

# Overview of the Atmospheric Modeling and Analysis Division

*Dr. S.T. Rao*

*AMAD Peer Review  
January 27-29, 2009  
Research Triangle Park, NC*





## AMAD Peer Review

- Important for NERL Management
  - AMAD is the 5<sup>th</sup> of 6 NERL Division Reviews
  - Reviews expected every ~ 4 years
- Important for air quality models
  - Complements the series of CMAQ Peer Reviews (every ~18 months)
  - We've had 3 CMAQ reviews since 2002



## Outline

- Context for AMAD's Research
- Background on Division Organization, Resources, and Personnel
- Background on Division Research Themes
- Questions



## Context for AMAD's Research



## **NERL Organizational Structure**

- Atmospheric Modeling and Analysis Division
- Human Exposure and Atmospheric Sciences Division
- Microbiological & Chemical Exposure Assessment Division
- Ecosystems Research Division
- Ecological Exposure Research Division
- Environmental Sciences Division

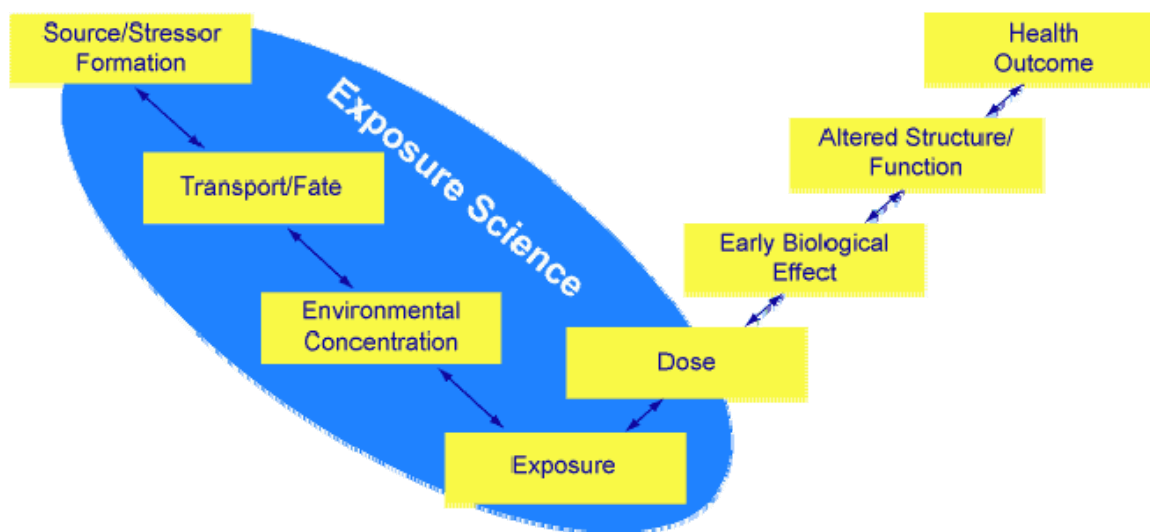
## **NERL Mission**

- Perform high-quality research to identify, understand and solve current and future problems of human health and ecosystem exposures to environmental stressors.
- Provide leadership in addressing environmental issues.
- Provide scientific and technical assistance at the local, state, federal, and international levels.



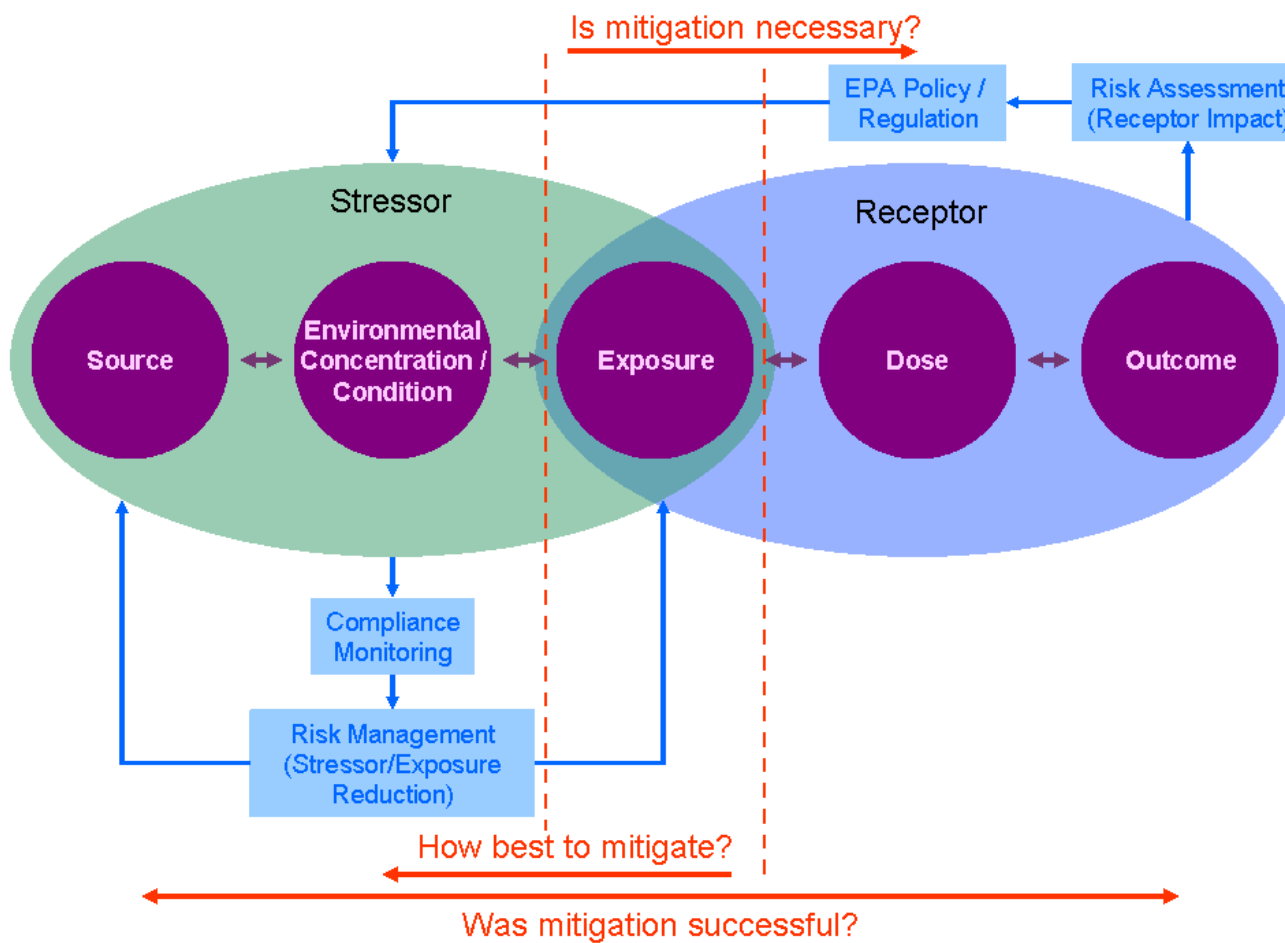
## The Division's Mission

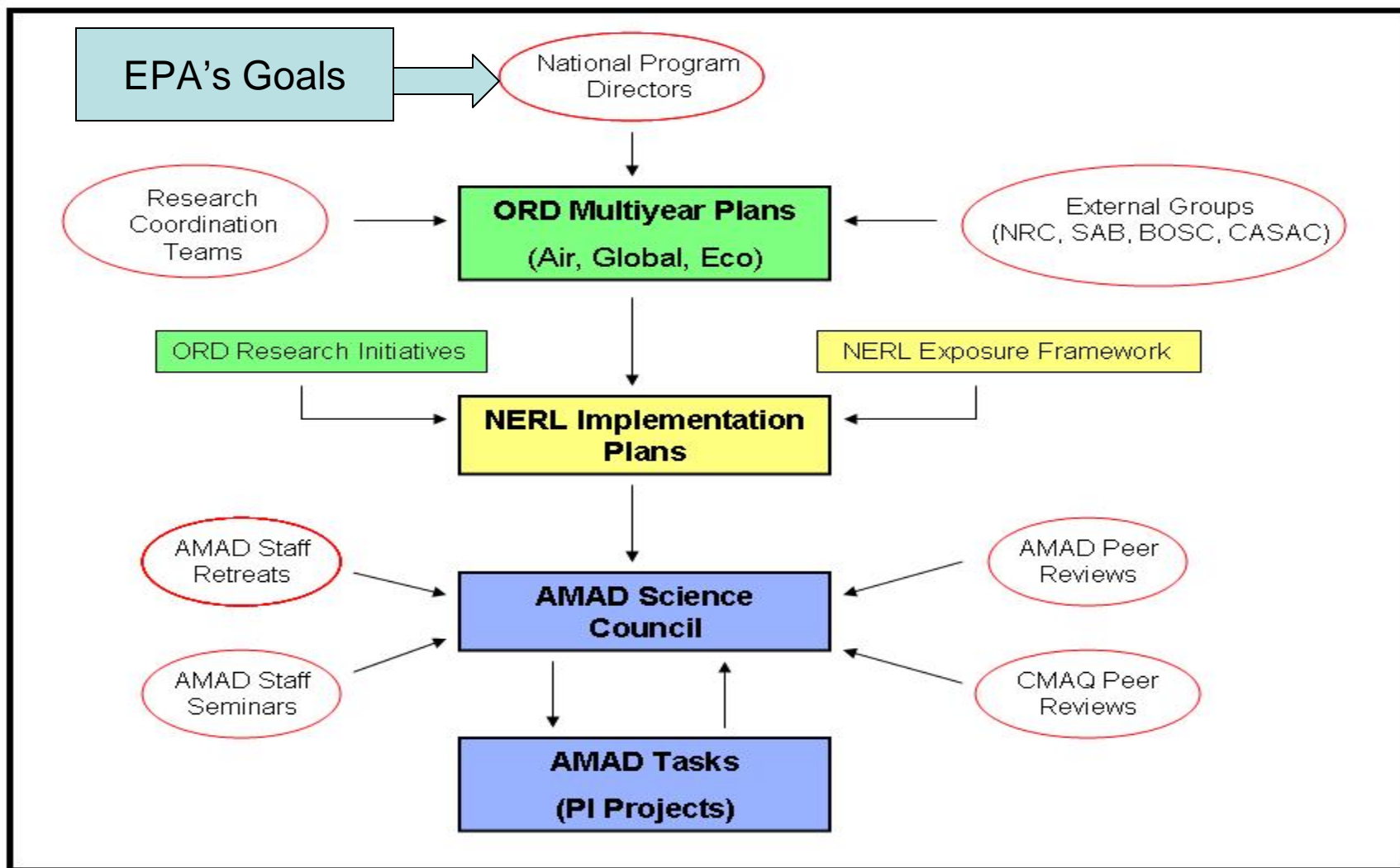
- **Studies to understand atmospheric physical and chemical processes and human exposure to atmospheric pollutants**
- **Development and application of air quality models to link**
  - Sources to atmospheric concentrations and deposition
  - Atmospheric concentrations to human and ecosystem exposures
  - Atmospheric concentrations back to sources
- **Help advance Exposure Science in the Source to Outcome Continuum**





## AMAD Supports NERL's Exposure Framework







## ORD Multiyear Plans for AMAD Research

- **Goal 1 – Clean Air and Global Climate Change**
  - **Clean Air**
    - **Long Term Goal 1: Standard setting and implementation.**
    - **Long Term Goal 2: Reduce uncertainties in linking with health and environmental outcomes.**
  - **Global Climate Change**
    - **Long Term Goal 1: Assess the effects of global change**
- **Goal 4 – Healthy Communities and Ecosystems**
  - **Long Term Goal 1: Develop ecological indicators**
  - **Long Term Goal 3: Assess vulnerability and manage for sustainability.**



# Background on Division Organization, Resources, and Personnel

# AMAD Organization Chart



*Science Direction,  
Management Oversight,  
National and International  
Partnerships*

**Office of Director**  
Dr. S. T. Rao, Director  
D. Mobley, Deputy Director

**Atmospheric Model  
Development Branch**  
Dr. R. Mathur

*Develop Advanced Air Quality Models and  
Maintain CMAQ at the Cutting Edge of Science*

**Emissions and Model  
Evaluation Branch**  
T. Pierce

*Develop and Apply Innovative Model Evaluation  
Techniques to Enhance the Scientific Credibility  
for the Emissions and Air Quality Models*

**Atmospheric Exposure  
Integration Branch**  
V. Garcia

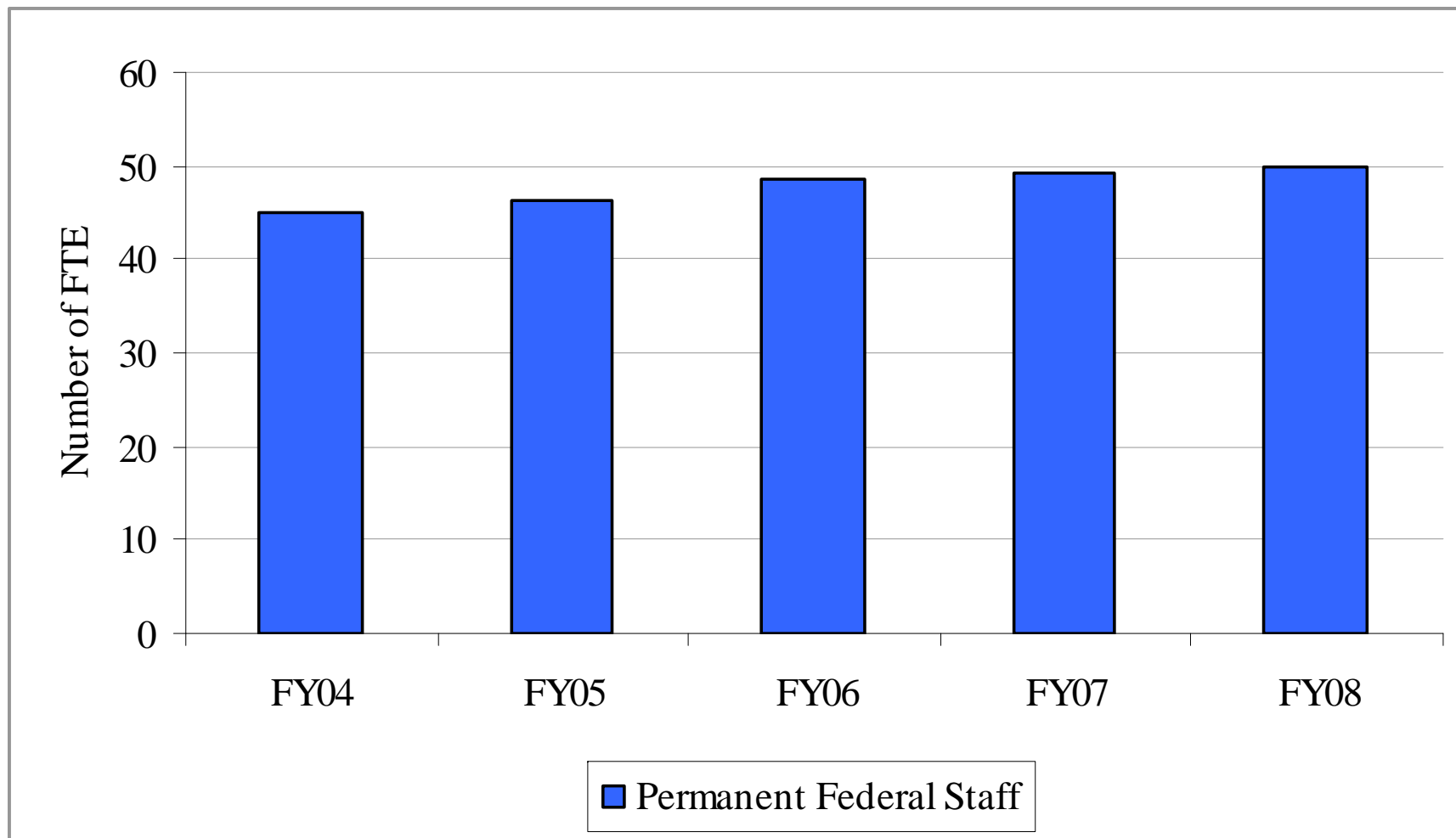
*Link Air Quality Models to Exposure Models to  
Better Assess Air Pollution Impacts on Human  
and Ecosystem Health*

**Applied Modeling Branch**  
Dr. A. Gilliland

*Apply Models to Address Problem Areas such as  
Impacts of Changing Climate and Emission  
Control Programs on Air and Water Quality*



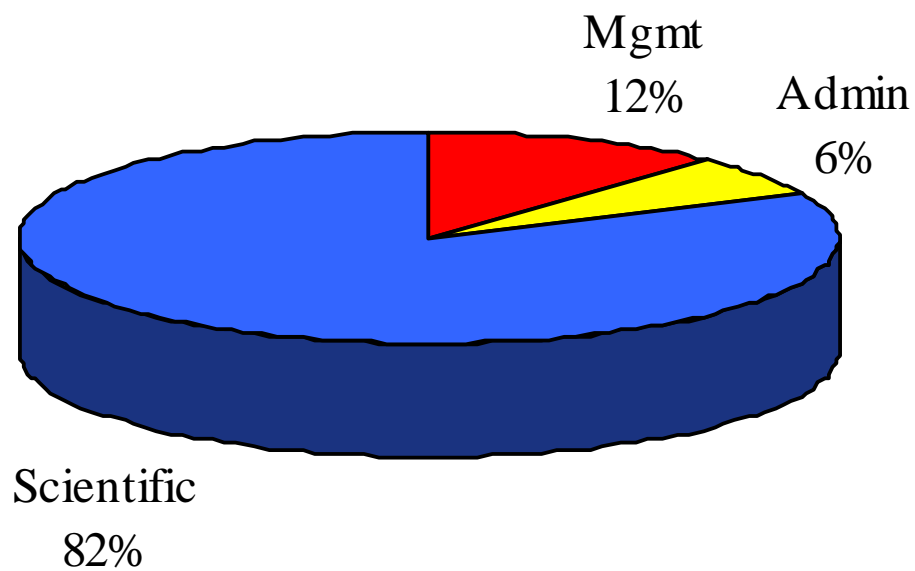
## AMAD Federal FTE (FY04 - FY08)





## AMAD FY08 Federal FTE by Job Category

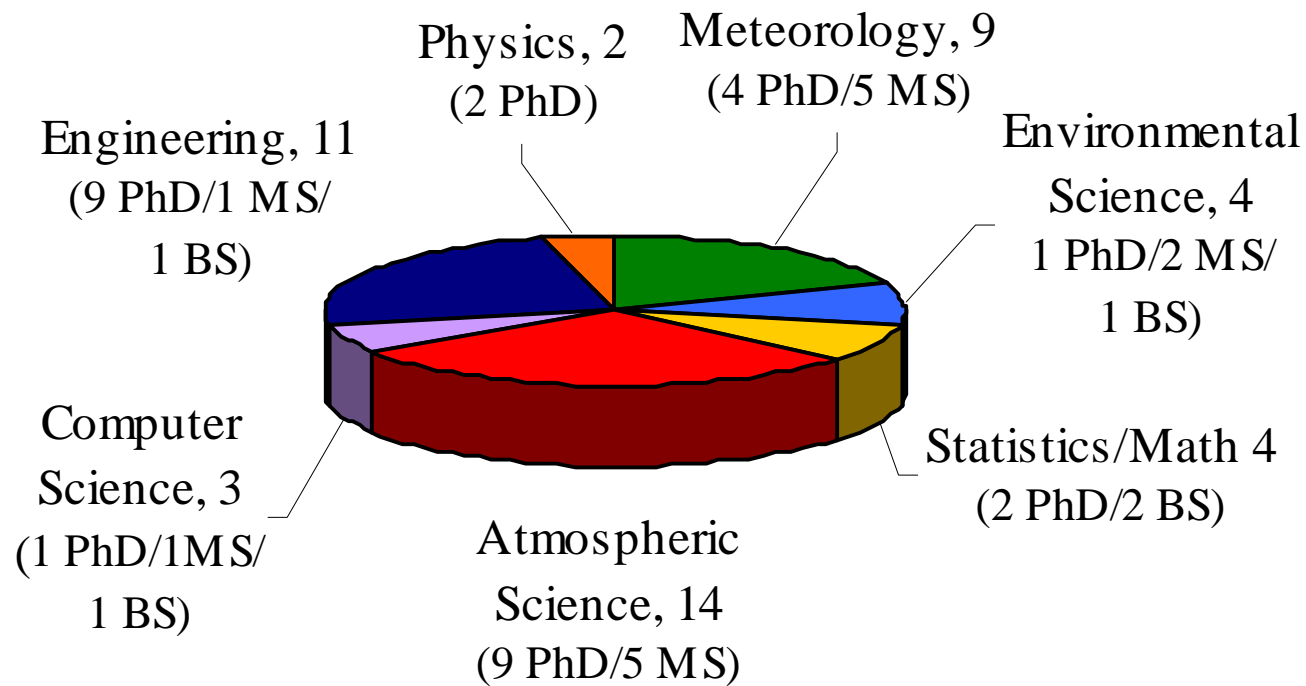
Total FTE 50





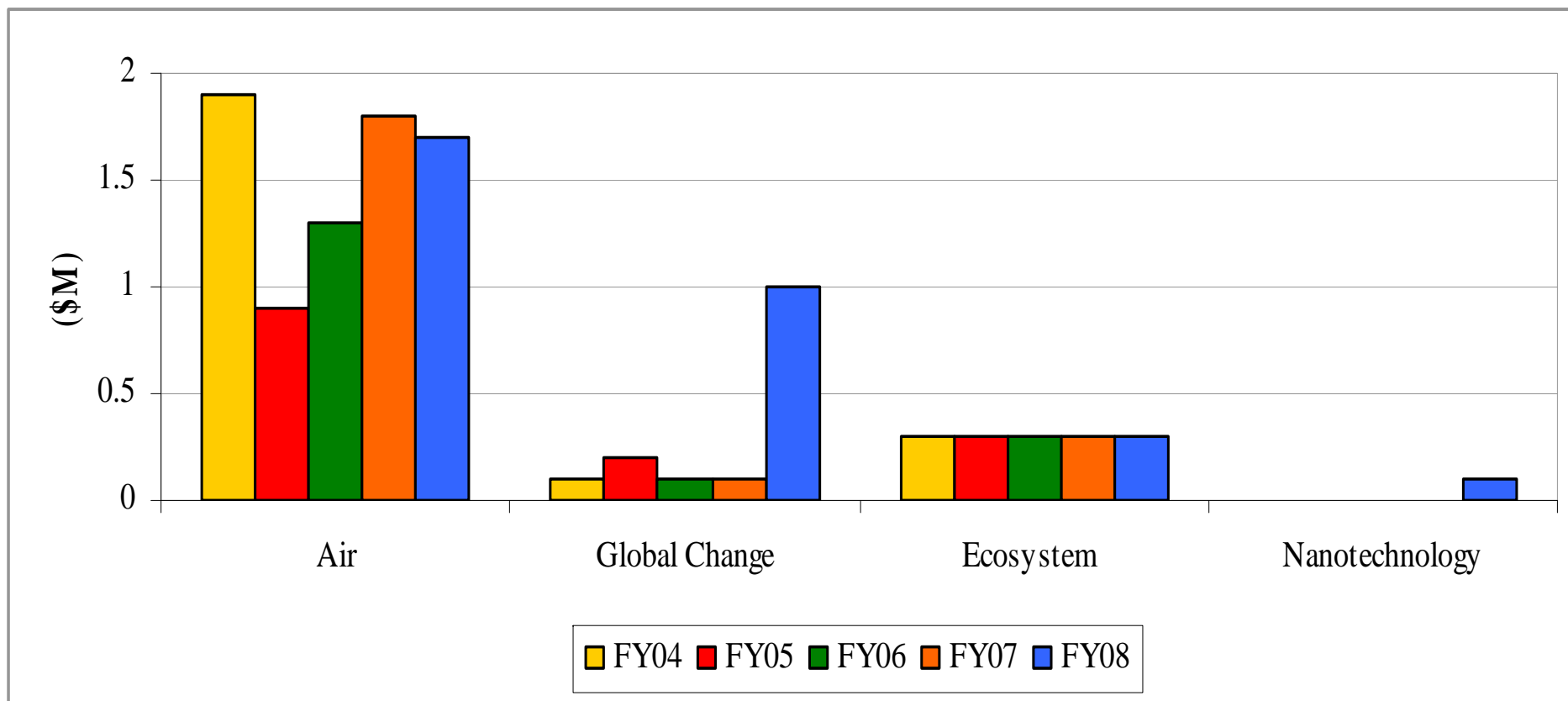
## AMD Scientific and Technical Staff Disciplines and Degrees

47 Federal Scientific and Technical Staff



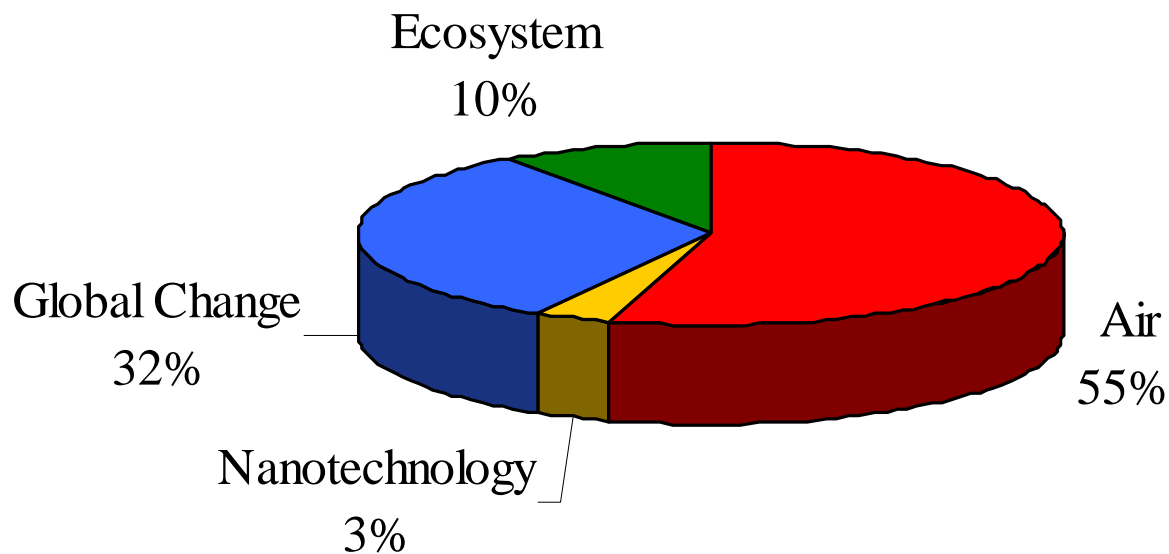


## AMAD Extramural Resources by MYP (FY04-FY08)





## AMAD Extramural Resources and FTEs by MYP in FY08 (\$3.2M & 47 FTEs)





## AMAD Leadership

- **Significant leadership activities**
  - Nearly 100% of our scientists are actively participating in leadership activities
  - 75% of our scientists are involved in journal editorial manuscript reviews
- **Numerous Awards and Recognition**
  - Over the last 5 years, AMAD scientists are recipients of
    - 47 Bronze Medals,
    - 8 Silver/Gold Medals,
    - 8 Administrator Awards, and
    - 8 awards recognizing excellent scientific contributions
- **Collaboration with many national and international leaders in the field**
  - 80% of our scientists are involved in collaborative research with academia, Federal, State and local agencies, and other consortiums



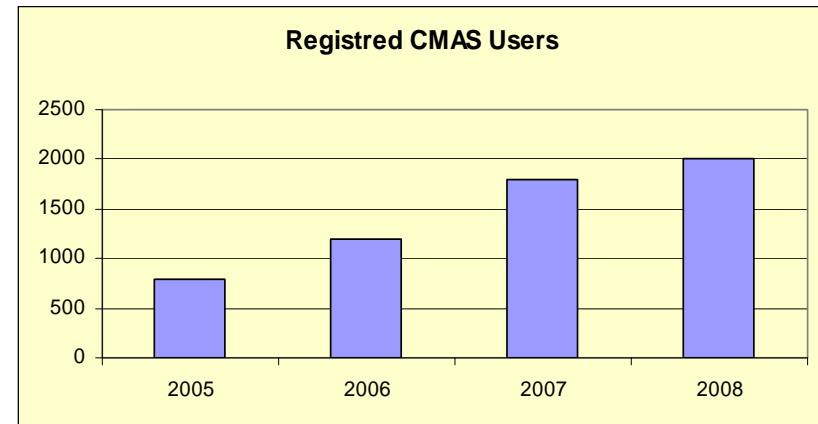
## AMAD Publications (2004-2008)

- **Impressive publication record**
  - 161 Journal Articles
  - 50 Authors
- **Bibliometric Analysis**
  - 32% publications highly cited (ORD average is 23%)
  - More highly cited than average paper
  - High impact journals used frequently

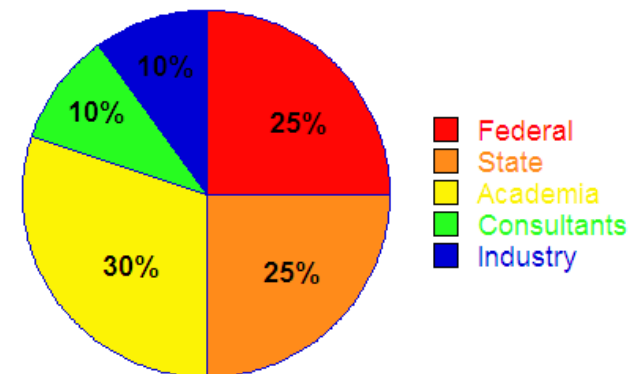
## National and International Outreach



- Collaboration with Community Modeling and Analysis System (CMAS) at UNC for distribution and support of modeling tools
- Over 2000 registered users from 90 countries
- Users requested about 5,000 model downloads in 2008
- CMAS listserv includes more than 1,000 members
- Family of models and tools: CMAQ, SMOKE, MCIP, I/O API, PAVE, VERDI, AMET, Spatial Allocator, and Watershed Deposition Tool

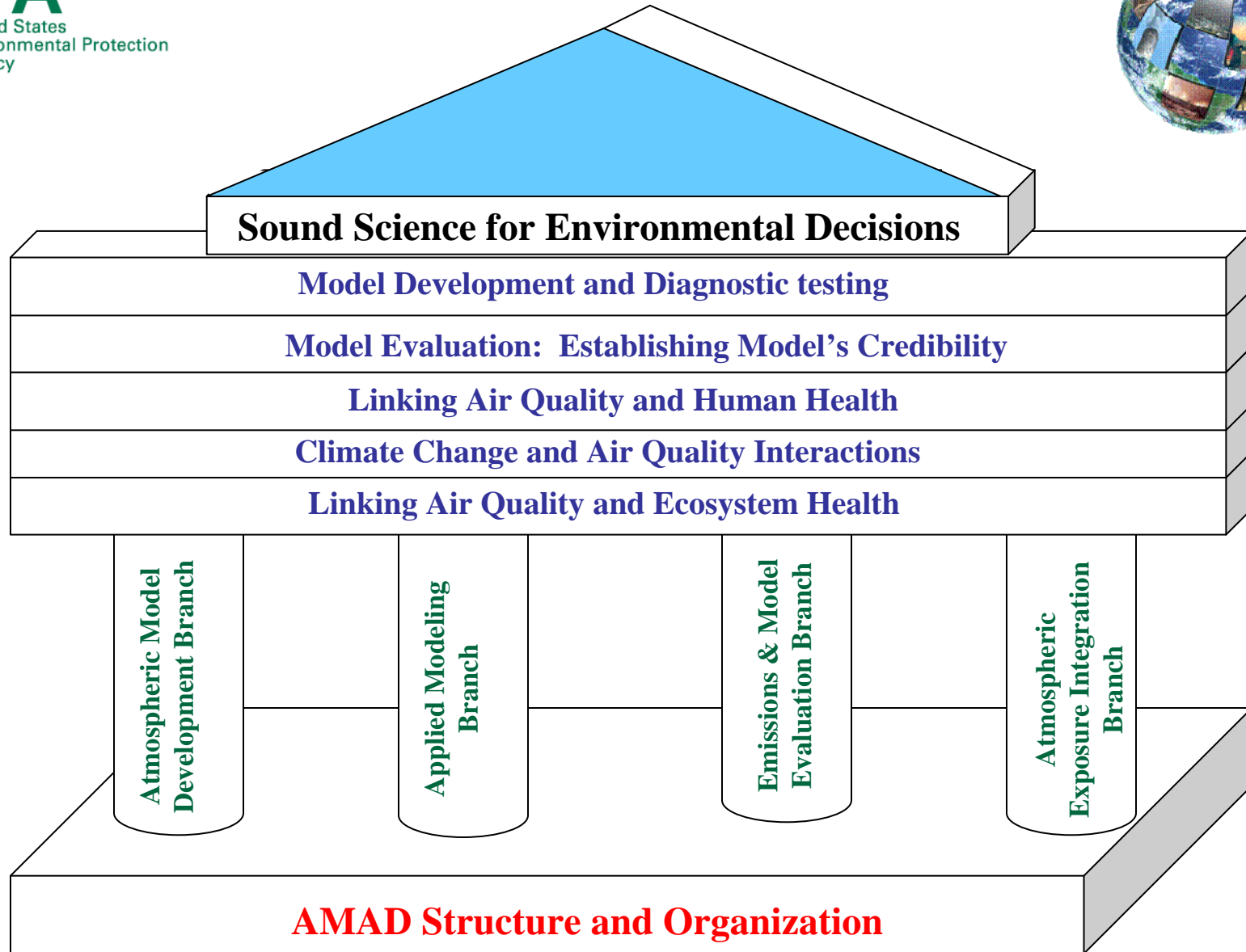


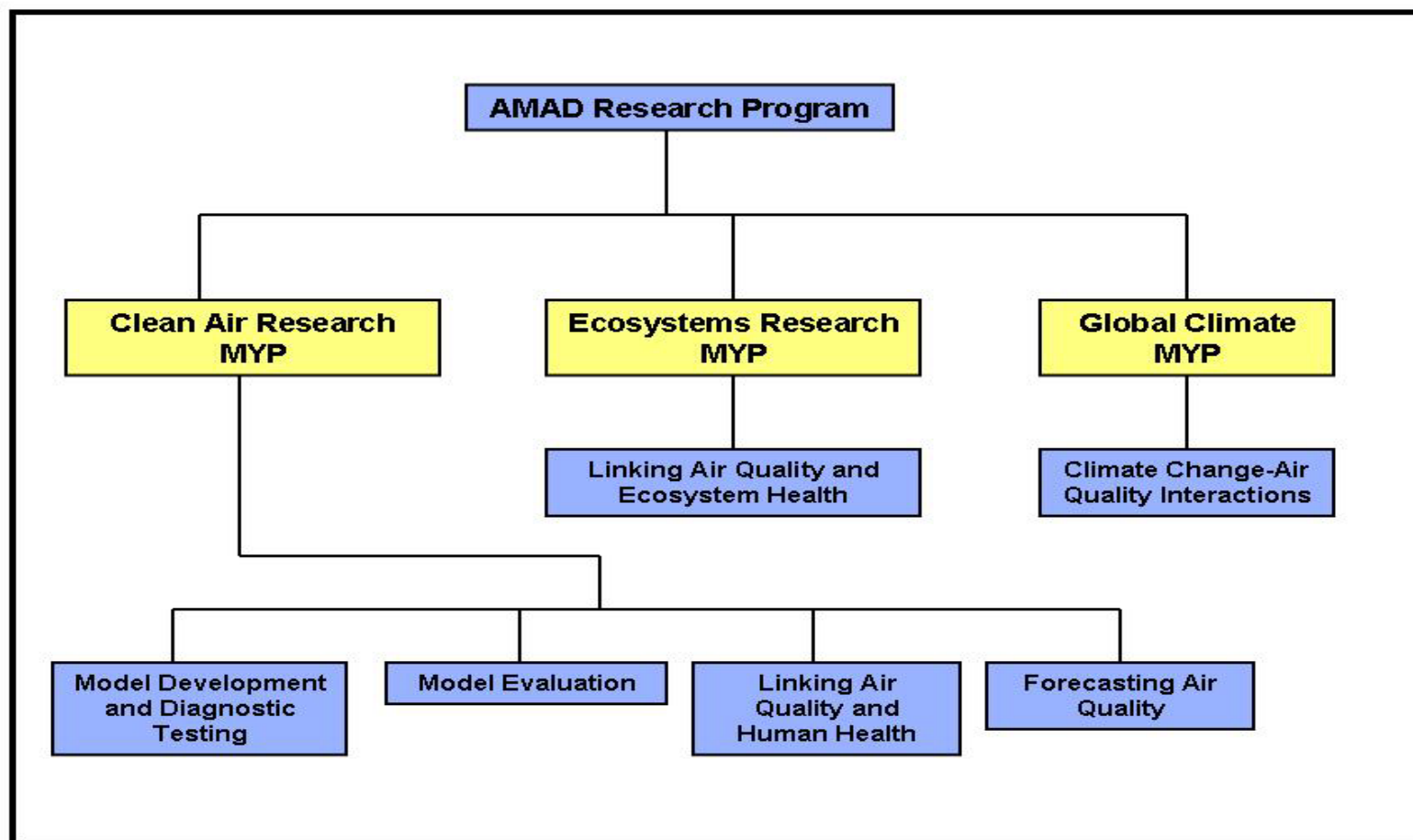
### The CMAS Community





## Background on Division Research Themes





AMAD's Research Program and Peer Review Structure



## Impacts of AMAD's Research

- **Contributed to 23 Annual Performance Measures for EPA & ORD (2004-8)**
- **CMAQ Model used in numerous regulatory applications**
  - Clean Air Interstate Rule
  - Clean Air Mercury Rule
  - State Implementation Plans
  - Total Maximum Daily Loads
  - Center for Disease Control's PHASE Study
- **Control strategies costing billions of dollars and health impact analysis are being based on CMAQ applications**
- **Worldwide community contributing to and utilizing CMAQ**



## Peer Review Structure

- **Five Research Themes in Five Sessions**
  - Model Development and Diagnostic Testing (Tuesday)
  - Model Evaluation (Wed. am)
  - Linking Air Quality and Human Health (Wed. pm)
  - Climate Change and Air Quality Interactions (Wed. pm)
  - Linking Air Quality and Ecosystem Health (Thur. am)
- **Format for Each Theme**
  - Overview presentation
  - Poster session
  - Panel work time
  - Q & A session
- **Final Q&A, Work Time, Debriefing** (Thursday PM)



# Questions?