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(1) Brief update on the U.S. Army Research Office
(2) Overview of DoD’s interest in MGI

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ARL provides underpinning Science, Technology, and Analysis to the Army

ARO is ARL’s principal conduit to engage the university research community
Mission
Provide innovative science, technology, and analyses to enable full spectrum operations.

Vision
America’s Laboratory for the Army: Many Minds, Many Capabilities, Single Focus on the Soldier

Acknowledged Scientific, Technical and Analytical Excellence

Recognized bridge between the Nation’s Scientific and Technical Communities and the Army

Leader in providing innovative solutions for the current and future Army

ARO plays a critical role within ARL in executing its mission, especially with regard to S&T excellence and harnessing the Nation’s S&R communities
• Exploit scientific opportunities for revolutionary new capabilities
• Apply science to generate solutions to existing needs
• Prevent technological surprises
• Accelerate the transition of research to application
• “Honest Broker” for the Army for objective assessments
• Leverage S&T of outside sources for Army benefit
• Strengthen university, in-house, industry partnerships
• Foster S&E training in disciplines critical to the Army
• Enhance outreach efforts for greater intellectual diversity
Director

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Operations Directorate
- Support Management
- Information Management
- Acquisition Center

Physical Sciences
- Physics
- Chemistry
- Life Sciences

Engineering Sciences
- Mechanical Sciences
- Materials Science
- Electronics
- Environmental Sciences

Informational Sciences
- Mathematical Sciences
- Computational Sciences
- Network Science
- Outreach Programs

Legal Counsel

~ 100 employees at RTP
45 PhD Program Managers
Army Research Office Organization

Information Sciences Directorate

Mathematical Sciences
- Bio-Mathematics & Informatics
- Modeling of Complex Systems
- Probability & Statistics
- Cooperative Mathematics

Computing Sciences
- Numerical Analysis
- Computational Architecture & Visualization
- Information Processing & Fusion
- Information & Software Assurance

Network Sciences
- Intelligent Networks
- Decision & Neuro-Sciences
- Communications & Human Networks
- Multi-agent Network Control

Technology Integration & Outreach
- Youth Sciences
- Historically Black Colleges, Universities, and Minority Institutions
- Small Business Programs
  - Small Business Innovation Research (SBIR)
  - Small Business Technology Transfer (STTR)
• Rapid and agile (approximately 20% redirected into totally new areas each year) exploitation of novel science opportunities world-wide

• Extremely cost-effective

• All states and D.C.

• >250 institutions

• ~1400 graduate students supported

• ~ 900 university grants

• Average grant size: $112k/yr
Includes -
MURI, DURIP, PECASE, MINERVA

Multi-Disciplinary University Research Initiative (MURIs)

• Research vital to the Army, but applicable to multiple Services

• Investigates high priority, transformational topics such as biologically inspired mobile networks of autonomous vehicles, self-assembling multifunctional ceramic composites

• Critical mass of researchers; $1.25M/year, 5-years

• Approximately 10 new initiatives started annually
Must Address Both Opportunity Driven Research and Need Driven Research

- Need Driven Research – emphasis on improving specific capabilities or overcoming identified technology barriers
- Opportunity Driven Research - emphasis on developing and exploiting scientific breakthroughs to produce revolutionary new capabilities
The DoD Basic Research investment should emphasize and fund work that has direct bearing on near term challenges and threats, but the real power of Basic Research is its ability to discover the phenomena and knowledge that will become the cornerstones and mortar in the foundations of military capabilities unimagined today. For this reason, DoD Basic Research must be funded in areas beyond those defined by current threats. As fundamental discoveries cannot be predicted in science, future missions cannot be predicted for the military.
ARO Broad Agency Announcement
- Paragraph descriptions of each area
- Program manager contact info

MURI Broad Agency Announcement
- Current and past BAAs for descriptions of each topic
- Program manager contact info
Proposal Evaluation and Selection

PM interactions with potential PIs

Development of Ideas

White Papers

Receive Proposals

Funding decision is based on balancing scientific opportunities, scientific needs, program portfolio, and Army objectives

Science Peer Review

Evaluate fit to program goals and quality of proposal

Evaluate scientific merit

Scores/comments of Army and external reviewers are assessed

Analysis of Evaluations

PM Recommendation Management Assessment

Army Lab/RDEC Review

Evaluate technical merit, Army relevance, desired participation: SL/SC
Single Investigator Awards
- $125/year for 3-5 years

Conference / Symposium / Workshop Grants
- $5-10K for 12 months

Short Term Innovative Research (STIR)
- $50K for 9 months

Young Investigator Program (YIP)
- $50K/year for 3 years

Presidential Early Career Award for Scientists and Engineers (PECASE)
- $200K/year for 5 years

Historically Black College/University and Minority Institutions (HBCU/MI)
- $350K for 3 years
Defense University Research Instrumentation Program (DURIP)
- $150-200K/year for 12 months

Tribal Colleges and Universities (TCUs)
- $150K for 12 months

Hispanic Serving Institutions (HSIs)
- $400K for 3 years

High School Apprenticeship Program (HSAP)
- $3K for 12 months (per apprentice, up to two)
Multidisciplinary University Research Initiative (MURI)
- Up to $6.5M for 5 years

Small Business Innovative Research (SBIR)
- $70K for 6 months - $50K for 4 months - $730K for 24 months

Small Business Technology Transfer (STTR)
- $100K for 6 months - $750K for 24 months
The Army, Navy and Air Force all have developed contributions to MGI.

2014: Digital Manufacturing and Design Institute (DMDI) Lightweight and Modern Metals Manufacturing Innovation (L3MI)

Army: Enterprise for Multiscale Research of Materials
- Materials in Extreme Dynamics Environments – the Johns Hopkins University
- Multidisciplinary Modeling of Electronic Materials
- University of Utah
Air Force: Center of Excellence on Integrated Materials Modeling – the Johns Hopkins University

Two Foundational Engineering Problems (AFRL)
1. Composites: Organic Polymer Composites
2. Metals: Nickel-based Superalloys
1. Uncertainty
   - NNI, MGI, AMP.... On and on and on
   - Rumors: pay attention to the dollars $$$

2. Perennial Rule: Study the Solicitations!

3. The Materials Genome Initiative
   - “Deep” – history of great successes
   - “Wide”
1. “Mission agencies really want devices and products”

2. Referencing the MGI will make my proposal better”

3. “DoD always funds the same people”

4. “Program Managers don’t want to hear my half-baked ideas”
1. ARO utilizes a coherent set of investment and execution strategies and programs, performed in concert with the rest of ARL, to **create and drive** extramural fundamental basic research that will provide future revolutionary Army capabilities and critical improvements to existing capabilities

2. DoD efforts in support of MGI are moving... slowly