Applied Physics Seminar

Lunch time, Every Wednesday

APPH E4901: Discussion of specific and self-contained problems in areas such as applied EM, physics of solids, and plasma physics. Topics change yearly.

 APPH E4903: Discussion of specific and self-contained problems in areas such as applied EM, physics of solids, and plasma physics.
Formal presentation of a term paper required. Topics change yearly.

"Science is more essential... than ever before"

Science – The Endless Frontier

"New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create a fuller and more fruitful employment and a fuller and more fruitful life."—

> FRANKLIN D. ROOSEVELT. November 17, 1944.



At such a difficult moment, there are those who say we cannot afford to invest in science, that support for research is somehow a luxury at moments defined by necessities. I fundamentally disagree. Science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been before.

> Barack Obama April 27, 2009 (to NAS)



Introducing my own interests in "Science for Policy"?

- Plasma physics: one of the "new sciences" of the 20th century
- I've served on more than 40 government science policy and advisory panels (many scientists do too!), including
 - 1987 Panel of Congressional Office of Technology Assessment
 - 1990 NSF Small Business Innovative Research Panel
 - 1990 DOE D-T Fusion Review Panel
 - 1990-2012 Over thirty (!) fusion facility review panels
 - 2007-2014 Member and Chair of NRC Plasma Science Committee
 - 2012-2015 Member of Science Evaluation Group of Canadian NSERC
- 2006-2007 Jefferson Science Fellow serving in International Energy Policy Office of Dept of State

1958: Fusion and Space Exploration launch the New Science of Plasma





July 29, 1958 President Eisenhower signed the National Aeronautics and Space Act of 1958 which established the National Aeronautics and Space Administration.

(NASA: \$6.6 B annual funding in 1958)

September 1-13, 1958 Second International Conference on Peaceful Uses of Atomic Energy (Geneva) marked declassification and was attended by 5,000 delegates with 2,150 papers.

(Fusion: \$0.19 B annual funding in 1958)

Like other fields of science, Plasma and Fusion Science Policy is Informed with Numerous Studies and Reports



My Sabbatical Year as a Diplomat



Prof. Osama Awadelkarim Penn State Nanotech

U/S Paula Dobriansky Prof. Paul Davis Worchester PolyTech Applied Math

Prof. Kim Boyer Ohio State EE/Vision (Now: Chair, EE at RPI) rof. Mike Mauel Columbia Applied Physics

Prof. Kathy Seley-Radtke Univ Maryland Biochemistry Prof. Claudio Cioffi-Revilla <u>GMU</u> Computational Socia

STAS George Atkinson

Seminar Plan

- Ad hoc science policy panels: 3 groups of six
- Present draft charge letter for my review and inclass discussion
- Gather information, discuss, develop group consensus
- Present interim report and in-class discussion
- Present Science Policy Brief to senior elected official/decision maker
- Draft op-ed for NY Times, advocating/explaining your policy recommendation to general public

Formats

- Interim and Final Policy Brief to Senior Policy Decision Maker:
 - Two page (three max) (w background attachments allowed/encouraged)
 - 14 pt Times font
 - Context
 - Objectives
 - Actions and Implementation
- Op-Ed:
 - ► 400-1200 words
 - http://www.nytimes.com/content/help/site/editorial/op-ed/op-ed.html

Assignment for Next Week

- What motivates your interest in applied physics?
- What are the leading issues facing our nation today? (no more than three)
- How can science (in general) and applied physics (in particular) contribute solutions to our nation's leading issues?

Send by email to <u>mauel@columbia.edu</u> before C.O.B. this Friday