For more information:
William Regli
ARLIS Executive Director
Professor of Computer Science
regli@umd.edu
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