



# **Alabama A&M University Research Institute**

D. ILA, Executive Director

AAMURI Briefing

# Who We Are: Supporting

- The Warfighter
- The Aerospace Industry
- Homeland Security

# Providing

- Contracted Advanced Research
- Engineering Services
- Flexible Contract Support
- Full Cost Accounting
- DCAA Audited Rates
- Cleared Site and Personnel
- Low G&A/Low IDC



ALABAMA A&M UNIVERSITY  
RESEARCH INSTITUTE

*Established June 1999*

# VISION



## *“Independently Supported Contract Institute”*

- *Serve as a Conduit for Contracts at AAMU*
- *Support Economic Improvement & Betterment of life in Alabama*

## *Our Role*



- 1. Serve as a Conduit for Contracts at AAMU (an HBCU)*
- 2. Help Small Business to develop their Competitive Capabilities*
- 3. Interface between Industry, Government and University Through M&P, SBIR/STTR, Training, Services, as well as providing access to State of the Art Facilities.*





A&M Research Institute leaders Dr. Leslie Evelyn, Dr. Gladies Herron, Dr. Daryush Ila and James Johnson.

## Who Are We?

- Founded 1875
- 1890 Land
- HBCU
- 5600 students,
- >1400 Grads.,
- 4 Ph.D. programs
- Fully accredited (SACS)

# Can do it conduit

Alabama A&M Research Institute joins university and its partners to corporations, small businesses and government

By ANNA CLAIRE VOLLERS

**A**labama A&M University's Research Institute links high-tech industries looking to gain access to top academic minds and advanced research labs with the resources of the university. Whether a company needs one position filled or a long-range project completed, the Research Institute is the connection

that can make it happen.

"We are the independently supported contract arm of the university," says Dr. Daryush Ila, executive director of the Alabama A&M Research Institute (AAMURI). "We support the economic improvement and the betterment of life in Alabama. Essentially, when industry and the government approach us, we help them. When the industry talks to

us, they're talking to us and all of our partners."

AAMURI has three major emphases: information science and information technology; environmental services; and technology development.

A 501(c)(3) entity of the university, AAMURI partners with faculty and students from disciplines in Alabama A&M's five schools, and has partnered

# ORGANIZATION CHART



**PRESIDENT  
AAMU**

**Dr. D. ILA, Executive Director  
Dr. G. Herron, Associate Director**

## Board of Directors

President, VP (R&D), President  
Pro Tempore of BOT, Chair of R&D  
Sub of BOT, Exec. Dir. of AAMURI

**Advisory Board**

**Last Updated 2007**

**Programs  
& ID/IQs  
(D. ILA)**

**IT & IS**

**ATR&D**

**IERS**

**Small Business  
Training and  
Partnership**

**FISCAL  
CONTROL  
(G. Herron )**

**Payable  
&  
Receivable**

**Personnel  
Payroll**

**(Property  
Management)**

**HRD  
a) Training,  
b) Internship  
c) Innovative Awards**

**CONTRACTS  
(A. L. Evelyn &  
D. ILA)**

**Grants &  
Contracts**

**Federal G&C**

**Internal  
Control**

**SUPPORT  
SERVICES  
(J. Johnson & ILA)**

**Analytical/  
Materials**

**IT**

**Training**

**Workshops  
STTR/SBIR/IP  
Public Awareness**

**BUSINESS  
DEVELOPMENT  
(ILA,J. Johnson,  
Evelyn)**

**FSO/SO**

# **MANAGEMENT TEAM**



**Dr. D. ILA, Exec. Dir. of AAMURI**  
**Dr. Gladies Herron, Assoc. Dir., Ops. Manager**  
**Dr. Leslie Evelyn, G&C Manager**  
**Col. James Johnson, Logistics, M&P/FSO/SO/TM**  
**Ms. Veena Sharma, Management Assistant/NSF-PA**  
**Ms. Vannessa McGlathery, Acc. Administrator**  
**Ms. Cynthia Lankford, Administrative support**  
**Ms. Chandra Ray, Acc. PR/AP/AR**

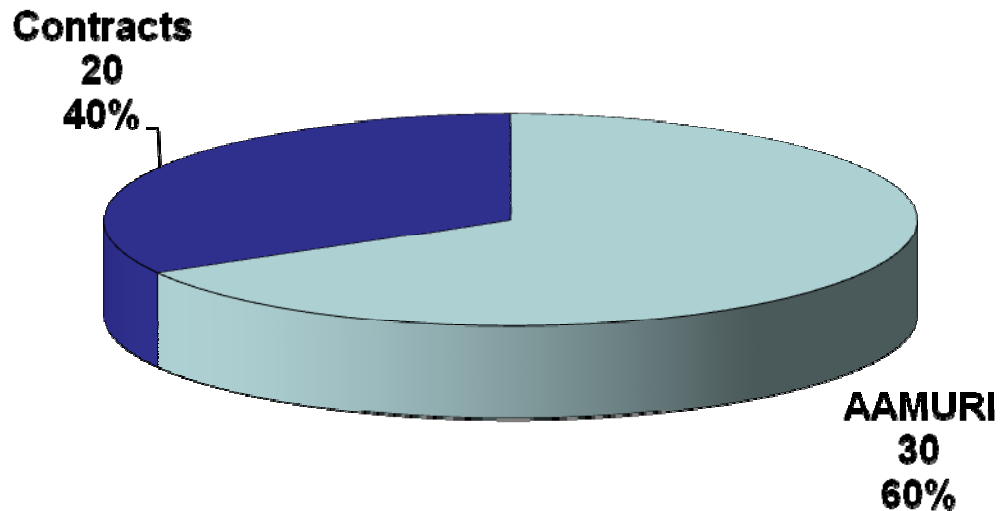


# Employees

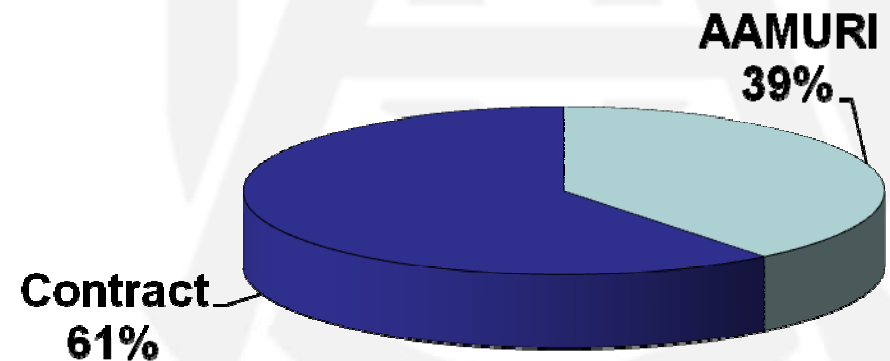


	FY 08	FY 09
AAMU Student Employees	28	50
Faculty & Staff Employees	45	35
Total	73	85

**FY 09 Student Assistants**



**FY 08 Student Assistants**





# Selected Customers & Partners



## Government

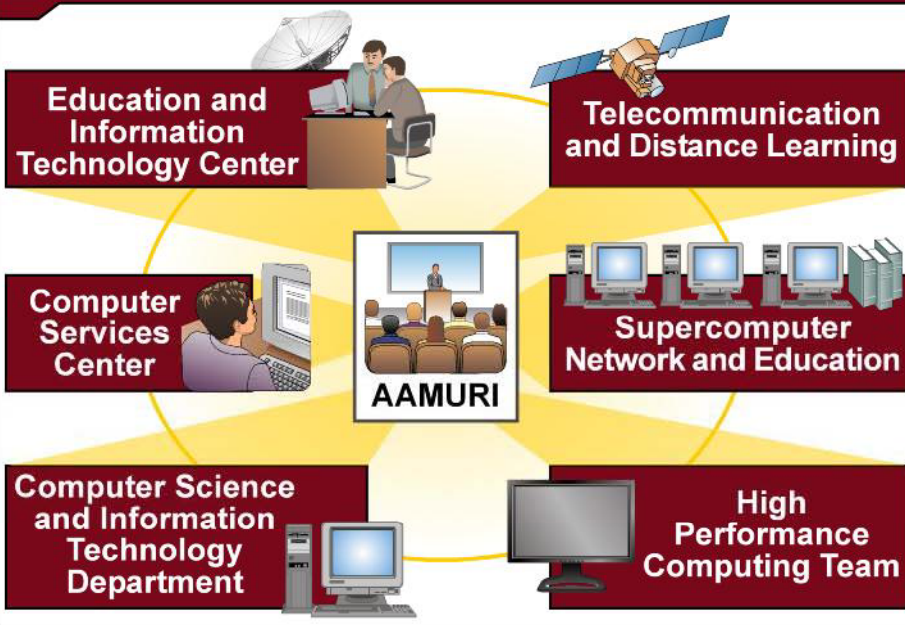
- DOD
- NASA
- DOE
- NSF
- SBA, DIA, ....

## Commercial

- SAIC
- Boeing
- EG&G
- Many others
- Small Businesses

# Strategic Research Areas

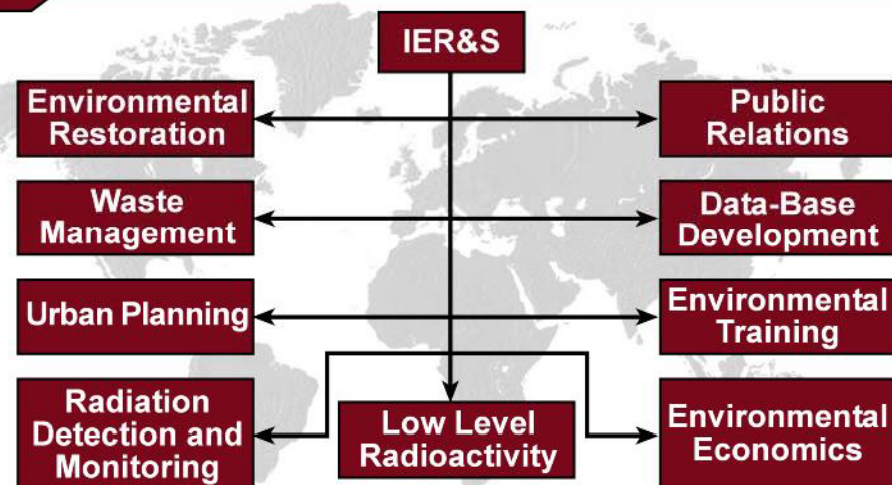
## Information Science and Information Technology (IS&IT)



## Advanced Technology Research and Development (ATR&D)

- IS & IT, ME, EE, CE, CS
- Nano-Technology
- Information Security
- Artificial Intelligence
- Imaging/Signal Analysis/Processing
- Simulation and Modeling
- Communications Networking
- Advanced Materials Proc.
- Prototyping
- Sensors/Detectors/Mirrors
- Validation and Verification
- Protocols and System Technology
- Technical Transfer, Insertion/Integration
- Plant Cell Tissue Culture
- Man/Machine Analysis Studies

## Integrated Environmental Research and Services (IER&S)



# Who Are We?



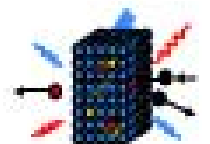
- Hydrology, Soil, Climatology & Remote Sensing
- Center for Irradiation of Materials
- Small Business & Economic Development
- Center for Environmental Research & Training
- Center of Excellence in Forestry & Ecology
- Advanced Propulsion Materials Res. Ctr.
- AAMU Research Institute

Research Institute  
HQ

Who are we?



Center  
for  
Irradiation of Materials



# Highlighted Expertise 1



- **Engineering services, Support Services**
- **Mentor-Protégé (Support)**
- **Advanced technology Dev. & Prototyping**
- **Materials research and development**
- **Small business development and training**
- **SBIRs and STTRs jointly with small businesses**
- **Specialized small business training program**
- **World-class composite, Nano-science and Nano-Technology facilities, Sensors**
- **Advanced Environmental and Forensic facility**
- **Highly Competent IT Engineers and Scientists**



# Highlighted Expertise 2



## 1. Propulsion:

- Increase partnerships (NASA, DOD, Industries and Universities).
- Topics: TEG, Support for NASA/Customers Mission, Carbon Base High Temperature Materials, Sensors for Extreme Environment, Power Generation and Radiation Effects, Carbon Composites and Metal Composite adhesion.

## 2. IER&S: Forensic, Environmental Training and Remediation, Public outreach

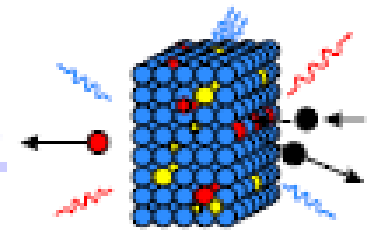
## 3. SBIR/STTR, SB Training, Mentor-Protégé

## 4. Nano-Science and nano-technology

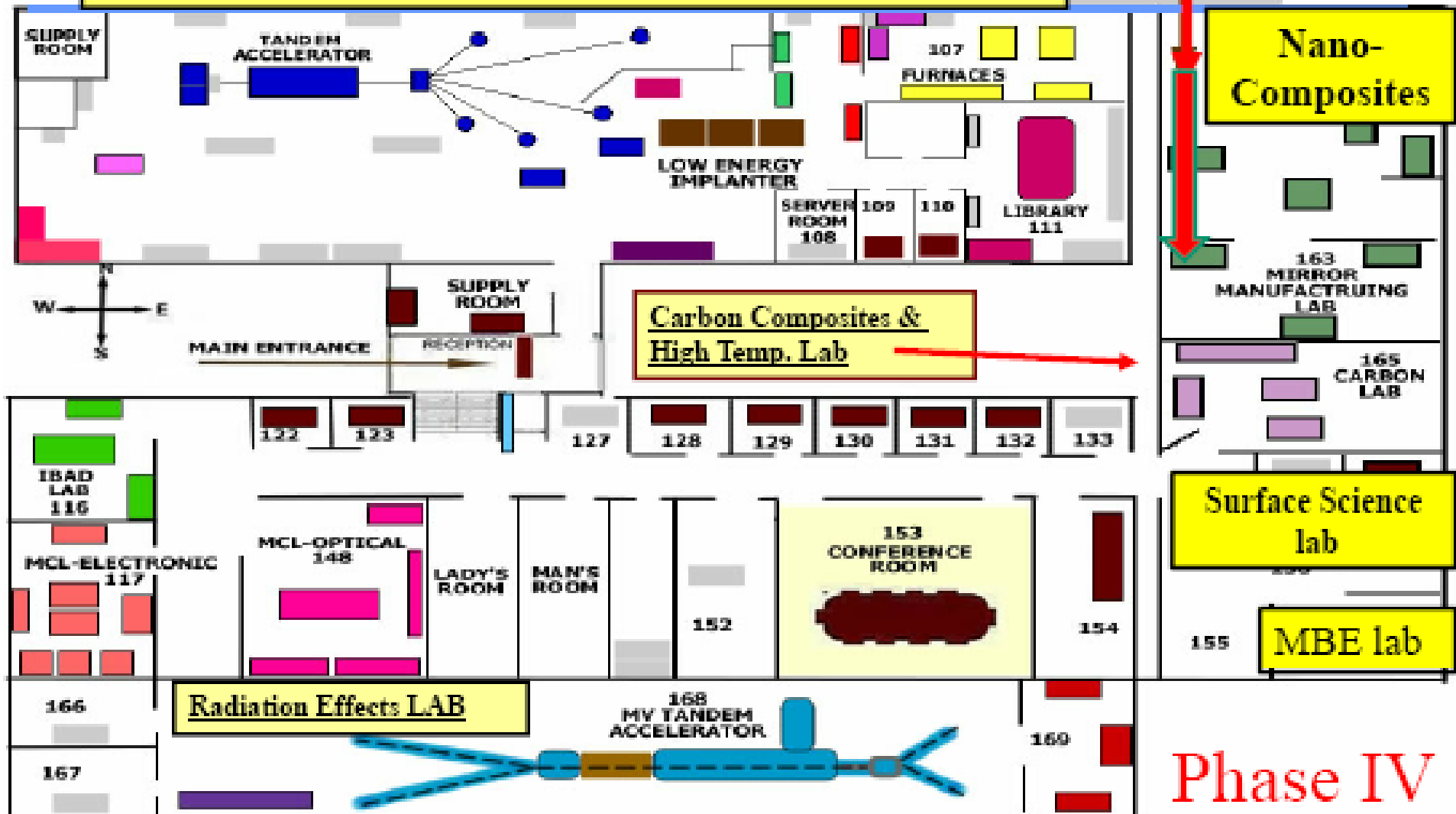
## 5. Services: HR, IT, Research Contract



# Ctr. for Irrad. of Materials



## Ultra-light Mirror Manufacturing Lab

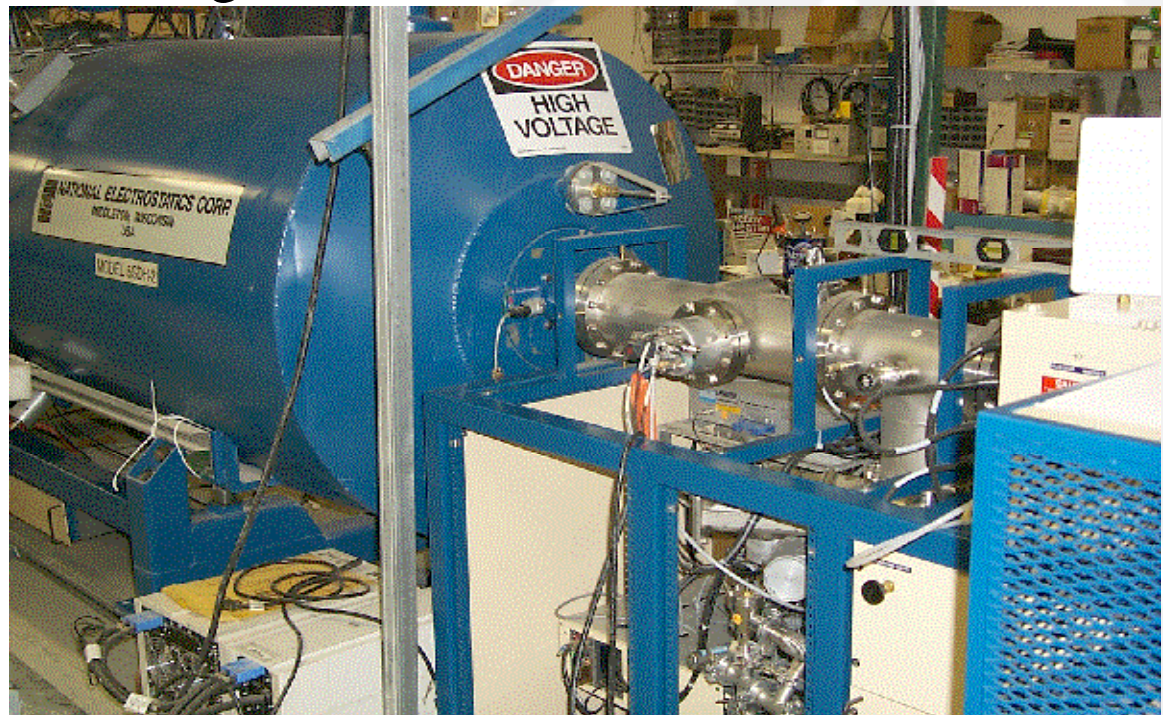


Phase IV

# Center for Irradiation of Materials

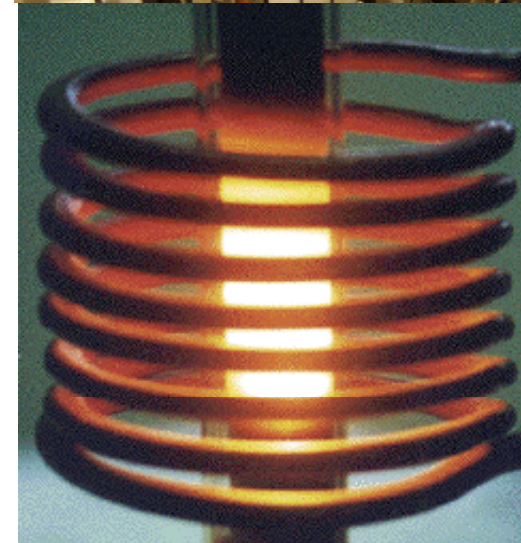
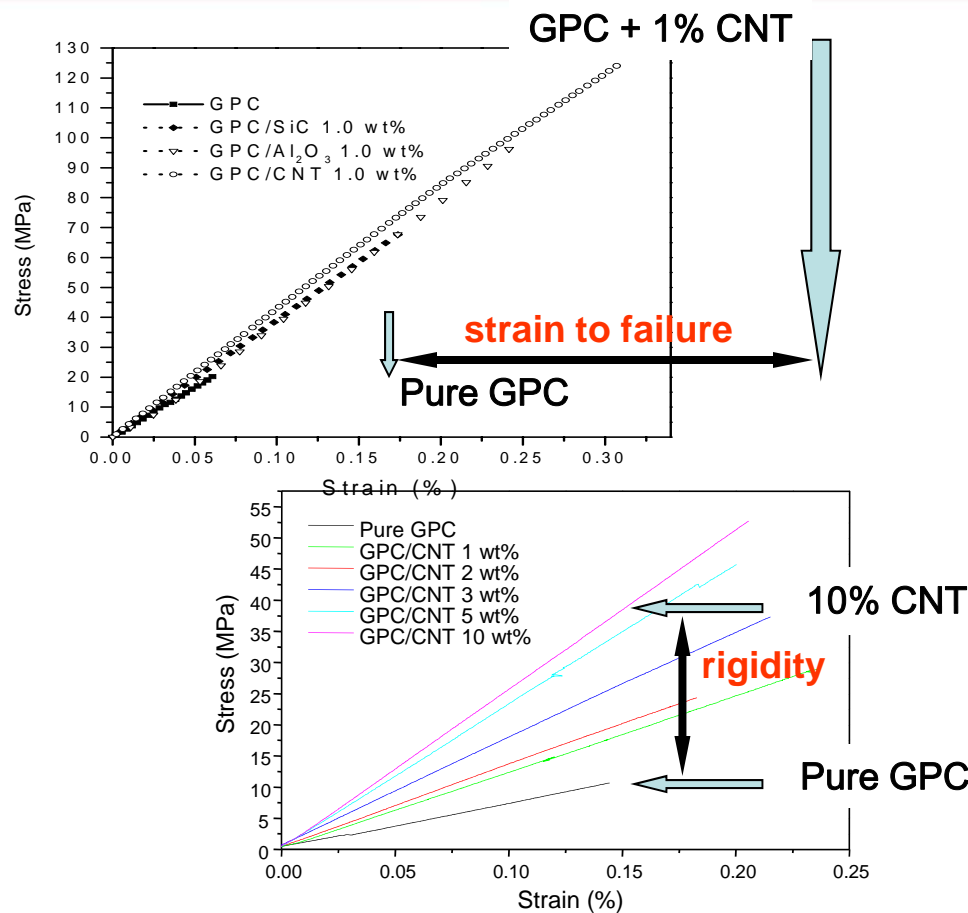


- Operates Two Tandem Particle Accelerators each 2 MV Accelerators
- Nano-Science and Nanotechnology (**NSF, DOE, NASA, DOD**)
- Surface and Interface Processing
- Materials Processing
- **Thermoelectric Mat.**
- **Ion Implantation**
- **Materials Analysis**
- **High Temp. Carbon Composites**
- **Environmental R&D, Forensic**





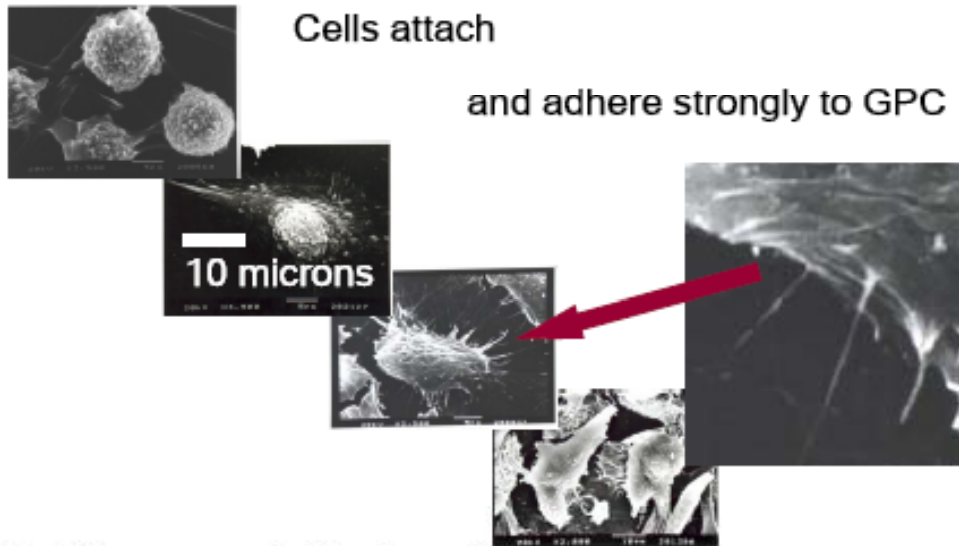
# High Temp. CARBON COMPOSITES



Ultra high (2500C) temperature carbon composites. Carbon nano-tubes improve the **strain to failure** more than factor 10. And the **rigidity** by factor 3!

Glassy Polymeric Carbon (GPC) - Composites  
Operates above 5000°F, Chemically stable, Biocompatible, Almost as hard as diamond, Good electrical conductor

# ION BEAM MODIFICATION of materials for biomedical applications.



- Tenuous cell attachment (top)

Strong adhesion (bottom)



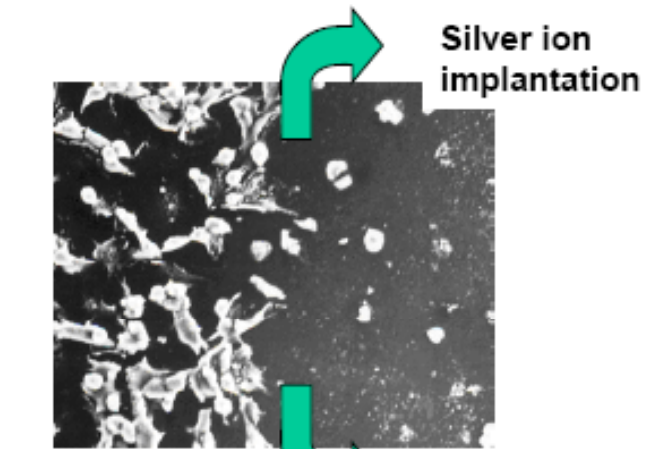
Brazil



Turkey



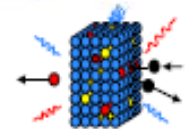
AAMU



Control of cell growth on carbon  
for improved medical implants



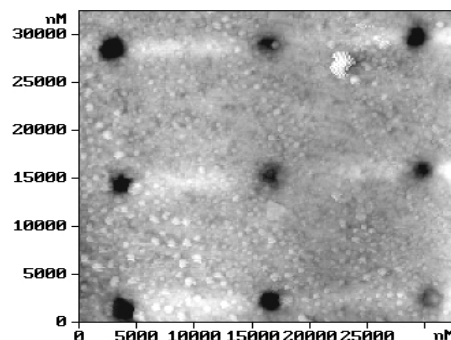
GPC heart valve  
(GPC is the black material)



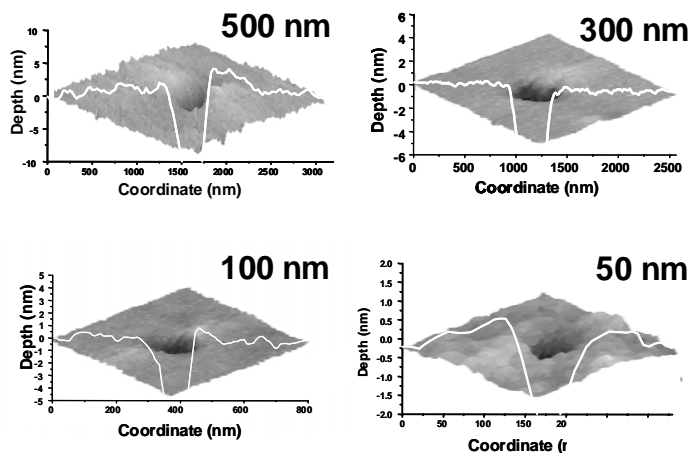


# Controlled Fabrication of Micro-/ Nano-pores Membranes

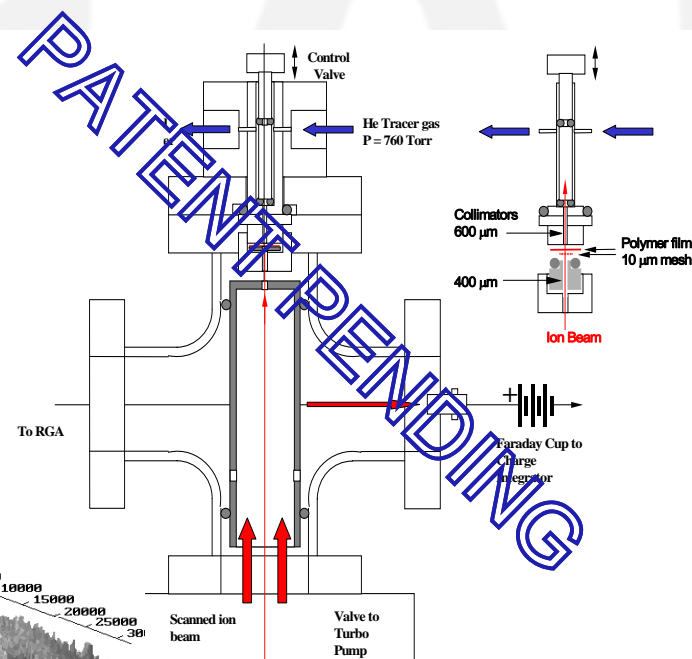
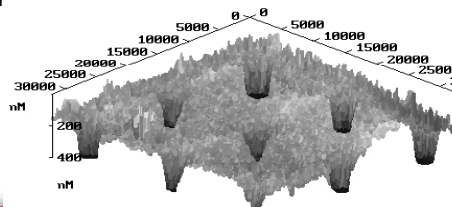
## *Production of nanopores in Fluoropolymer films*



Nano pore production for single molecule biochemistry  
DNA and Protein characterization



Perfluoroalkoxyethylene (PFA)  
 $[\text{CF}_2\text{CF}_2]_{0.99}[\text{CF}_2\text{COF}_3]_{0.01}$



# Highly Efficient Thermoelectric Materials

## *In House Materials Processing and Device Prototyping*

### AAMU TEM (June 2009)

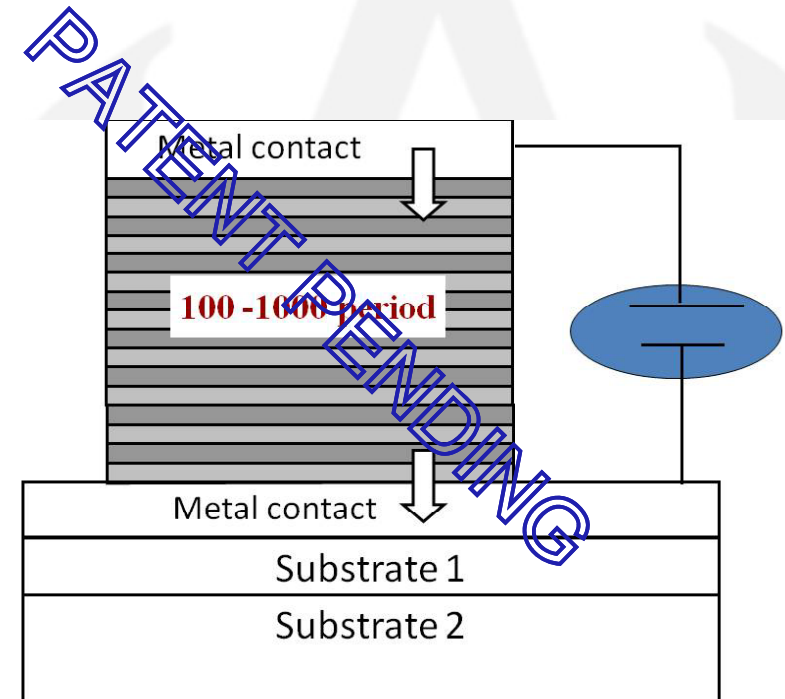
Materials	Reported ZT/Temp	AAMU ZT/Temp	Potential ZT/Temp
$\text{SiO}_2\text{Au/SiO}_2$	0	2.52 @ 360K	> 2.52
$\text{Bi}_x\text{Te}_3/\text{Sb}_2\text{Te}_3$	1.1 @ 350K	2.6 @ 350K	> 2.6
$\text{SiO}_2 \text{ Ag/SiO}_2$	0	0.085 @ 300K	Under Investigation
$\text{Zn}_4\text{Sb}_3$	0.50 @ 300K	0.53 @ 300K	Under Investigation
$\text{CeFe}_2\text{Co}_2\text{Sb}_{12}$	0.05 @ 300K	3.07 @ 300K	>3.07
$\text{SiO}_2/\text{Zn}_4\text{Sb}_3$		0.28 @ 300K	
$\text{Si}_{1-x}\text{Ge}_x/\text{Si}$	1. @ 300K 0.6 @ 1200K	0.61 @ 300K	>> 0.61

$\text{SiO}_2/\text{SiO}_2+\text{Au}$ ,  $\text{Bi}_x\text{Te}_3/\text{Sb}_2\text{Te}_3$ ,  $\text{Zn}_4\text{Sb}_3/\text{CeFe}_2\text{Co}_2\text{Sb}_{12}$ ,  
 $\text{SiO}_2/\text{SiO}_2+\text{Ag}$ ,  $\text{Zn}_4\text{Sb}_3$ ,  $\text{ZrNiSn}$ ,  $\text{Zn}_4\text{Sb}_3$ ,  
 $\text{CeFe}_2\text{Co}_2\text{Sb}_{12}$ ,  $\text{SiO}_2/\text{SiO}_2+\text{Zn}_4\text{Sb}_3$ ,  $\text{Si}_{1-x}\text{Ge}_x/\text{Si}$ ,  
 $\text{Bi}_2\text{Te}_3/\text{Sb}_2\text{Te}_3$

0.5 < ZT gained < 3.07

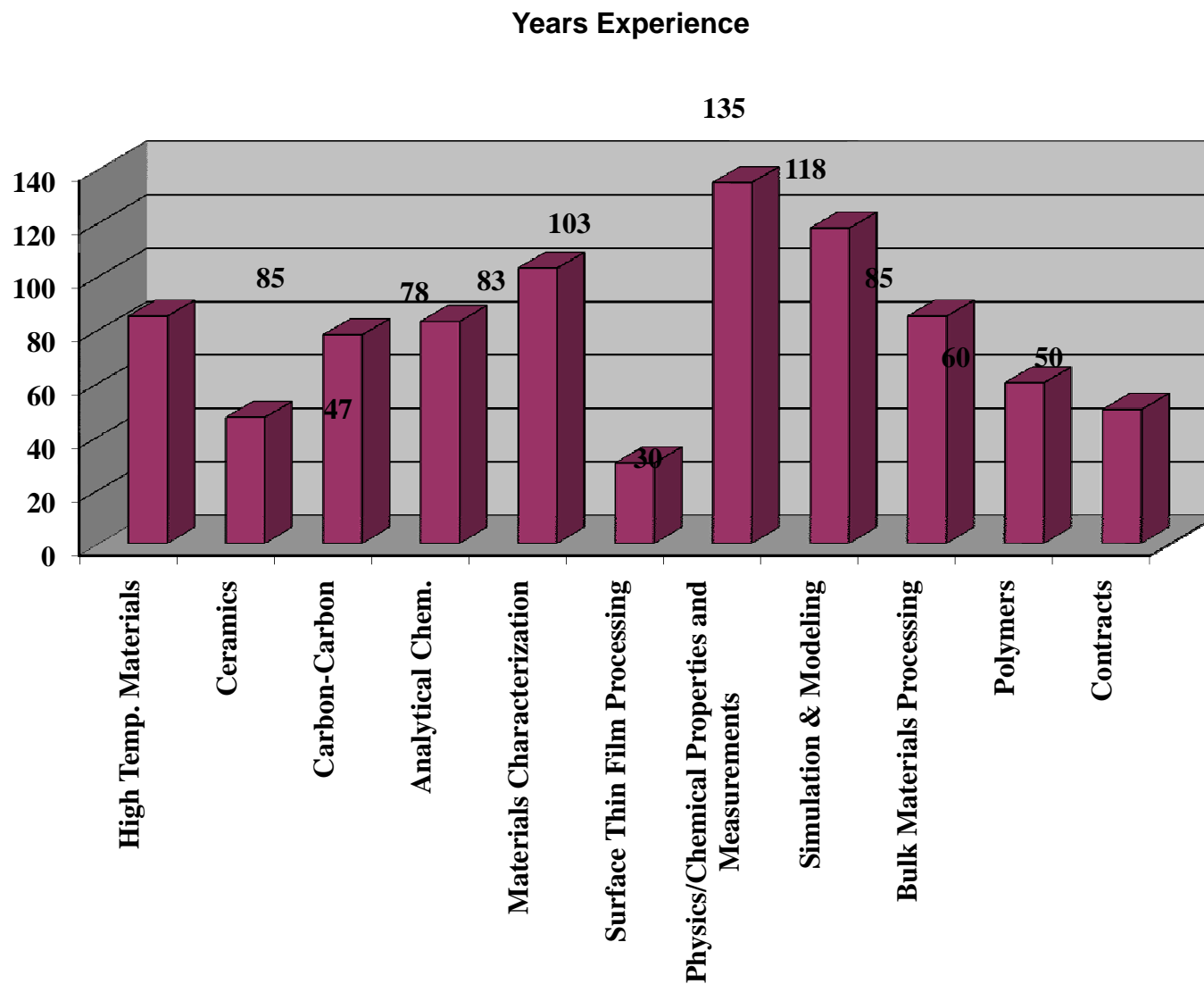
300K < Operation Temp < 1200K

Design of NL/NC (QW/QD)



Schematic of Layer1/Layer2 Superlattice TE device

# Advanced Propulsion Materials Research and Technology Center



# Advanced Propulsion Materials Research and Technology Center



**Concave Ni-Co mirror and a nuzzle**





# **Sensor Development, Testing & Prototyping**

**Radioactive Litmus Sensors  
Volatile Gases Litmus Sensors  
Volume Mapping Sensor Arrays  
Nano-Structured Based Sensor  
Technology  
Innovative Sensor Development  
and Manufacturing &  
Characterization**



# Additional Past Performance Indicators



- **NASA - Advanced Propulsion Materials (>\$3M)**
- **SBA** Contract to AAMURI “Conduct National Business Training Sessions” (Completed)
- **ARO/NIH/DOE STTR/SBIR (> 12)**
- **EG&G** (NASA-Technical/Engineering Services) (Five more year)
- **SAIC** (DTRA-Engineering Services)
- AAMURI granted access to **DOD Joint Clearance Access Verification System (JCAVS)**
- **Nunn-Perry Award**,  
(Six years consecutively)
  - The prestigious Nunn-Perry Awards are presented each year to outstanding Mentor-Protégé relationships across the country.





AAMU

AU

TU

UA

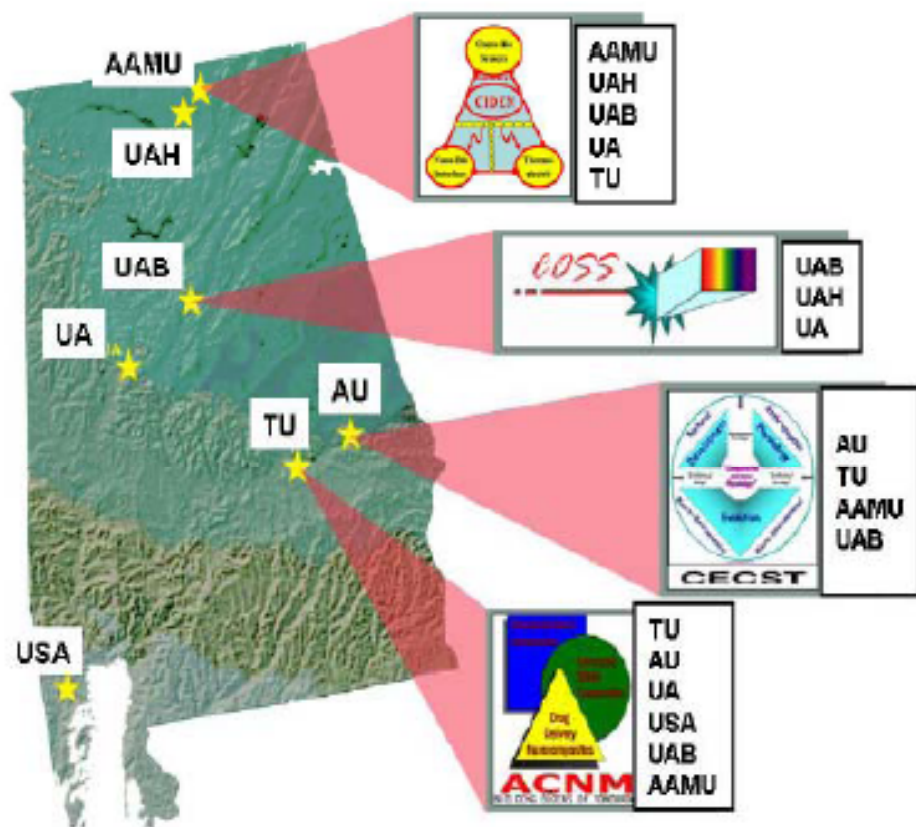
UAB

UAH

USA



# Enhancing Research Capabilities in Nano/Bio Science and Sensors



## •Vision:

Enabling internationally-competitive nano/bio research and contributing significantly to science and technology-related education, outreach, and economic development in Alabama.

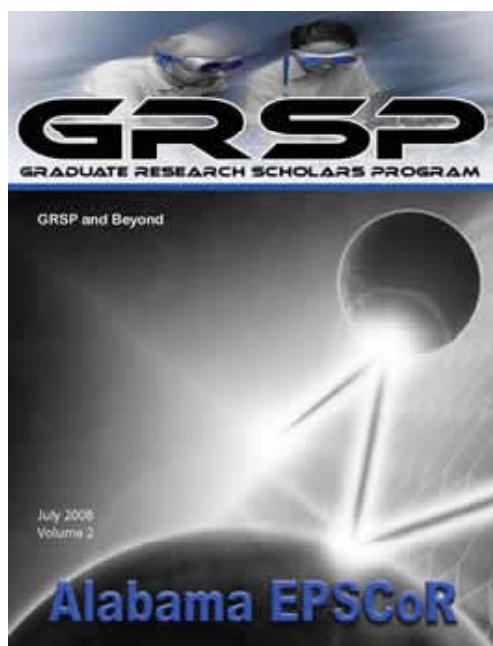
## •Mission:

Establishing a multi-campus nano/bio science and sensor research and education infrastructure for the State of Alabama that will allow researchers and research centers to be nationally competitive and ultimately self-sustainable..

**Competitive and Self-Sustained**

# Alabama EPSCoR Program

## AAMU, AU, TU, UA, UAB, UAH, & USA



**(256)372-8710**

***<http://epscor.aamu.edu/>***





# Inter-state collaborations

AAMU

AU

TU

UA

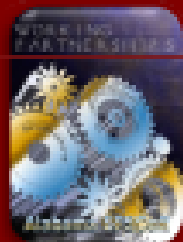
UAB

UAH

USA



A multi-campus nano/bio science and sensor research and education





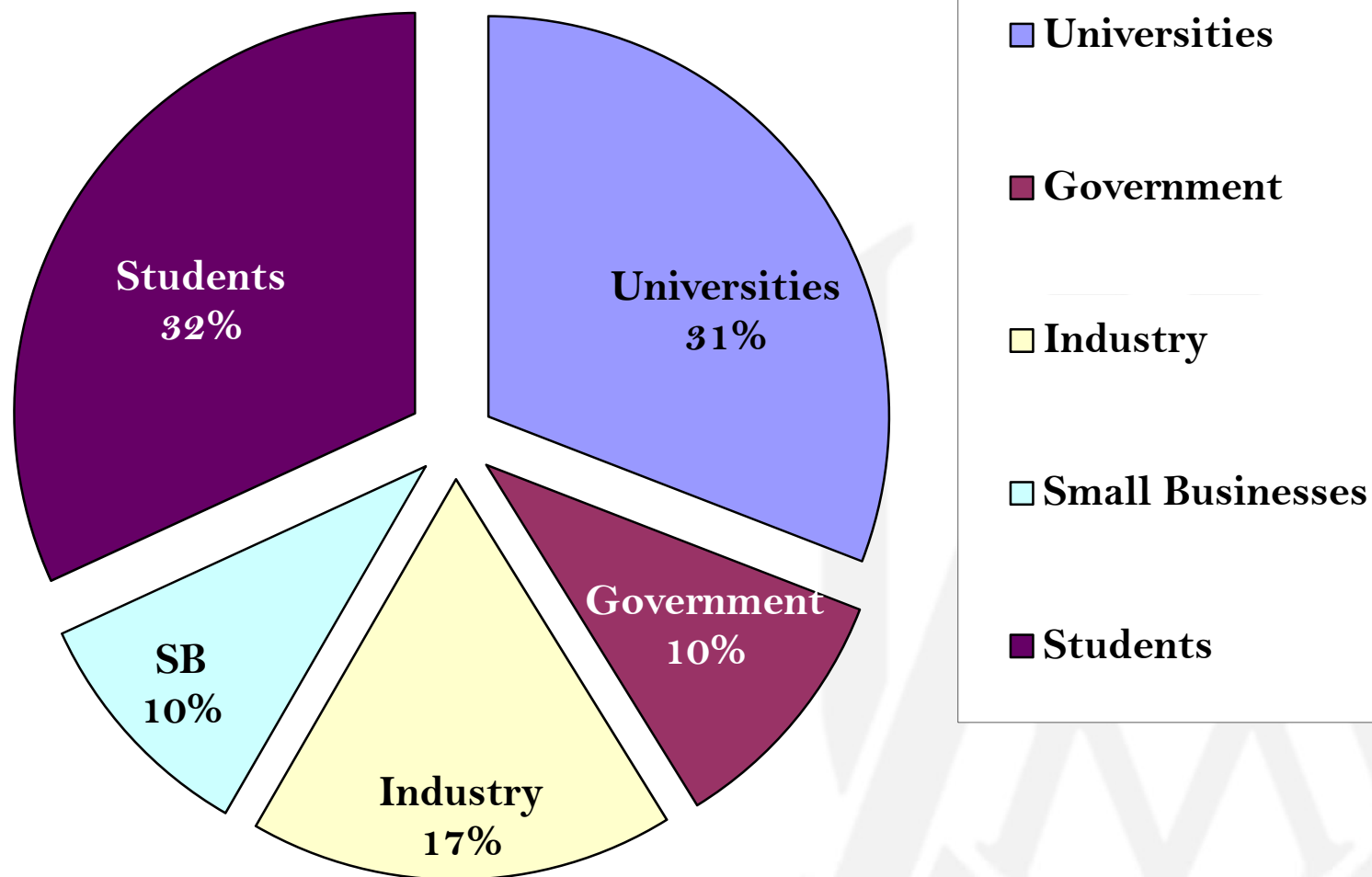
# NEWS



- **AAMURI passed the annual DSS Industrial Security Program Review**
- **AAMURI Passed External Audit (B&F, DCAA, State of AL)**
- ***Approval of the AAMURI's accounting system by Defense Contract Audit Agency* (DCAA AUDIT REPORT NO. 1201– 2007J17740001, 23 January 2007).**
- **Record Breaking STTR/SBIR/HBCU/MI/Small Business meeting at AAMU 2010**
- **AAMURI Hosted Nanotechnology meetings, 2009-2010**
- **\$15M NSF EPSCoR Award for ALEPSCoR**
- **AAMURI, a successful model (National Academies)**  
**(AAMURI sets the requirements for large scale industrial application of nano-fabrication Labs)**



# 2010 STTR/SBIR Small Business Conference



# Past Performance Indicators



- **Alabama EPSCoR Program** - \$ 4.5M/Y to \$17.5M/Y
- **SBA** Contract to AAMURI “Conduct National Business Training Sessions” (Completed) , **“Frontiers of Nano-Technology Business”**
- **ARO/NIH/DOE STTR/SBIR** (> 12)
- **EG&G** (NASA-Technical/Engineering Services) (Five more year)
- **SAIC** (DTRA-Engineering Services)
- AAMURI granted access to **DOD Joint Clearance Access Verification System (JCAVS)**
- **Nunn-Perry Award**,  
(Several years)
  - The prestigious Nunn-Perry Awards are presented each year to outstanding Mentor-Protégé relationships across the country.



# Current ID/IQ Contracts

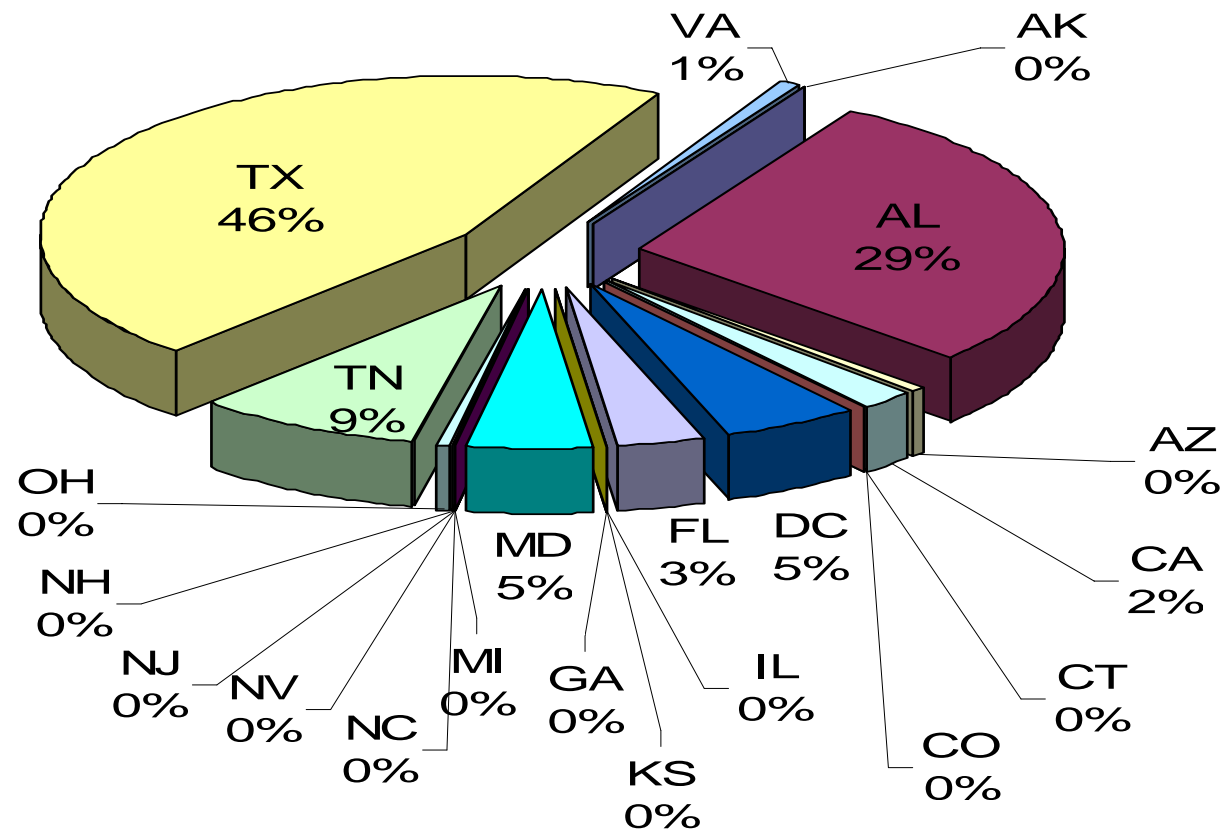


ID/IQ	AGENCY	PRIME CONTRACTOR
Flexible Acquisition Sustainment Tool ( <b>FAST</b> )	U.S. Air Force	SAIC-Warner Robbins
Night Vision and Electronic Sensors Directorate ( <b>NVESD</b> )	U.S. Army-CECOM	SAIC-San Diego
Space Technology Applications and Requirements Support ( <b>STARS</b> )	U.S. Army	ARINC, Inc.
<b>Millennia Lite:</b> Legacy Systems Migration and New Enterprise Systems Development	U.S. General Services Administration	Madison Research Corporation
<b>Minority Institutions Technical Support Services II (MITSS II)</b>	<b>DoD-DISA</b>	<b>AAMURI</b>
STRICOM Omnibus Contract ( <b>STOC</b> )	U.S. Army-STRICOM	Lockheed Martin-Orlando
Environmental Restoration at Paducah	DoE/Bechtel Jacobs	SAIC-Oak Ridge
Environmental Restoration at Oak Ridge	DoE/Bechtel Jacobs	SAIC-Oak Ridge
Defense Information Systems Network (DISN) Global Solutions ( <b>DGS</b> )	DoD-DISA	SAIC-Vienna
DISA Next Generation ( <b>NEXGEN</b> ) Engineering Contract	DoD-DISA	SAIC-Arlington
<b>AMCOM Express</b>	U.S. Army-AMCOM	SAIC-Huntsville
MSAD Systems Development and Operations Support ( <b>SDOS</b> )	NASA-MSFC	Teledyne Brown Engineering
<b>Encore</b> Information Technology (IT) Products and Services	DoD-DISA	Analytical Services, Inc.
<b>CECOM R2</b>	U.S. Army	Tamsco, Inc.
<b>CECOM R2</b>	U.S. Army	Lear Seigler, Inc.
<b>System Engineering Analysis and Testing Support</b>	<b>U.S. Army-AMCOM</b>	<b>AAMURI</b>
Flexible Acquisition Sustainment Tool ( <b>FAST</b> )	U.S. Air Force	SAIC-Warner Robbins
Night Vision and Electronic Sensors Directorate ( <b>NVESD</b> )	U.S. Army-CECOM	SAIC-San Diego

# Small Business Subcontracts 20%-50%



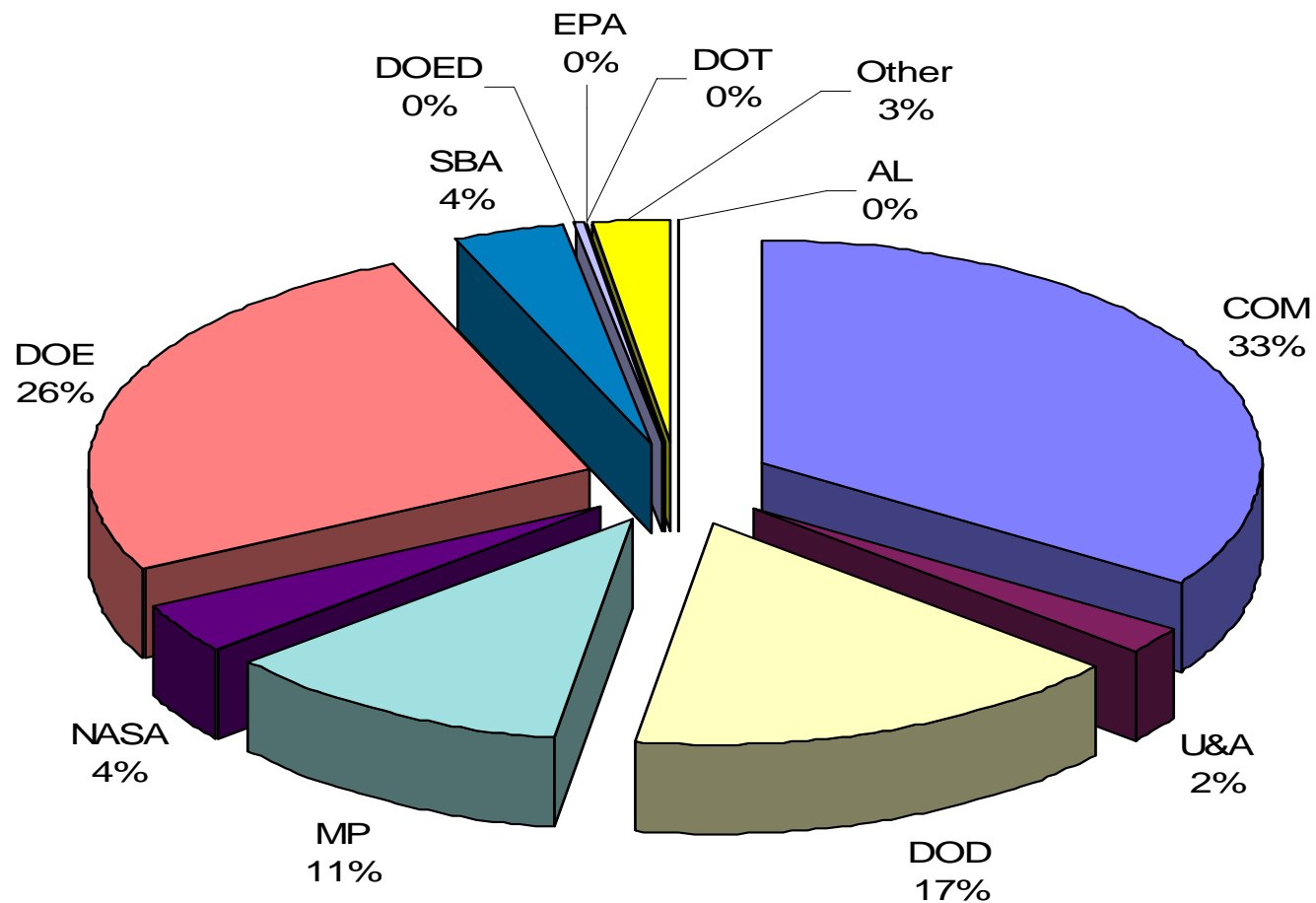
**Value by Location**



# FY07 Revenue by Category

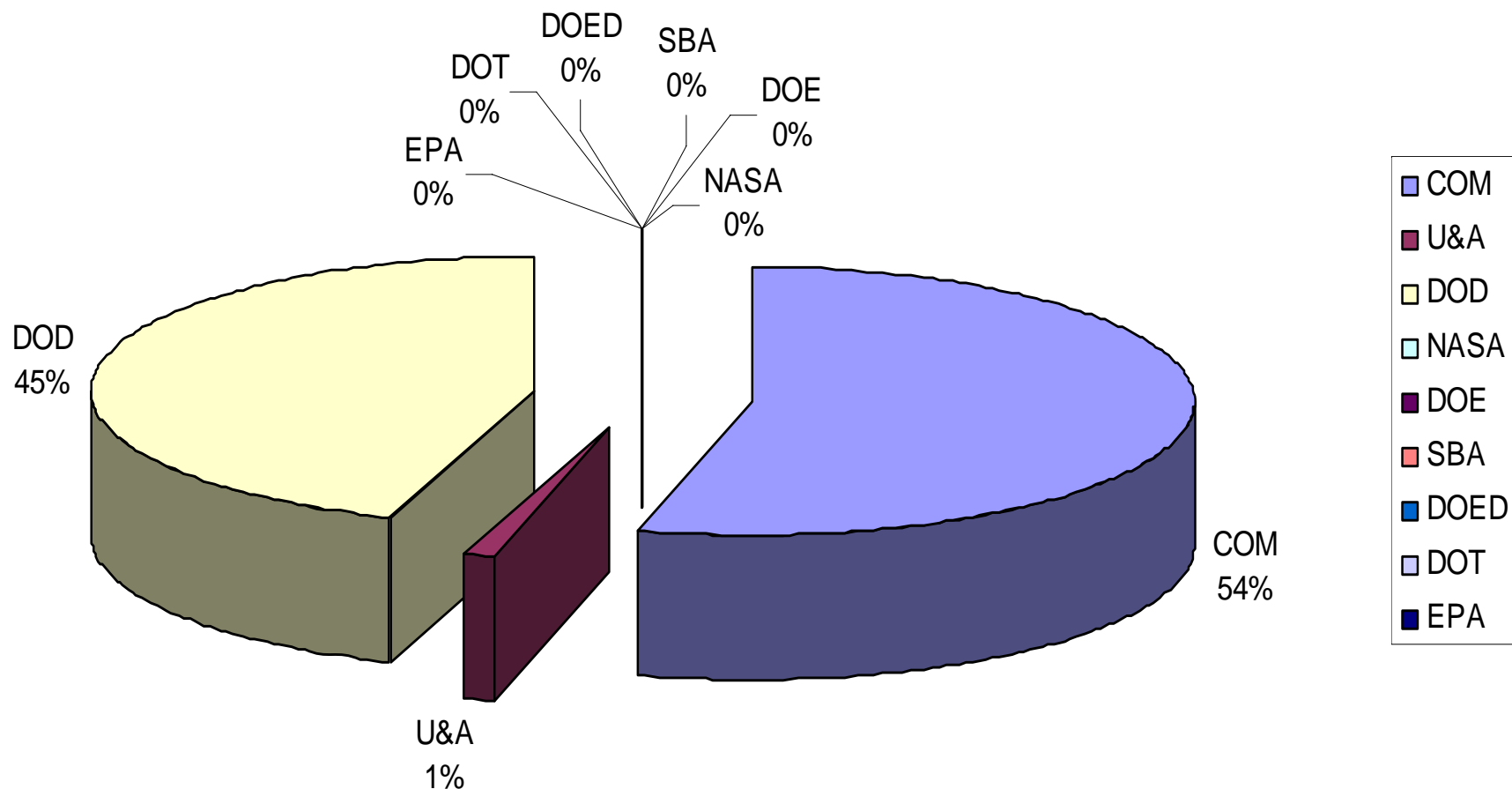


**FY06 Revenue by Category**





# FY08 Awards by Category



# Annual Small Business Conference



## *Department of Defense STTR/SBIR and Small Business Conference*



Hosted by

**Alabama A&M University Research Institute  
(AAMURI)**

**Cosponsors: SAIC, AL-EPSCoR, NSF, AMRDEC,  
Boeing, AAMURI, ....**

**31Jan. - 2 Feb.2011**

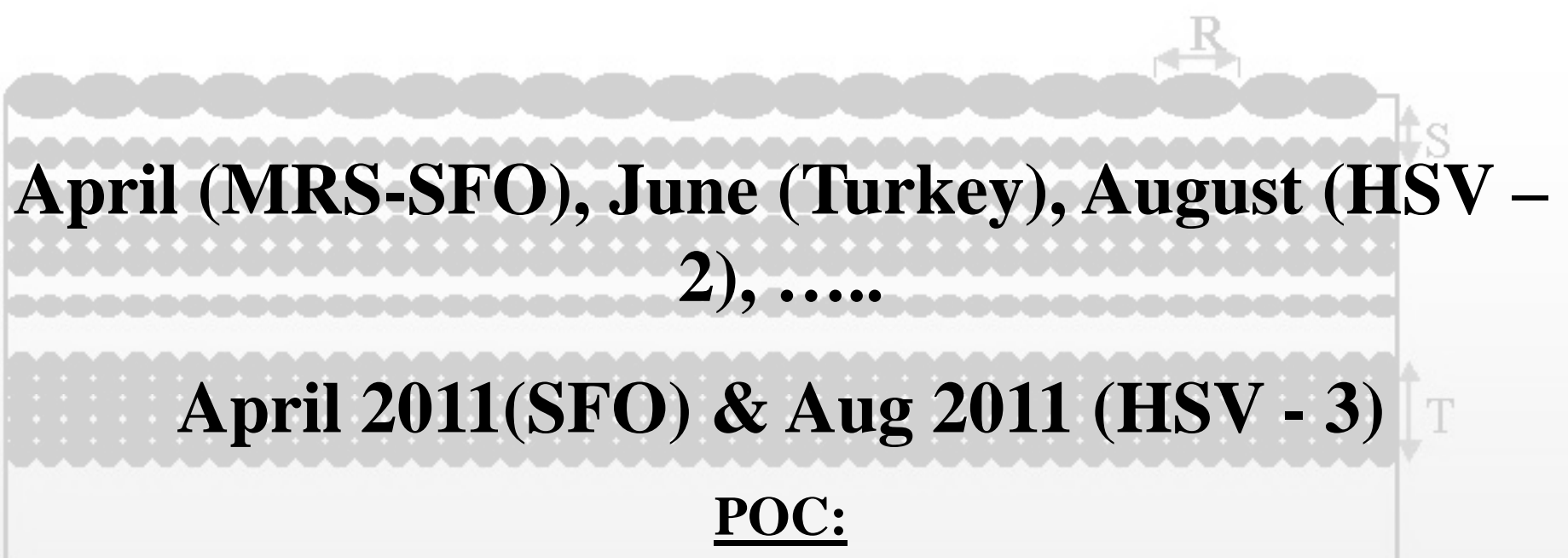
**Alabama A&M University**

**<http://AAMURI.AAMU.EDU>**

# *Nanotechnology*

Layered Nano-Structures

## *Workshops & Symposia*



April (MRS-SFO), June (Turkey), August (HSV – 2), .....

April 2011(SFO) & Aug 2011 (HSV - 3)

POC:

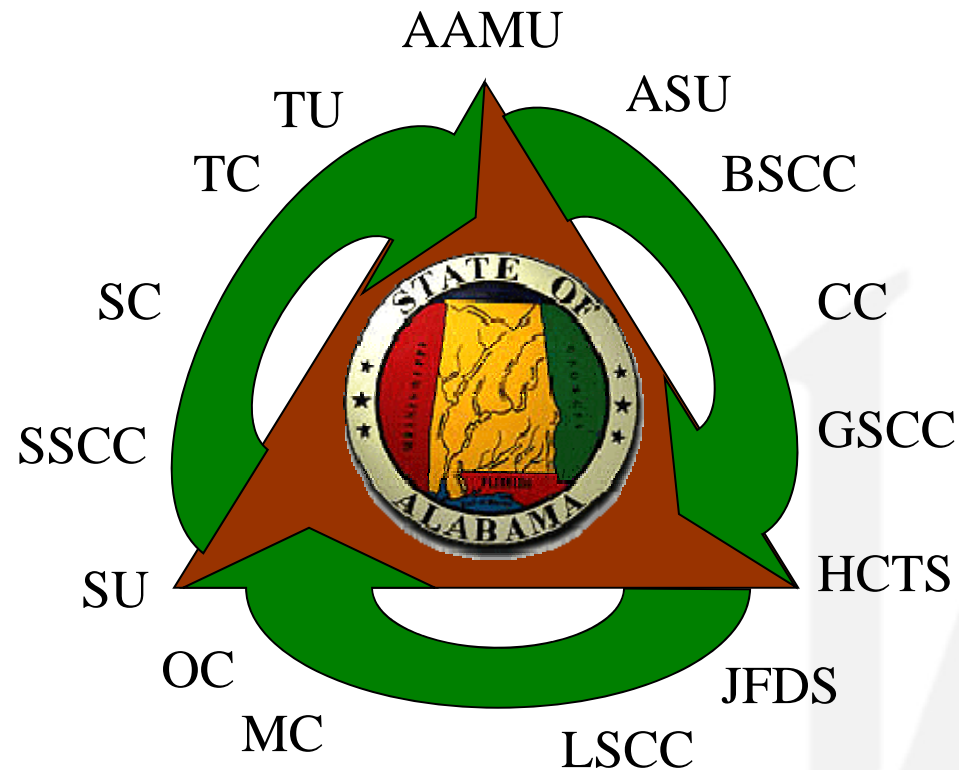
Dr. Daryush ILA (**ILA@CIM.AAMU.EDU** )

(256)372-8700, <http://AAMURI.AAMU.EDU>

T: Layer Thickness

# Alabama HBCUs Research and Development

Alliance, Established April 2002



**State of Alabama and AAMURI**

**(256)372-8700**

***<http://aamuri.aamu.edu/Alabama-HBCUs/HBCU.htm>***