How to Engage with Federal Research Funding Agencies

Lewis-Burke Associates, LLC

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LEWIS–BURKE ASSOCIATES LLC

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About Lewis-Burke

- Twenty-seven policy experts with range of expertise/backgrounds allow multi-layered issue teams with deep expertise in agencies and scientific/education areas
- Support federal relations activities to develop and implement federal strategies to pursue, shape, and create new sources of funding to increase and diversify research portfolio
- Able to engage on multiple levels:
  - Individual faculty (including early career faculty)
  - Teams of faculty
  - Associate Deans for Research
  - Deans and Center Directors
  - University leadership and campus-wide priorities

Today's talk

- Introduction to federal agencies
  - –Current funding landscape
  - –Cross-cutting priorities
- Introduction to agencies: NSF, DOD,NIH, DOE, NASA
- Engaging with program officers
  - –Preparing for meetings
  - –What to expect and how to follow up
- Questions and follow-up on specific programs and opportunities

FY 2016 Omnibus and FY 2017 Request

In Billions of Dollars

Agency	FY 2015 Actual	FY 2016 Enacted	FY 2017 President's Request
NIH	30.3	32.3	**33.1***
NSF	7.34	7.46	**7.96***
DOE	27.40	29.60	**30.24**
DOD Basic Research	2.28	2.31	**2.10**
NASA	18.01	19.29	**19.03***

**Mandatory funding proposed*

Cross-cutting Administration and Agency Priorities

- **Advanced Manufacturing**
- **Big Data**
- **Cybersecurity**
- Cancer
- Environment
- Healthcare Transformation
- Opioid Abuse
- Resilience
- Antimicrobial Resistance
- College Access and Affordability
- Graduate & STEM Education
- International
- Neuroscience/BRAIN
- **Nanotechnology**
- Precision Medicine
- **Urban & Smart Cities/Communities**
- **Innovation & Commercialization**
- Alzheimer's & Aging

National Science Foundation (NSF)

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NSF Overview

- FY 2017 budget request of $7.564, $100.5 million or 1.3% over FY 2016
- Based in Arlington, VA, across the river from DC
- Six Research Directorates organized by science and engineering disciplines:
  - Biological Sciences (BIO)
  - Computer and Information Science and Engineering (CISE)
  - Engineering (ENG)
  - Geosciences (GEO)
  - Mathematical and Physical Sciences (MPS)
  - Social, Behavioral, and Economic Sciences (SBE)
- Education and Human Resources (EHR) directorate focuses on STEM teaching, learning, and workforce development
- Cross-NSF priorities include: education, broadening participation, broader impacts
- Policy issues continue:
  - Continued congressional pressure to defend individual grants and facilities management
  - Leadership – Assistant Director terms expiring

Engineering Directorate (ENG)

- ENG includes:
  - Chemical, Bioengineering, Environmental, and Transport Systems (CBET)
  - Civil, Mechanical and Manufacturing Innovation (CMMI)
  - Electrical, Communications and Cyber Systems (ECCS)
  - Engineering Education and Centers (EEC)
  - Emerging Frontiers and Multidisciplinary Activities (EFMA)
  - Industrial Innovation and Partnerships (IIP)
- Cross-NSF priorities include: Clean Energy; Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS); Understanding the Brain (UtB); Risk and Resilience
- Standing programs, Dear Colleague Letters, Focused Solicitations

Recommendations for CAREER

- Strategy and expectations vary by division. Important to speak to program director before applying
- Expectations related to education components also differ by division.
  - Some divisions like to see more focused education projects
  - Others want to see efforts that check a number of boxes, the education component has to be integrated with the research proposed and for some divisions (broadening participation, undergraduate research, etc.)
  - Department chair's letter of support is helpful to show how education efforts would be of value to the department and its students.
- Think carefully about when to apply as you only get a few chances.
  - Don't submit at the very beginning of your career
  - Don't wait so long that you can't use your second and third tries.
  - The odds of obtaining a CAREER go up on the second try, so it's important not to get discouraged.
- The research proposed for CAREER should be expansive enough to build a career on – very narrow research aims will not be competitive.
- First CAREER proposals often rejected because of presentation. Pay attention to details.

Department of Defense (DOD)

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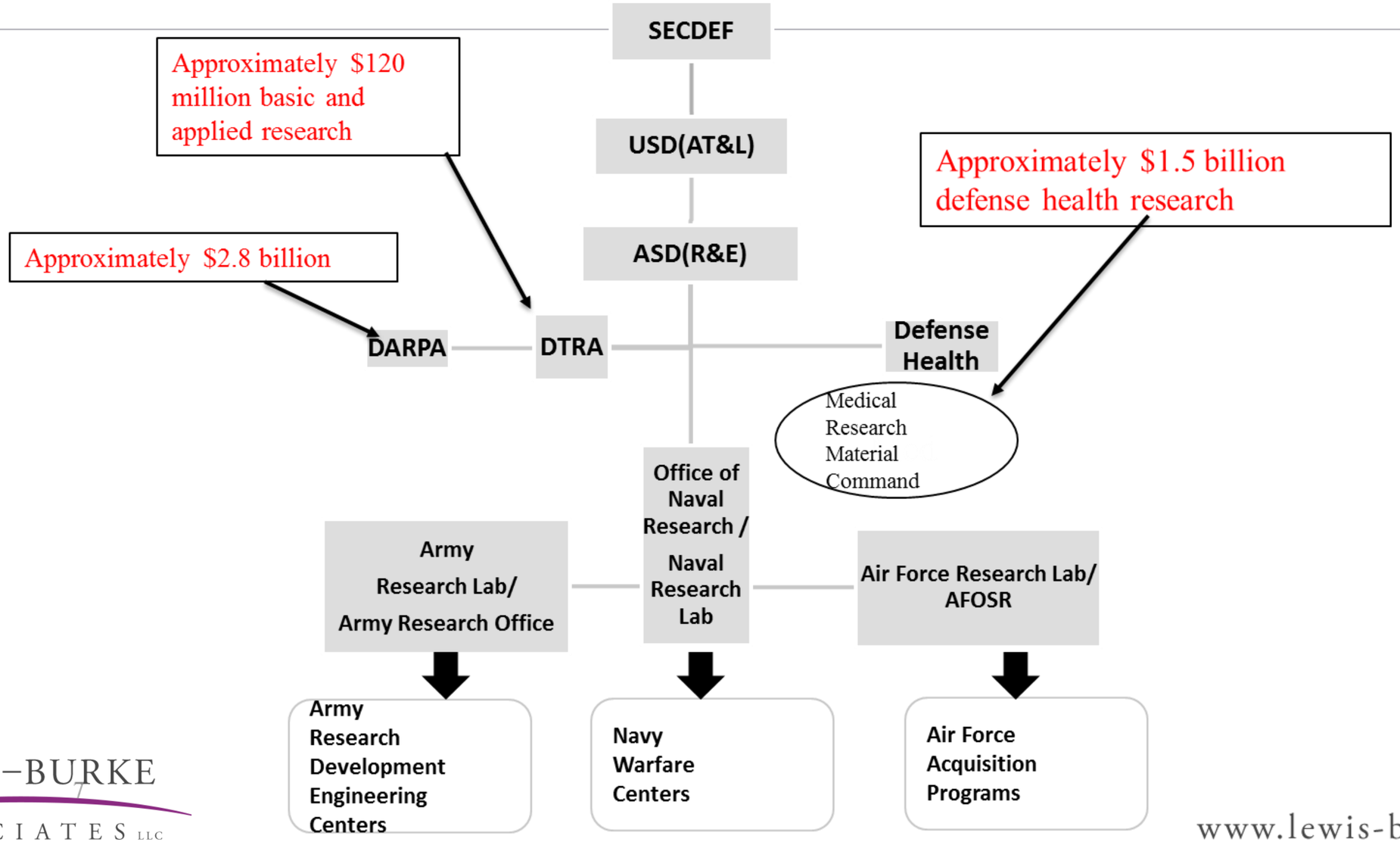
Department of Defense (DOD)



Types of Opportunities

- All opportunities focus on DOD research needs
- Operate primarily through Broad Agency Announcements, not specific solicitations
- Types of awards and programs:
  - Individual grants – program managers have extensive autonomy over research directions
  - Multidisciplinary University Research Initiative – larger teams, topics change annually
  - Basic Research Challenges to address high priority areas
  - Defense University Research Instrumentation Program
  - Young Investigator Program and Young Faculty Award (DARPA)
  - Summer faculty research opportunities

Steps to Effectively Engage DOD

- Start with the DOD challenge; NOT the research idea
- DOD Program managers have broader authority and more flexibility
- Only some DOD programs use peer review; more ad hoc, not always external
- New DOD managers often change program goals and direction
- Attend conferences
- Review program websites, BAAs, and past solicitations to find relevant programs
- Submit white paper ahead of application to assess fit to program, get feedback, and potentially shape future solicitations
- Have more than one idea to propose
- Be prepared to adapt your research to meet program manager’s goals

DARPA

- DARPA funds high-risk, high-reward basic and applied research; game-changing R&D around future threats
- FY17 President's Budget: increase $105 million in base funding, total of $2.97 B
- Basic research program proposed 9 % increase
- FY17 proposed topic areas:

Defense Research Sciences
- Secure Programming Languages (Math and Computer Sciences)
- Quantum and Materials Basics (Electronic Sciences)
- Engineering Complex [biological] Systems (Transformative Sciences)
- Decoding Neural Activity (Transformative Sciences)

Electronics Technology
- Limits of Thermal Sensors
- Connect Everything

Basic Operational Medical Sciences
- Outpacing Infectious Disease

Biomedical Technology
- Enhanced Monitoring of Health and Disease

Information and Communication Technology
- Tactical Context Extraction
- Removing Barriers to Hardware
- System Security Integrated through Hardware and S oftware

Tactical Technology
- Counter Unmanned Air Systems and Force Protection
- 21st Century Propellants
- Science of Human and Computer Teaming

Materials and Biological Technology
- Enhancing Neuroplasticity

Working with DARPA

- About 250 current programs; SEEDlings come from PM budget now
- Utilizing more “Challenges” mechanism – across whole portfolio
- Ideal for areas where have lots of pieces and just need to put it all together
- When pitching – want milestones; vision that is “DARPA hard”
- Program managers develop solicitations, enjoy broad autonomy in funding projects
- Opportunity to shape portfolios when new program managers come on board
- Always contact program managers ahead of submission to get feedback on white paper or abstract
- Have more than one idea to propose
- Be prepared to adapt your research to meet program manager’s goals

ASD (R&E): FY 2017 S&T Priorities

Defense Innovation Initiative : 3rd Offset

- Autonomous Learning Systems
- Human-Machine Collaborative Decision Making
- Assisted Human Operations
- Advanced Manned-Unmanned System Operations
- Network-enable, autonomous weapons hardened to operate in a future cyber/electronic warfare (EW) environment

Near-term emerging technologies that would receive increased funding include:

- Assured positioning, navigation and timing
- Large displacement unmanned undersea vehicles
- High speed strike weapons;
- Arsenal plane
- Hypersonics
- Low-cost unmanned systems
- High-Velocity Projectiles from “powder guns”
- Biotechnology, cyber/computing, & manufacturing

National Institutes of Health (NIH)

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NIH Overview

- Funded at $32 billion in FY 2016; community advocating $34.5 billion for FY 2017
- Most ICs are in Bethesda, MD, about a half hour north of DC
- Largest biomedical research agency in the world
- Comprised of 27 institutes and centers (ICs), often focusing on a particular disease or part of the body
- Priority, cross-cutting areas:
  - –BRAIN Initiative
  - –Precision Medicine
  - –Antimicrobial Resistance
  - –Alzheimer’s Disease
  - –Cancer Moonshot

Particularly relevant NIH ICs

- **National Institute of Biomedical Imaging and Bioengineering (NIBIB):** mission is to improve health by leading the development and accelerating the application of biomedical technologies. The Institute is committed to integrating the physical and engineering sciences with the life sciences to advance basic research and medical care.

- **National Institute of General Medical Sciences (NIGMS):** supports basic research that increases understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment and prevention.

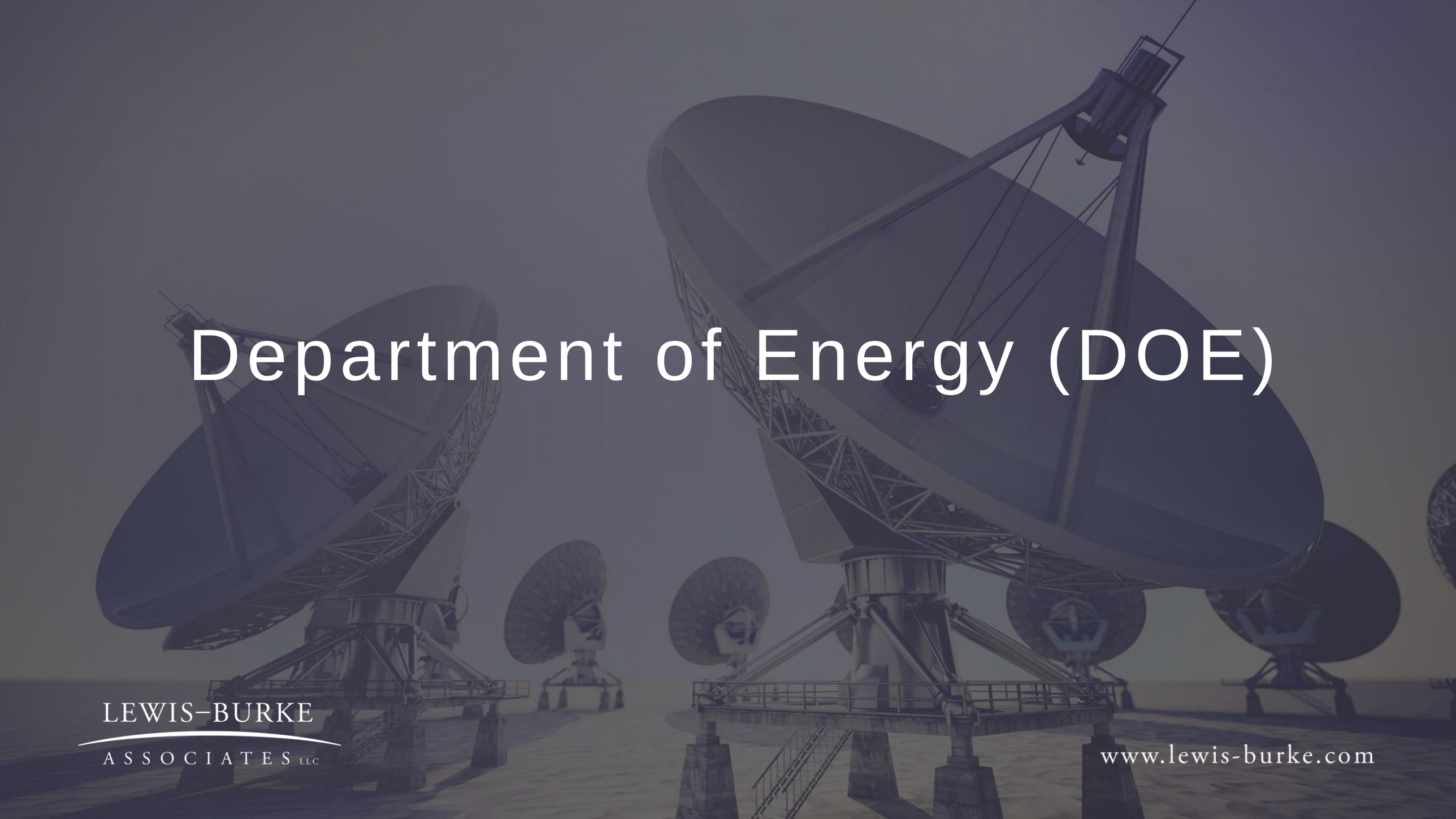
Current issues and trends at NIH

- **Award trends:**
  - NIGMS MIRA (R35) program will support people rather than projects to allow flexibility in pursuing research avenues; NCI, NINDS, NHLBI, NIDCR launched their versions and other ICs exploring
  - Collaborative funding mechanisms enhance program officers' input on projects (U awards)
  - Special consideration for first-time applicants continues; new concerns over achieving second grants
  - Select pay across ICs enables program leaders to fund proposals above payline that meet priorities and unmet needs or to support new investigators
  - NIH leadership exploring ideas to maximize funding, including limiting funding, awards, or efforts per PI

- **NIH structure and policies:**
  - Internal review of peer review process to increase innovative projects and improve diversity of grantees
  - Ongoing efforts to enhance reproducibility of pre-clinical research

Notable distinctions NSF vs. NIH

- NSF is concerned with advancing the disciplines it supports and fundamental science, normal development; NIH traditionally is very focused on biomedical research and disease, aberrant development
- NSF is more heavily focused on teaching, student mentoring, broadening participation, and broader impacts – every proposal must address broader impacts; NIH usually doesn't have such requirements
- NSF peer review is organized by program directors on an ad hoc basis – no standing panels; NIH has regular standing study sections that meet three times a year
- NSF program directors have more flexibility in determining program directions and funding decisions – proposal pressure and peer review are still main drivers; NIH applications largely go through the Center for Scientific Review



Department of Energy (DOE)

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Department of Energy

- The Department of Energy (DOE) has 3 core missions:
  - Science and Energy
    - Basic Research: provide the backbone for discovery and innovation, especially in the physical sciences, for America's research community
    - Applied Research: develop new energy technologies to transition to a low-carbon, secure energy future with low-cost, all-of-the-above energy technologies
  - Nuclear Security
    - Nuclear Stockpile: maintain and modernize the nuclear deterrent without testing
    - Nonproliferation: eliminate nuclear materials worldwide and develop technologies to detect nuclear proliferation
    - Naval reactors: maintain and develop nuclear reactors to propel the Naval fleet of submarines and aircraft carriers
  - Environmental Management
    - Cleaning up sites from the Cold War legacy of nuclear weapons production
- Based in Germantown, MD, though some offices divisions have offices in downtown DC

ARPA-E

Mission: To overcome long-term and high-risk technological barriers in the development of energy technologies

- $280 million a year to fund new projects.
- Modeled after DARPA—small, nimble organization with very low overhead costs
- Program managers rotate through on a 3-4 year basis
- About 40 percent of ARPA-E funding goes to universities each year and universities are required to provide a 5 percent cost share.
- Most funding opportunities tied to a targeted program focusing on specific technology (energy storage, grid modernization, bio fuels, etc.) - $30 million per program
- The average award size is $1 million annually for three years
- OPEN solicitation released every three years – much lower success rate

Applied Energy Programs

Applied Energy Offices:

- –Energy Efficiency and Renewable Energy
- –Fossil Energy
- –Nuclear Energy
- –Electricity Delivery and Energy Reliability

- Focus on technology improvement with heavy emphasis on industry connections
- All programs have 5 year plans that guide R&D investments
- Priorities include clean energy manufacturing, electric vehicles, building efficiency, biofuels, SunShot, carbon capture and sequestration, and transition to smart grid

DOE Office of Science Overview

- DOE is the “lead federal agency supporting fundamental scientific research for energy and the Nation’s largest supporter of basic research in the physical sciences”
- Office of Science:
  - Advanced Scientific Computing Research (ASCR)
  - Basic Energy Sciences (BES)
  - Biological and Environmental Research (BER)
  - Fusion Energy Sciences (FES)
  - High Energy Physics (HEP)
  - Nuclear Physics (NP)

Science Research Initiatives

- Materials research: the discovery and eventual design of new materials with desired properties for energy applications

- Exascale initiative: programming for energy-efficient, data-intensive applications on the next generation computing platforms 100 times more powerful than today's deployed systems

- Climate modeling: improve confidence in predictions of climate change and develop models that predict extreme weather events within 1 km

- Biofuels: create new bioenergy feedstocks designed for biofuels and convert biomass into commodity chemicals and liquid fuels other than ethanol

National Aeronautic and Space Agency (NASA)

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NASA Science Mission Directorate

- Science Mission Directorate focuses on basic research investigations on the Earth, Sun, solar system, and universe
- Main source for individual investigators: Research Opportunities in Space and Earth Science (ROSES)
  - Organized by research topic, i.e. “Concepts for Ocean Worlds Life Detection Technology”
  - Grants range from $100K to <$1 million
  - Important to speak with program managers to find out if research is relevant and get suggestions for collaborators
  - A list of program officers can be found at:http://science.nasa.gov/researchers/sara/program-officers-list/
- Useful to build relationships with NASA centers and existing teams
  - Principal Technologists based at NASA centers guide R&D
  - Program Executives based at NASA HQ oversee programs, ensure proposals align with agency-wide priorities

NASA Space Technology Mission Directorate

- Space Technology Mission Directorate (STMD) seeks rapid maturation of crosscutting, broadly applicable technologies through partnerships with industry/academia
- $686 million in FY 2016
- Several categories with single or multi-year awards ranging $100K-$2M per award
- Funds both applied and basic research that aligns with NASA Technology Roadmaps
  - Broad interest in technologies related to human and scientific space exploration
    - Examples: human habitation, modeling and simulation, sensors, propulsion
- Main program for faculty support is Space Technology Research Grants
  - Includes graduate fellowships, early career faculty awards, and early stage innovation to advance technology
  - One program manager for whole program

Engaging with Program Officers

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How to Engage with Agencies

- Research the program/solicitation
- Sign up to the listserv
- Participate in agency workshops and regional events
- Offer to serve as a reviewer
- Contacting the agency:
  - Email first rather than phone and be specific
  - Provide details of the program/solicitation/award number that you want to discuss
  - Any attachments summarizing your research should be no more than 1-2 pages and should be tailored to that program officer
  - It's OK to follow up with program officers, but don't overdo it
  - Always be courteous – get feedback if their response is disappointing

Objective of agency meetings

- Relationship-building opportunity.
- Introduce yourself to the agencies, and the agencies to you.
- Be on both “send” and “receive.”

Prior to the meeting

- Review the programs of the officials with whom you will be meeting and other relevant funding opportunities at their agencies.
  - As you are reviewing program descriptions and past solicitations, note places of potential fit to your areas of interest so you can ask specific questions.
- Prepare a one-page description of your research that may be left behind with the program staff, or sent ahead *if that has been requested*.
  - Including your contact information
  - Research descriptions should be consistent with areas of interest of the targeted agency program staff.
- Speak to more senior investigators who are funded by the federal agencies at which you will be meeting about their experiences and insight into the agencies and programs.
- Prepare questions to ask in the meetings.

Template for One-Pager

- Note: *Consider your audience. Each one-pager should be tailored to a specific meeting target, whether an agency leader, federal program officer, Member of Congress, or their staff. The depth and scope of information should align with the role of the meeting target.*

- **Intro/Project Overview:** The one-pager should have a short introduction. It should discuss specific aims of the research and describe strengths and uniqueness of your approach. This section should also briefly outline the relation of your research to the specific program that you will be discussing.

- **Significance:** This section can discuss the issue, problem, challenge or areas of interest that the proposed research will address. If appropriate, describe your vision for the future of your research and potential applications. Again, be sure to tie it to a research area within the program's portfolio.

- **Description of the Project/Activities:** This section should briefly describe the "what" such as the research/technology being conducted and the impact. For example, does it improve health outcomes? It is important to tailor the message to the audience. You may also want to describe the approach in this section, but keep in mind this is not a proposal, rather an introduction to your research. However, we have heard some program managers prefer to see specific aims.

- **Partnerships:** If appropriate, highlight federal support and/or partnerships that can strengthen the one-pager.

- **Contact Information:** Include name, title, department, institution, email address, phone, and websites.

On the day of the meeting

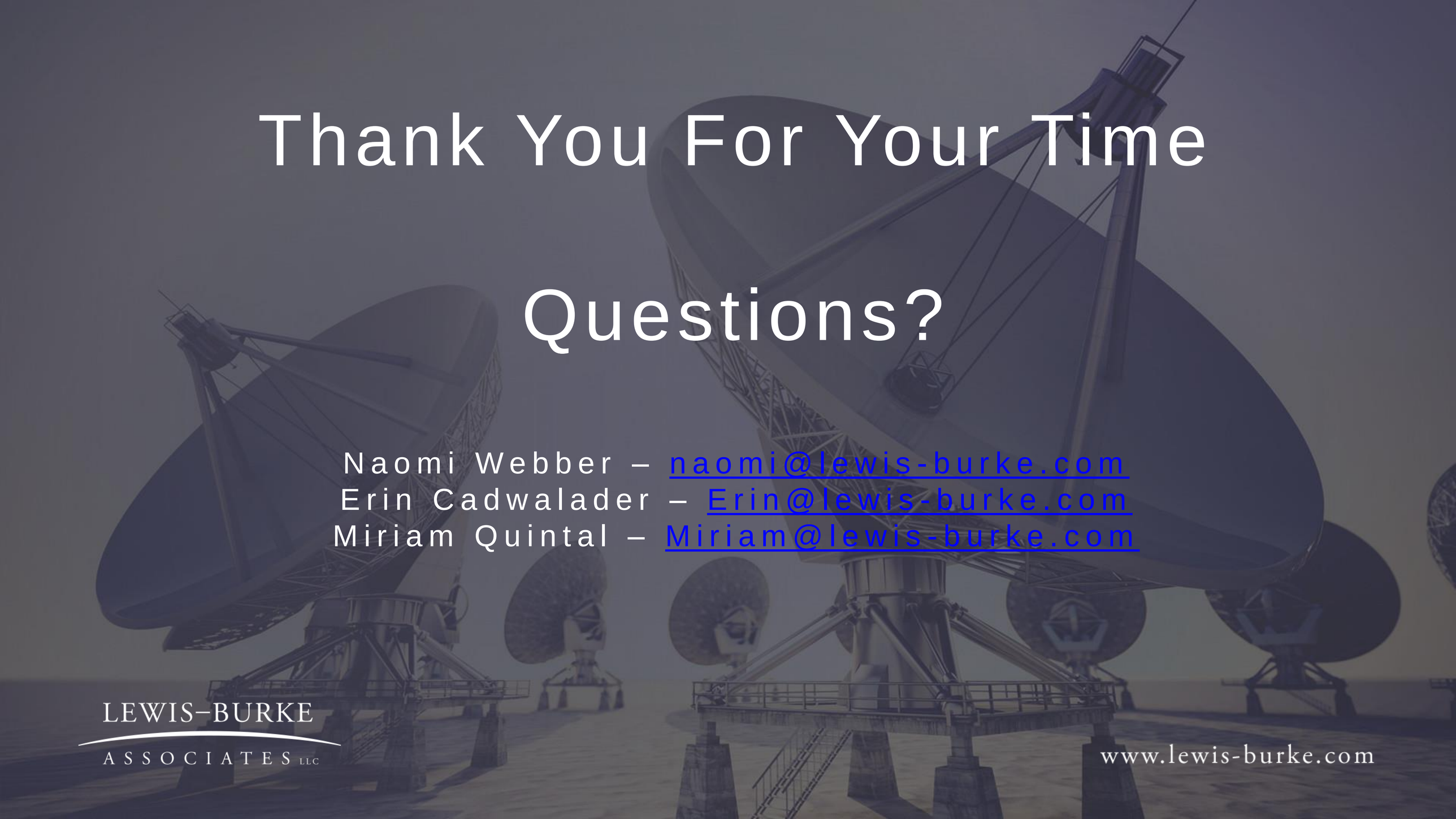
- Appropriate dress: business attire.
- Bring:
  - –Business cards
  - –Copies of your research descriptions.
- Be prepared to:
  - –Give a short introduction (5 minutes) about you and your work.
  - –Talk succinctly and clearly about your current and future research interests.
  - –Ask questions.
  - –Take notes.
  - –LISTEN to their answers.
  - –Thank them for meeting with you.

Example questions to ask in meetings

- What are the areas of interest of your program?
- What are the emerging areas of interest at the agency in your area?
- What are the mechanisms to seek funding at your agency and in your program? Are there targeted solicitations? Are you open to unsolicited proposals? Is there a recommended approach?
- How can I better prepare to submit proposals? At what point in the process is it appropriate to discuss specific project ideas with agency personnel/program staff? What kind of feedback can I expect?
- What are the success rates, and what helps with resubmittals ?
- Are there opportunities to serve as a reviewer or on advisory committees?
- Are there researchers whose work you would suggest I look into or that I collaborate with?
- Are there workshops or events you would suggest I participate in or help organize?
- Are there program officers at this or other agencies you recommend I contact?

Meeting follow-up

- Upon returning to campus, submit appropriate thank you emails to each of the meeting participants.
  - These emails should display an appreciation for the meeting, a quick reference to or summary of the issues discussed, any follow-up actions or conversations agreed to, and supplemental information if applicable.
- As you initiate contact with various agency officials, it is crucial that you maintain open lines of communication, especially if these contacts have displayed a willingness to accept unsolicited research proposals or provide unofficial advice.
- Federal program officials can be key advisors and sources of information throughout the challenging grant application process.



Thank You For Your Time

Questions?

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