



Air Force Research Laboratory



The Air Force Office of Scientific Research

6 June 2017

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Chief Scientist
*Air Force Office of Scientific
Research*



AFRL HERITAGE | 1917-2017

100 YEARS OF U.S. AIR FORCE
SCIENCE & TECHNOLOGY

Integrity ★ Service ★ Excellence



United States Air Force Mission



**The Mission of the United States Air Force is to
Fly, Fight, and Win...In *Air, Space, and Cyberspace***

**“The first essential of air power necessary for
our national security is preeminence in
Research.”**

- General Henry “Hap” Arnold





Air Force Research Laboratory



Space Vehicles



Information



Munitions



Directed Energy



Materials & Manufacturing



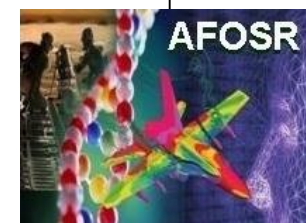
Aerospace Systems



711th Human Performance Wing



Sensors



Air Force Office of Scientific Research





AFRL

One Lab / Many Locations



| | | | | |
|---|---|---|---|--|
| AFRL Headquarters  | 711th Human Performance Wing  | Materials & Manufacturing  | Aerospace Systems  | Sensors  |
|---|---|---|---|--|

Information
Rome Research Site, NY



International Sites



London, UK

Tokyo, Japan


Santiago, Chile



AF Office of Scientific Research



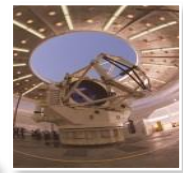
Space Vehicles Directed Energy



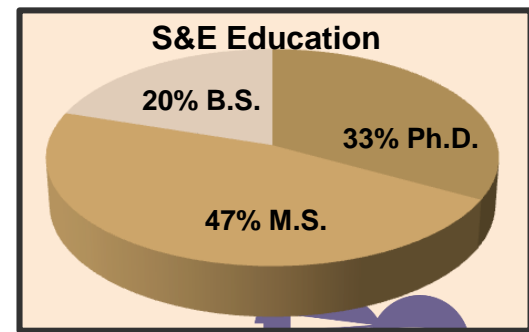
Munitions



Maui, HI



| | Employees | Civilian | Military |
|-----------------|-----------|----------|----------|
| Total | 5,827 | 79% | 21% |
| S&Es | 3,455 | 80% | 20% |





Turning Science Into Capability



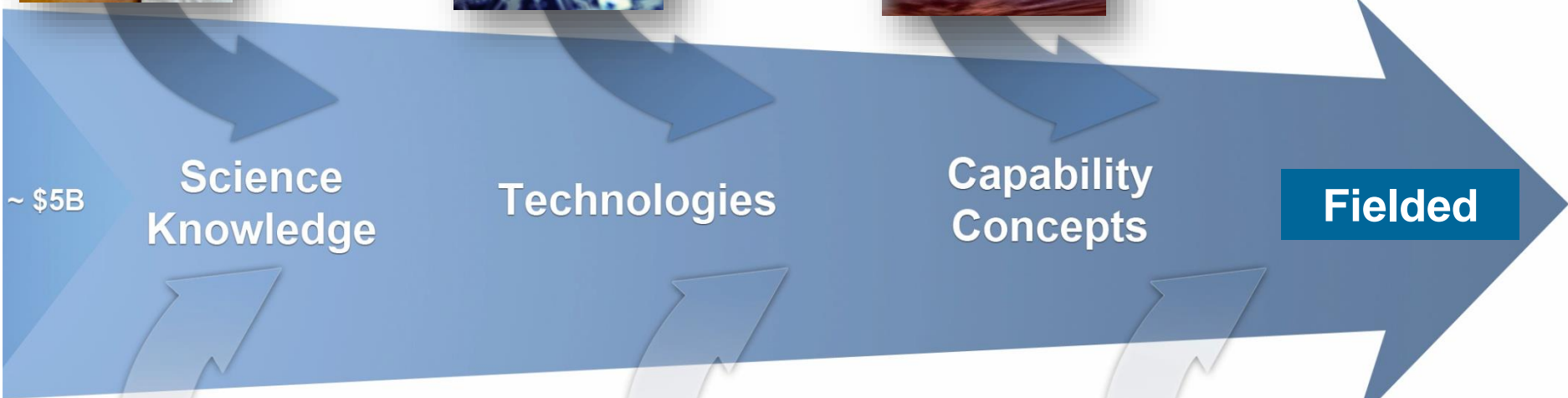
**6.1
Basic
Research**



**6.2
Applied
Research**



**6.3
Advanced
Tech Demo**



~ \$5B

Science
Knowledge

Technologies

Capability
Concepts

Fielded

**Outputs:
New Technologies**

**Outputs:
Mature Technologies**

**Outputs:
Flagship Capability Concepts**



25 Years

10 Years

5 Years

1 Year

Initial Operating Capability Timeline



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What is Basic Research?



- **Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind**
- **Implications**
 - AFOSR investments impact far-term capabilities
 - Basic research can be published without restrictions
 - AFOSR is free to invest internationally with very few restrictions

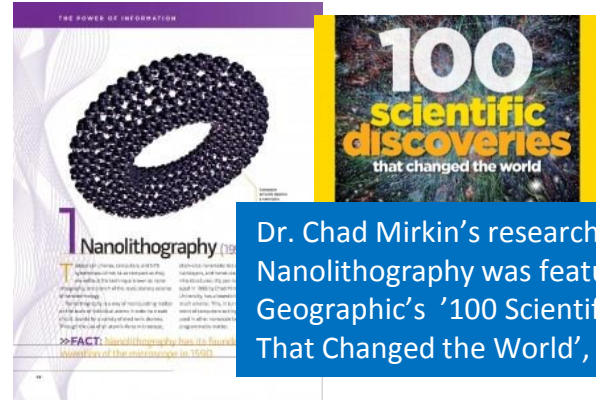


Why the United States Air Force Invests in Basic Research

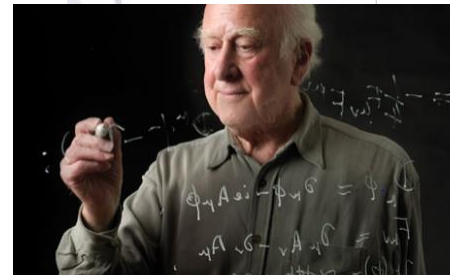


- To probe today's technology limits and ultimately lead to future technologies with DoD relevance
- Attract the most creative minds to fields of critical DoD interest
- Create a knowledgeable workforce in fields of critical DoD interest

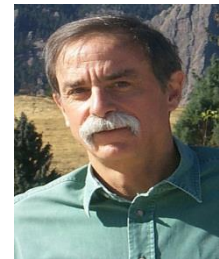
AFOSR has sponsored 78 Nobel Laureates



Dr. Chad Mirkin's research on Dip Pen Nanolithography was featured in National Geographic's '100 Scientific Discoveries That Changed the World', 2011



2013 Nobel Prize in Physics – Dr. Peter Higgs, Univ of Edinburgh



2012 Nobel Prize in Physics Dr. David Wineland, Univ of Colorado/NIST



Dr. Greg Pitz & Dr. Onome Scott-Emuakpor, AFRL scientists, received 2013 PECASE awards.



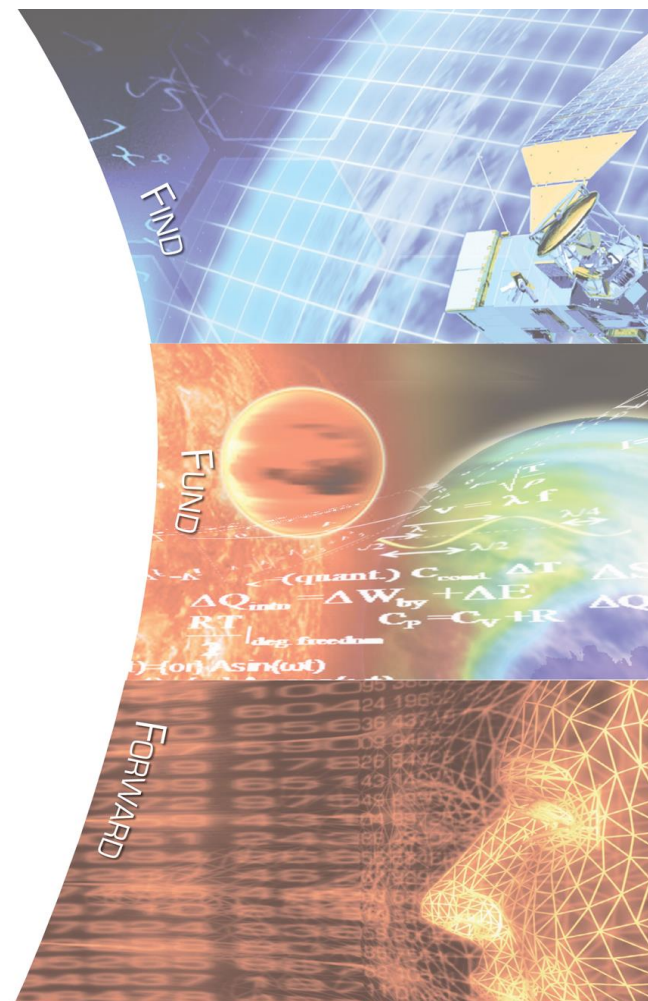


Snapshot of AFOSR



Discover, shape, and champion basic science that profoundly impacts the future Air Force

- **Manage the basic research investment for the Air Force**
 - Basic research is the foundation of all scientific discovery
 - Leads to revolutionary new concepts & technology
- **Find and fund the most dynamic & promising world-class researchers in academia, industry, & government**
 - 297 intramural research projects & 1052 research grants at about 177 U.S. universities
 - 346 research grants at 213 international institutions
- **Ensure timely transitions of research results**
 - Offer significant benefits to national warfighting and peacekeeping capabilities, and society at large





AFOSR Locations



Santiago

Arlington

London

Tokyo



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AFOSR (Arlington) Portfolios as of Mar 2017



AFOSR/RT

Engineering and Information Science

Engineering and Complex Systems

Multiscale Structural Mechanics and Prognosis

Test Science for Test and Evaluation

Unsteady Aerodynamics & Turbulent Flow

Energy Combustion and Non-Equilibrium Thermodynamics

Electronic Materials and Devices

Low Density Materials

Space Power and Propulsion

Dynamic Materials and Interactions

High Speed Aerodynamics

Information and Networks

Computational Cognition and Machine Intelligence

Information Operations and Security

Science of Information, Computation, Learning and Fusion

Trust and Influence

Dynamic Data Driven Applications Systems

Computational Mathematics

Systems and Software

Complex Networks

Dynamics and Control

Optimization and Discrete Mathematics

Physical and Biological Sciences

Physical Sciences

Atomic and Molecular Physics

Space Sciences

Ultrashort Pulse Laser-Matter Interactions

Sensing, Optics, and Imaging

Optoelectronics and Photonics

Aerospace Materials for Extreme Environments

Quantum Information Science

Electromagnetics

Plasma and Electro-Energetic Physics

Lasers, Sources, and Materials

Quantum Electronic Solids

Chemistry and Biological Sciences

Natural Materials and Systems

Mechanics of Multifunctional Materials and Microsystems

Organic Materials Chemistry

Biophysics

Human Performance and Biosystems

Molecular Dynamics and Theoretical Chemistry



AFRL Opportunities for Faculty



- **Grants**
 - <https://www.grants.gov/web/grants/view-opportunity.html?oppld=285269>
- **Multidisciplinary University Research Initiatives**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842111#anchor2>
- **Defense University Research Instrumentation**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842111#anchor1>
- **Small Business Tech Transfer Program**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842100#anchor3>



AFRL Opportunities for Faculty



- **National Research Council Programs**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058#anchor5>
- **Young Investigator Program**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842100#anchor2>
- **Summer Faculty Fellowship Program**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058#anchor6>
- **Air Force Visiting Scientist Program**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058#anchor1>



AFRL Opportunities for Students



- **Awards to Stimulate and Support Undergraduate Research Experiences**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058#anchor2>
- **National Defense Science and Engineering Graduate Fellowship Program**
 - <http://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/842058#anchor4>
- **Science, Math, and Research for Transformation Program**
 - <https://smart.asee.org/>
- **AFRL internship and career opportunities**
 - <http://teamafrl.com>



<https://community.apan.org/wg/afosr>



Air Force Office of Scientific Research

The Basic Research Directorate of the Air Force Research Laboratory

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PRESENTATIONS DIRECTORY

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▼ Research Areas

- Aerospace Materials for Extreme Environments
- Atomic and Molecular Physics
- Biophysics

BASIC RESEARCH FUNDING OPPORTUNITIES

AFOSR invites proposals in broad research areas through the general BAA and other broad agency announcements. Proposals submitted under the BAAs are evaluated using a peer or scientific review process and selected for award on a competitive basis.

To apply for AFOSR funding opportunities listed in the BAA, visit www.grants.gov. All application forms and instructions are provided on the site. You can search grants.gov by CDFA numbers 12.800, 12.630 and 12.910. There you can also search for opportunities by all grant issuing agencies.

Quick Links:

[2016 AFOSR BAA](#)

[AFOSR Funding Opportunities](#)

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