

**CENTER FOR EQUITABLE ARTIFICIAL
INTELLIGENCE & MACHINE LEARNING**

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<https://www.morgan.edu/ceaml>

Proposed Name Change

- Center for Equitable Artificial Intelligence and Machine Learning Systems
- Justification
 - Emphasizes the center's focus on addressing AI/ML equity in a wholistic manner
 - Will enable the use of CEAMLS as an acronym (Center for Equitable Artificial Intelligence and Machine Learning Systems)
 - Memorable and easily relatable
 - Emphasizes the interdisciplinary nature of the center by suggesting coherent, consistent and logical interconnections between disciplines



CEAMLS

Mission

Facilitate the development, deployment and verification of socially responsible, trustworthy and equitable artificial intelligence systems

Ensure the public is well informed of how evolving technologies in this space affect their health, prosperity and happiness

Goals



Goal 1

Conduct theoretical and applied research in socially responsible and trustworthy AI aimed at solving complex real-world problems



Goal 2

Address algorithmic bias in AI research and educate the public on the possible disproportional impact to health, prosperity, and society



Goal 3

Increase diversity of thought in the field of AI by attracting significantly more underrepresented computer scientists and engineers



Goal 4

Collaborate with educational, non-profit, government and industrial organizations to study, document, and mitigate the effects of algorithmic bias

Interdisciplinary Research Thrusts

1. Best Practices & Standards

Formalize best practices & standards for developing equitable AI and detecting bias in existing systems

2. AI Transparency

Research and educate on how to improve transparency and explainability

3. Objectivity Optimization

Research on how to include fairness as an optimization objective function

4. Bias Detection & Remediation

Research and develop new tools and techniques for detecting bias and reducing the disparate impact caused

5. Testing & Validation

Study and validate the equity of new tools on underrepresented groups through techniques such as AI audits

6. AI Misapplication

Study and release guidelines regarding potential misuse or misapplication of AI

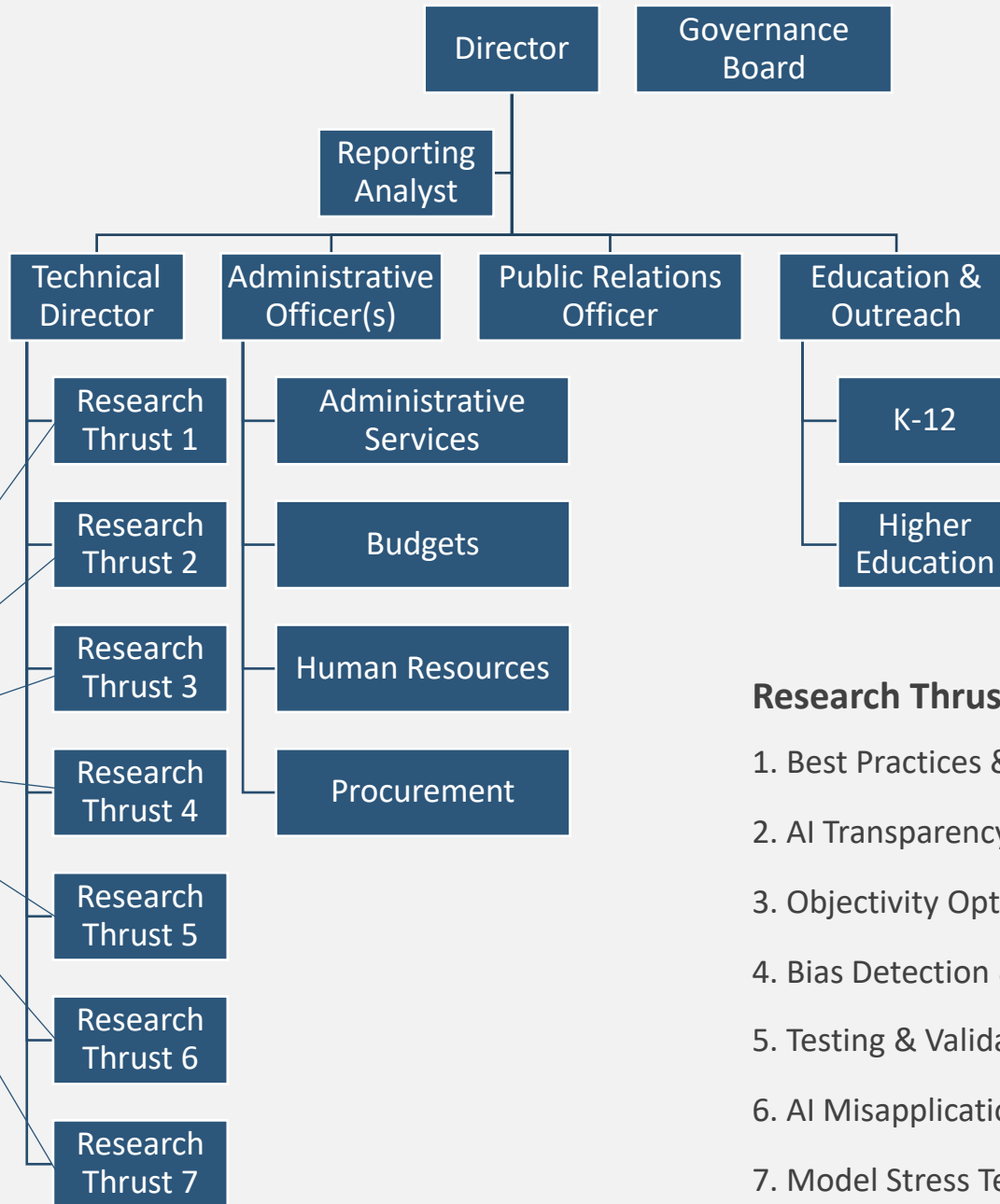
7. Model Stress Testing

Research and develop adversarial tools to stress-test models

Short-term
Mid-term
Long-term



Center Structure



Research Thrusts

1. Best Practices & Standards
2. AI Transparency
3. Objectivity Optimization
4. Bias Detection & Remediation
5. Testing & Validation
6. AI Misapplication
7. Model Stress Testing

Center Structure

- State Budget: \$3.1M
- Schools/Departments & Faculty Lines (14 total):
 - **School of Engineering** (4 Faculty)
 - *ECE/Civil/Transportation/Industrial*
 - **School of Business** (1 Faculty)
 - *Information Science & Systems*
 - **School of Computer, Mathematical & Natural Sciences** (4 Faculty)
 - *Computer Science*
 - **College of Liberal Arts** (2 Faculty)
 - *English and Language Arts*
 - *Behavioral & Social Science*
 - **School of Community Health & Policy** (2 Faculty)
 - *Public Health*
 - *Nursing*
 - **School of Global Journalism & Communications** (1 Faculty)
 - *Strategic Communication*

New Funding

- Congressman Ruppberger Legislation in House of Representatives: \$2M
- New Awarded Proposals in which the Center Participated– Fall 2022 (~\$10.5M)
 - **Characterization of health disparities in African ancestry and reduction of algorithmic bias (NIH)**
 - *Center for Urban Health Disparities Research and Innovation, School of Engineering, Department of Philosophy & Religious Studies*
 - **Building an Equitable and Sustainable Logistics System in Rural Areas with Drone (NSF)**
 - *Department of Information Science and Systems, Department of Electrical and Computer Engineering*
 - **Building for Health Equity through Artificial Intelligence and Machine Learning at Morgan State University (NIH)**
 - *School of Community Health and Policy, School of Engineering*
 - **Research and Education in Equitable AI and Machine Learning and Cybersecurity: Implications for National Defense (DoD)**
 - *D-RED and School of Engineering*

Center Faculty

Core Faculty – New Faculty Hires

Affiliated Faculty – Existing Faculty

Core & Affiliated Faculty

- Leverage the Center to acquire research grants (e.g. propose collaborative research, leverage existing relationships with sponsors, past performance of collaborators)
- Work in interdisciplinary teams in support of the Center's mission
- Have access to center resources by request (e.g. supplies, equipment, students, travel)

Core Faculty

- 14 Newly hired faculty with time split evenly (50/50) between department and center
- Have guaranteed reduced course load (2/2) for 2 years
- Have formal startup package

Affiliated Faculty

- No specific limit on the number of affiliated faculty
- May get release time from affiliated sponsored research

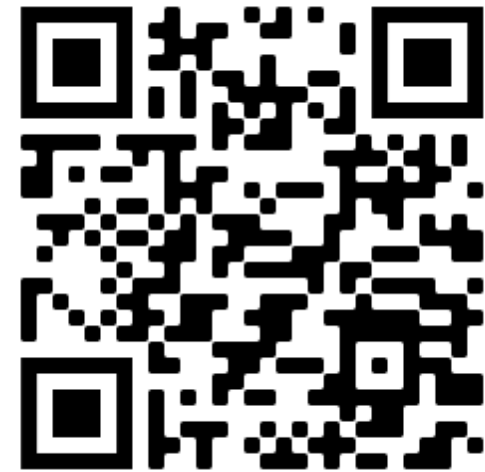
Center Faculty

Hiring New Faculty

- Work with department and committee chairs to draft position descriptions
- Participate in faculty hiring committees to review, interview and select Center faculty

Becoming Affiliated Faculty

- Write a one-page description of your current or anticipated research project and indicate how its aligned to the Center's mission through one or more Center goals
- Complete form at <https://forms.gle/VrPTuMJU1gb9S2kP7>



Start-up Issues and Challenges

- Hires planned for the first year
 - Administrative assistant (complete)
 - 4 – 8 new faculty across 6 schools
 - Director of public relations (in-progress)
- Issues
 - Budget lines weren't loaded as given (waiting for budget transfers to complete to progress with hiring)
 - Shorter turn around regarding budget code setup would be ideal
 - Proper budget authorizations not granted at startup
 - Delay in P-Card increase
- Positives
 - Budget detail codes and index number were set up in timely manner
- Other Planned 1st year activities
 - Complete presentations to associated departments
 - Start working with faculty hiring committees
 - Joint workshops with Center for Urban Health Disparities Research and Innovation and School of Community Health and Policy
 - Submitting NSF proposal with University of California, San Diego and Australian National University

Industrial & Federal Partnerships

- Work with partners to
 - Formalize testing protocols for new AI innovations
 - Publish new insights regarding detection and mitigation of algorithmic bias
- Key partner: Consumer Reports (CR), Digital Lab
 - Help students currently conducting research with the center to take their research into practice
 - Working with the center to publish investigations from researchers and classroom activities
 - Have the center help establish ongoing CR research activities which are currently limited
 - Analyze historical data from past CR evaluations
 - Working to distil center research so it's more accessible for public dissemination

Current Center Aligned Projects

- Synchronized Analysis of Video Audio and Imagery through ML (Kofi Nyarko – ECE)
- Environmental Justice Massive Data Collaborative ML Technical Infrastructure (Paul Wang – CS)
- Deep Learning Based Automated Concept and Caption Generation of Medical Images (Md Rahman – CS)
- Cyber Assessment of AI/ML Tools (Paul Wang – CS)
- Using Machine Learning for Healthcare Cyber Threat Analysis (Paul Wang – CS)
- Building an Equitable, Sustainable and Intelligent Logistics Systems with Drones in Rural Areas (Ziping Wang – INSS & Kofi Nyarko – ECE)
- Characterization of health disparities in African ancestry and reduction of algorithmic bias (Pilhwa Lee – RCMI)
- Building for Health Equity through Artificial Intelligence and Machine Learning at Morgan State University (Kim Sydnor – SCHKP)
- Research and Education in Equitable AI and Machine Learning and Cybersecurity: Implications for National Defense (DoD) (Willie May – DRED)



CEAMLS

Vision


The Center for Equitable AI and Machine Learning Systems (CEAMLS) seeks to facilitate the research, development of standards, identification of new methods, and advancement of innovative technologies that benefit everyone on the planet. CEAMLS will serve as an interdisciplinary nexus for thought leadership in the application of fair and unbiased technology and its applications. The Center will remain rooted in scholarly stewardship, cultivating the next generation of students at all levels, as well as life-long learners across industries and areas of study

THANK YOU

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