Presented at the AFOSR Spring Review 2013, 4-8 March, Arlington, VA.
Air Force Research Laboratory
AF Basic Research Manager

Mission: We discover, shape, and champion basic science that profoundly impacts the future Air Force.

- Identify Breakthrough Research Opportunities – Here & Abroad
  - 60 Program Managers interacting with leading scientists and engineers across the globe
  - 3 International offices (London, Tokyo, Santiago)
  - Sponsored 165 scientific workshops and symposiums

- Foster Revolutionary Basic Research for Air Force Needs
  - 1291 extramural research grants at 201 U.S. universities
  - 313 intramural research projects at AFRL, USAFA, AFIT
  - 1900 PIs, 3500 grad students, 603 post-docs supported

- Transition Technologies to DOD and Industry
  - 907 funded transitions (follow-on-uses) from FY11 PI data call
  - AFRL is the principal transition path
  - 152 STTR small business - university contracts
AFOSR Reorganization

- Current and previous AFOSR organizations were structured around number of SES positions
  - Not organized to optimize Science Mission, Organized to justify SES positions
  - Organization becomes series of stovepipes and opportunistic engagements

- Current fiscal and scientific environment demands a change
  - Organization must be more collaborative and responsive
  - Scientific Community is changing how they execute research, we need to evolve from current structure

Desired End State: A coherent, collaborative, 6.1 AF organization leading the way to tomorrow’s technologies

Distribution A: Approved for public release; distribution is unlimited
Goals of Reorganization

• Maintain strong 6.1 focus and improve scientific quality across AFOSR
  – Maintain semi-autonomy for program managers as subject experts
  – Enhance responsiveness to rapidly changing scientific environment
• Improve the ability to collaborate across all AFOSR portfolios
• Improve the ability to collaborate across the International Enterprise

Two program manager committees were formed with a focus on RSXs –

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Number of Projects: 1291

Top Funded Univ.
- Stanford
- Princeton
- Georgia Tech
- M.I.T.
- UC San Diego
- Univ. of Michigan
- UC Berkeley
- Univ. of Maryland
- Univ. of Arizona
- Cal Tech

AFOSR Sponsored 70 Nobel Laureates

Current PI Awards & Recognitions:
- 4 - Nobel Prize winners
- 52 - National Academies members
- 2 - President's Council (PCAST)
- 24 - Presidential Early Career Award
- 115 - Professional Society Fellows
- 131 - Young Investigator Program

Distribution A: Approved for public release; distribution is unlimited
Improving the AF Organic Research Capability

Intramural Proposal Process

• Best new-start proposals endorsed by AFRL Directors
• Proposals peer reviewed
• 10% of recipients designated as “STAR” teams

Workforce Development

• Centers of Excellence (7 Active/3 Pending)
  – Tie selected universities to TDs
• International personnel exchanges (30)
• Postdocs (80) & summer faculty (99) & students (22) at AF research sites

Assures a healthy AF in-house basic research capability
Building International Relationship to Avoid Technology Surprise

- Building international goodwill
- Strengthening partnerships
- Avoiding technological surprise
- Accelerating S&T achievements and transitions to the U.S.

$19.7M at International Universities

Defense Science Board Report: “It is important for DoD to be involved in the cutting edge of basic research on topics of specific interest to the Department—whether the cutting edge is in the U.S. or overseas.”

Recommendation: DoD increase the percentage of basic research funding that is invested internationally from 2.5% to 5%

- Nanomaterials (Taiwan, Korea)
- Metamaterials (Europe, Israel)
- Fiber Lasers (UK)
- Hypersonics (Australia, Brazil, Belgium)
- Machine Cognition (Japan, Australia)
- Brain Science (Korea)
- Extremophiles (Chile)
- Plasma Science (FSU)
- SSA (Chile)
- Bio-Inspired Flight (India, UK)
- Quantum Info Sciences (UK)
- Ultra-Short Pulse Lasers (Europe)

2010 898,416 Articles

- Africa 3%
- Aus/NZ 2%
- Russia 4%
- South Korea 6%
- China 24%
- United States 26%
- Canada 4%
- Taiwan 11%
- Middle East 3%
- Japan 11%
- Other America 3%
- South Korea 3%
- Russia 2%
- US share of global R&D steadily decreasing

2000 636,358 Articles

- Africa 3%
- Aus/NZ 2%
- Russia 4%
- South Korea 6%
- China 24%
- United States 26%
- Canada 4%
- Taiwan 11%
- Middle East 3%
- Japan 11%
- Other America 3%
- South Korea 3%
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AF Basic Research Budget

### 2012-2015 AF Basic Research Budget

<table>
<thead>
<tr>
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<th>FY 2012</th>
<th>FY 2013*</th>
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*Estimate

### AF Basic Research Budget Details

- **Extramural Research**, $193,196,791
- **AFRL (Intramural)**, $62,240,656
- **USAFA & AFIT**, $4,032,500
- **Workforce (Post-Doc, SFFP, & Other)**, $16,378,482
- **AFOSR Support/Overhead**, $35,706,222
- **AFRL, Sec. 219**, $33,072,000
- **International**, $19,701,349

### OSD Basic Research Budget Details

- **Multi-University Research Initiative (MURI)**, $71,434,493
- **National Defense S&E Graduate Fellowship (NDSEG)**, $35,982,849
- **MINERVA**, $3,300,000
- **DURIP**, $12,441,316
- **PECASE, Tax**, $4,088,381
- **Overhead**, $4,209,961
- **ASSURE**, $4,500,000
Educating the Next Generation

• National Defense Science and Engineering Graduate Fellowship (NDSEG - $36.0M)
  - Full tuition assistance + $31K/per year stipend
  - Fellows do not incur any service obligation
  - Supports over 550 PhD-track graduate students

• Awards to Stimulate and Support Undergraduate Research Experience (ASSURE - $4.5M)
  - Provide undergraduates with research opportunities in S&E fields of DoD interest
  - Supports over 500 undergraduate students during summer months – managed by National Science Foundation

• Junior Science and Humanities Symposia (JSHS - $.70M)
  - Provide high school students to conduct an original research investigation in the STEM field.

• Professional Society Meetings, Scientific Exchanges, and other Scholar Programs - $8.89M

• Historically Black Colleges & Universities and Minority Institutions (HBCU/MI)

ASSURE site at Fort Johnson, NY

USA Science & Engineering Festival, DC
Young Investigator Program (YIP)

- Develop long-term relationships with leading junior PIs
- 222 awards since FY07; 48 awarded in FY12
- Must have received PhD in the last five years
- Awards up to 5 years
- Goal: increase YIPs to >50/year
Find AFOSR on Facebook

Main AFOSR Page:
http://www.facebook.com/afosr

Aerothermodynamics & Turbulence Portfolio:
http://www.facebook.com/afosr.GoFast

Flow Interactions & Control Portfolio:
Summary

• The White House and DoD strongly supports the basic research program

• AF basic research:
  – Probes today’s technology limits and ultimately leads to future technologies
  – Creates knowledgeable workforce in fields of critical AF interest

• AF basic research investments are fully coordinated and leveraging opportunities are exploited for innovation

“Innovation also demands basic research. Today, the discoveries taking place in our federally-financed labs and universities could lead to ... New lightweight vests for cops and soldiers that can stop any bullet. Don't gut these investments in our budget. Support the same kind of research and innovation that led to the computer chip and the Internet.”
- President Obama, State of Union Speech, 24 January 2012
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*TODAY’S BREAKTHROUGH SCIENCE FOR TOMORROW’S AIR FORCE*