

*250 years*

of

*PHYSICS AT THE COLLEGE OF  
WILLIAM AND MARY*

*1760-2010*

*Thanks :*

*Keith Griffioen (for getting me into this)*

*John McKnight (colonial period)*

*John Kane (1960s)*

*Franz Gross (1980s)*

*Jack Willis (English department)*

*Pat Winter*

*...*

*and the rest of the department for feeding  
me facts, figures, and photos.*

# Physics at William and Mary in five dates

1693 Foundation of the College

1760 Jefferson meets Small

1960's W<sup>m</sup> Small Physics Lab

1980's Jefferson Lab

2010 Prospect

1693

(Harvard 1636)



Mary and William



Christopher Wren Building



#1 Surveyor's license



#3 Jefferson



#5 Monroe



#10 Tyler

## Honorary degrees



Ben (A.M. 1756)



Jon (M.A. 2004)

## MILESTONES



*Phi Beta Kappa 1776*



*Public University 1906*



*U. Va. 1969*  
*Coeducation 1918* 🌸🌸🌸🌸

2002

**U.S. News:  
W&M Top  
Small  
Public  
University ... Again!**



**E**ach William and Mary fall finds freshmen settling into a new home and the College taking its familiar place atop the rankings of American colleges and universities. According to the *U. S. News & World Report*, this year is no different: the publication ranks William and Mary the best small public university in the nation.



1760



**W<sup>m</sup> SMALL**

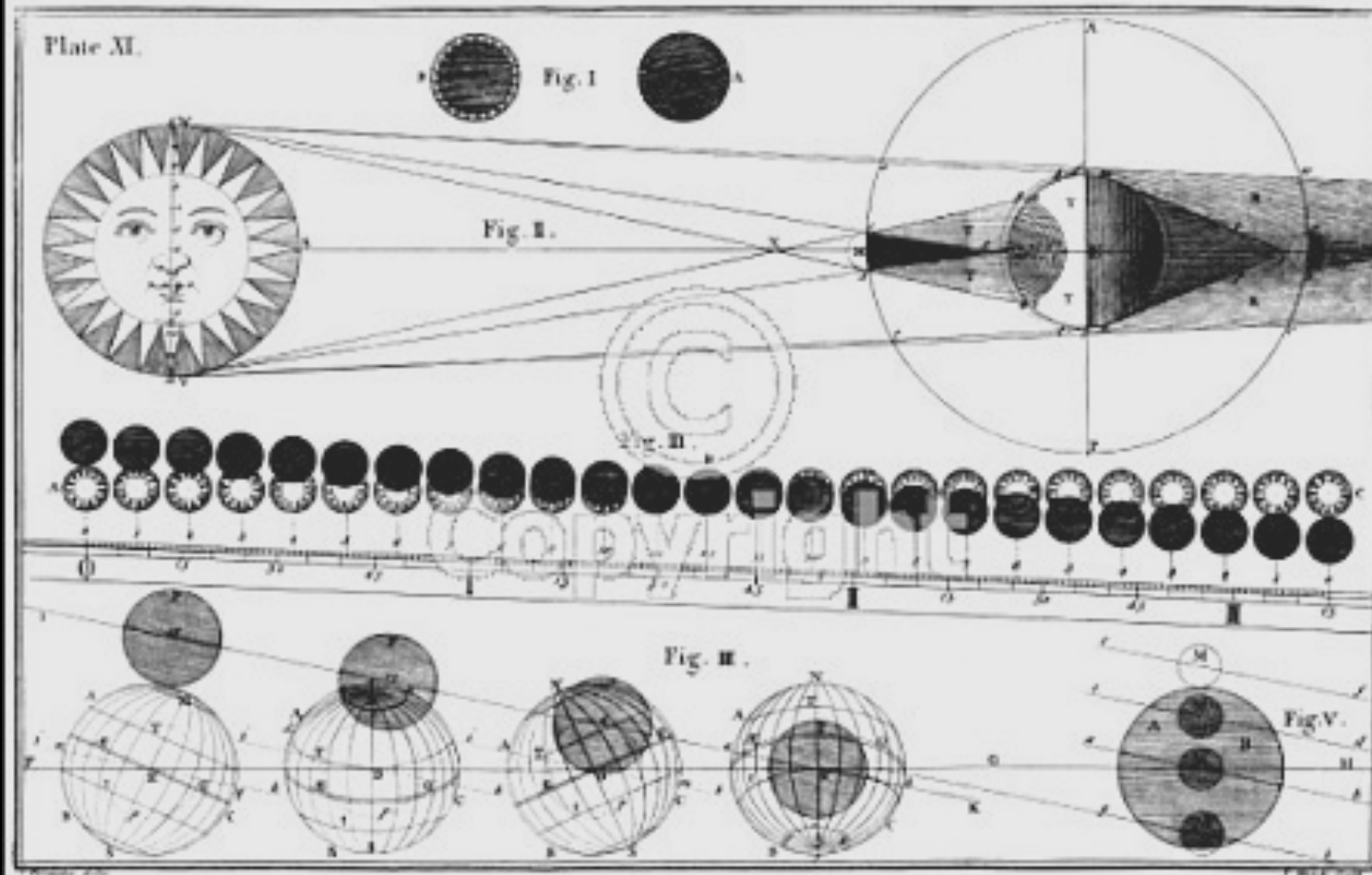
*meets*



**TOM JEFFERSON**

“It was my great good fortune, and what probably fixed the destinies of my life, that **Dr. William Small** of Scotland was then professor of mathematics, a man profound in most of the useful branches of science, with a happy talent of communication, correct and gentlemanly manners, and an enlarged and liberal mind. He, most happily for me, became soon attached to me, and made me his daily companion when not engaged in the school; and from his conversation I got my first views of the expansion of science, and **of the system of things in which we are placed...**”

*Thomas Jefferson*



From Astronomy explained upon Sir Isaac Newton's Principles, published by James Ferguson (b. Scotland 1710) in 1756.

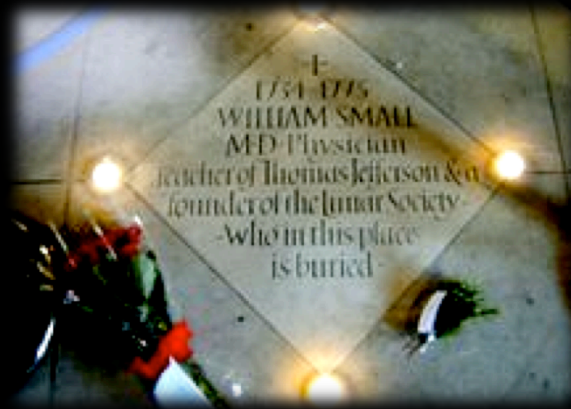
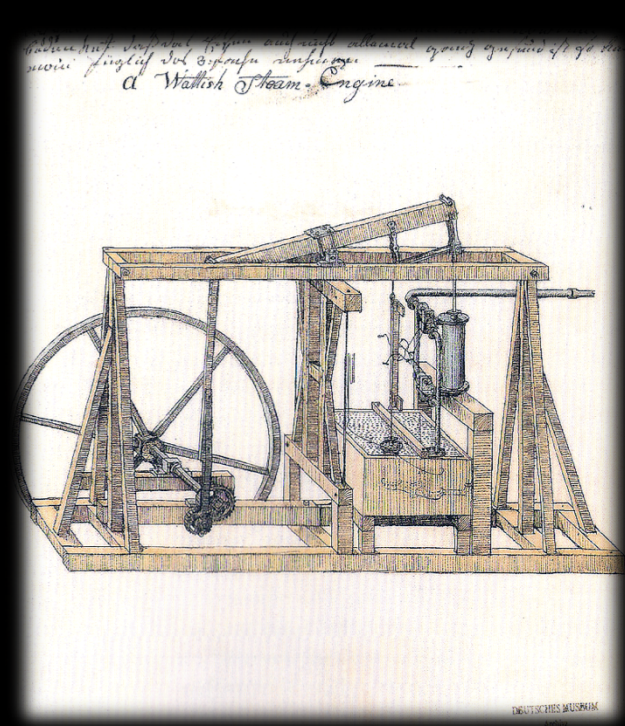
“**Dr. Small** was ... to me as a father. To his enlightened and affectionate guidance of my studies while at college, I am indebted for everything.... He procured for me the patronage of Mr. Wythe, and both of them, the attention of Governor Fauquier.... At their frequent dinners with the governor.... I have heard more good sense, more rational and philosophical conversation **than all my life besides.**”

*Thomas Jefferson*

...and was the first who ever gave in that college  
regular lectures...

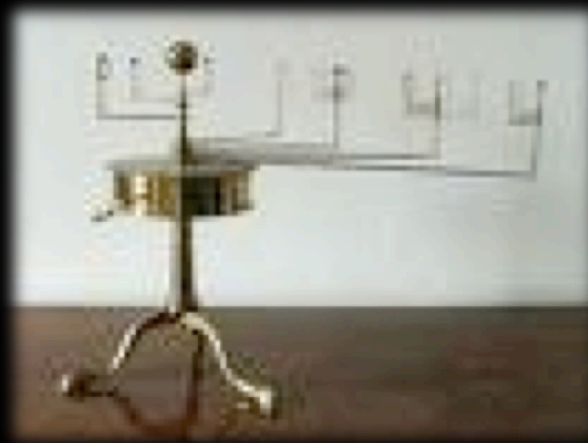


Small in  
Birmingham



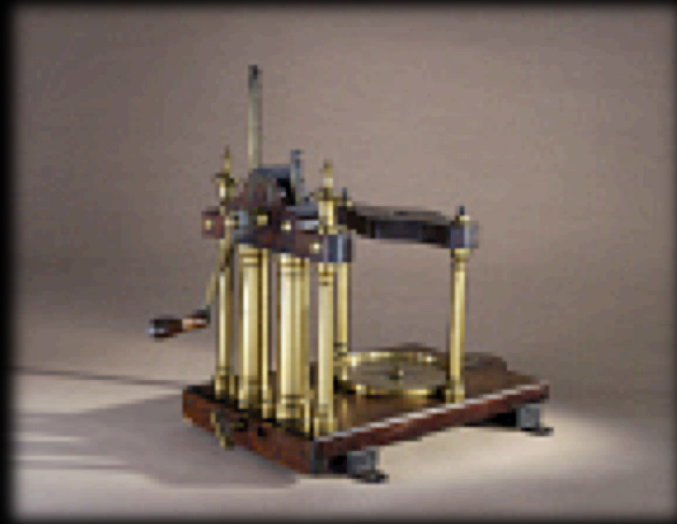
...teacher of Thomas  
Jefferson and a  
founder of the Lunar  
Society...

Orrery  
or  
Mechanical Planetarium

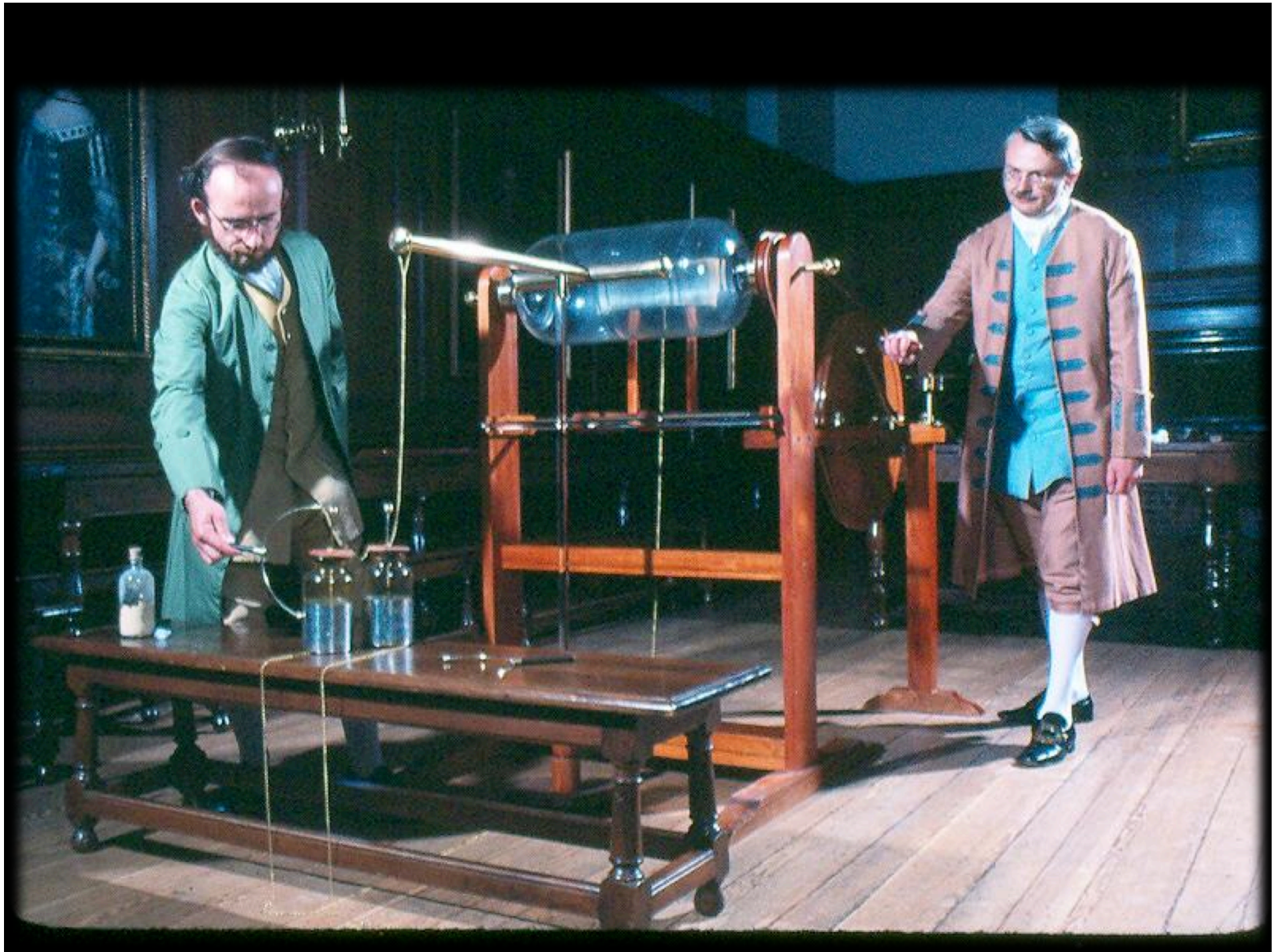




# Air Pump



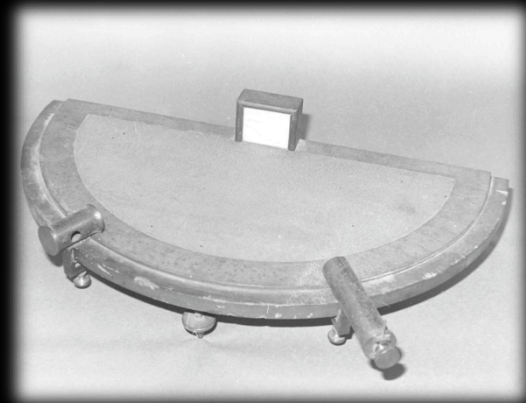
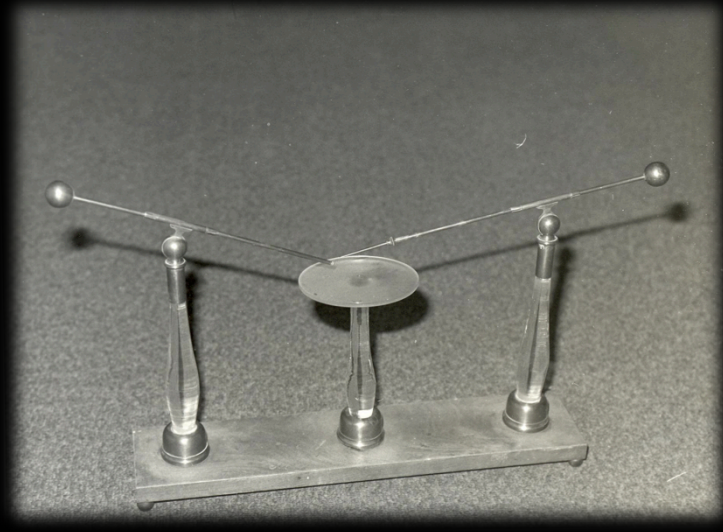
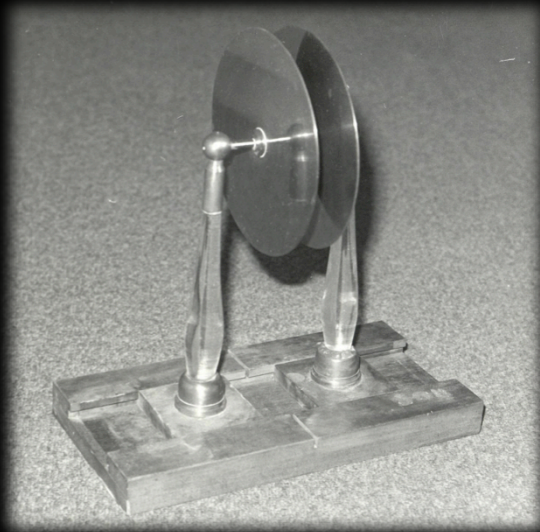




1779

Small was the Professor of  
Mathematics. A Major  
curriculum reform under  
governor Jefferson  
establishes a chair of  
"Natural Philosophy and  
Mathematics"

1859



1960's

## The Logic of Inflation

- *Human Space Flight is planned (Sputnik 1957)*
- *NASA-Langley Research Center builds the Space Radiation Effects Laboratory (SREL)*
- *Copies 600 MeV CERN Synchrocyclotron*
- *The accelerator can be used part-time for PHYSICS*
- *Nuclear physicists want university affiliations (UVA, Tech)*
- *William and Mary has the advantage of proximity*
- *The Ph.D. program is established*
- *W&M professor Robert Siegel becomes Director of SREL*

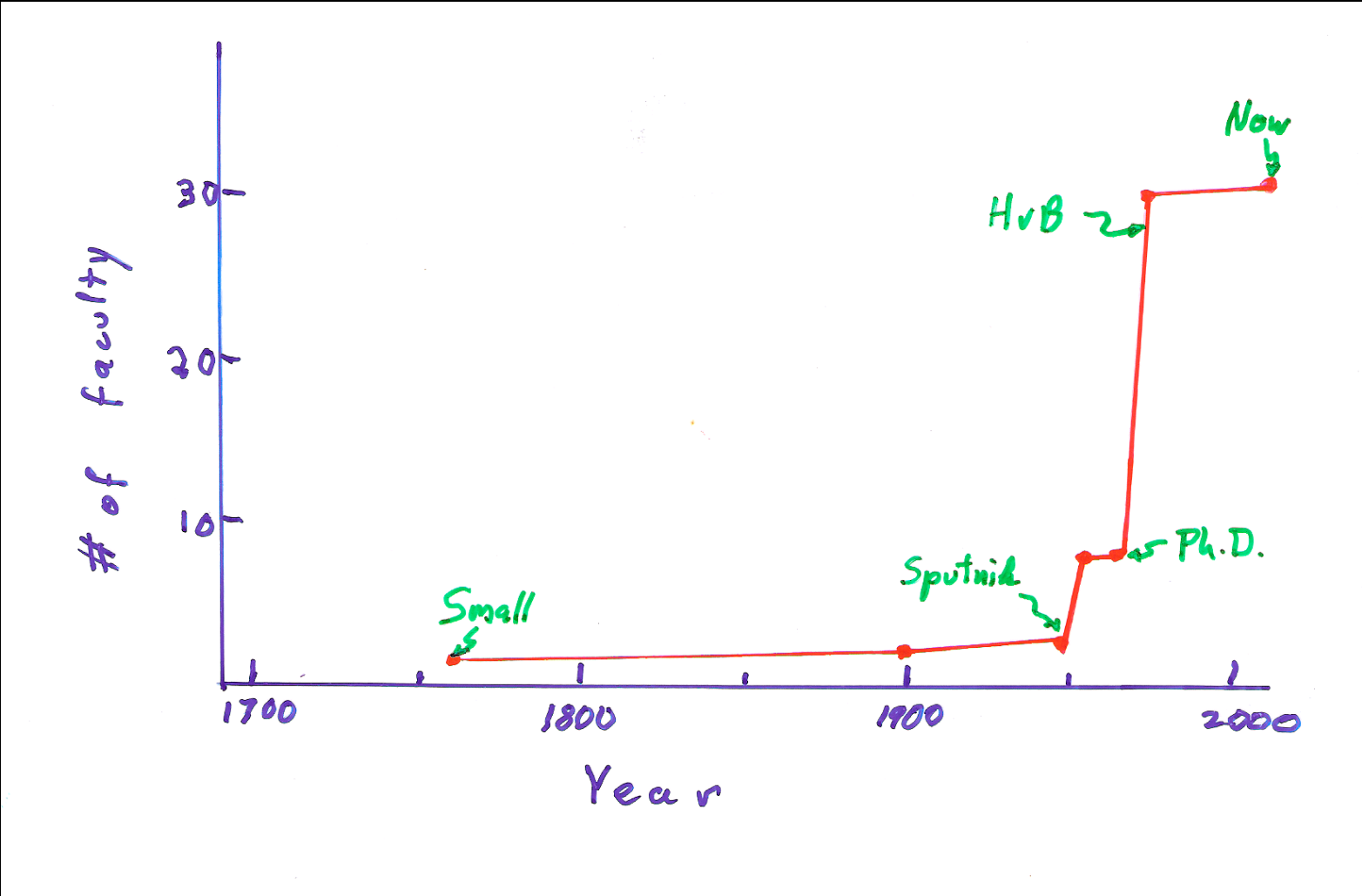
1960



President Paschall seizes the opportunity



WILLIAM SMALL  
PHYSICAL LABORATORY  
DEPARTMENT of PHYSICS

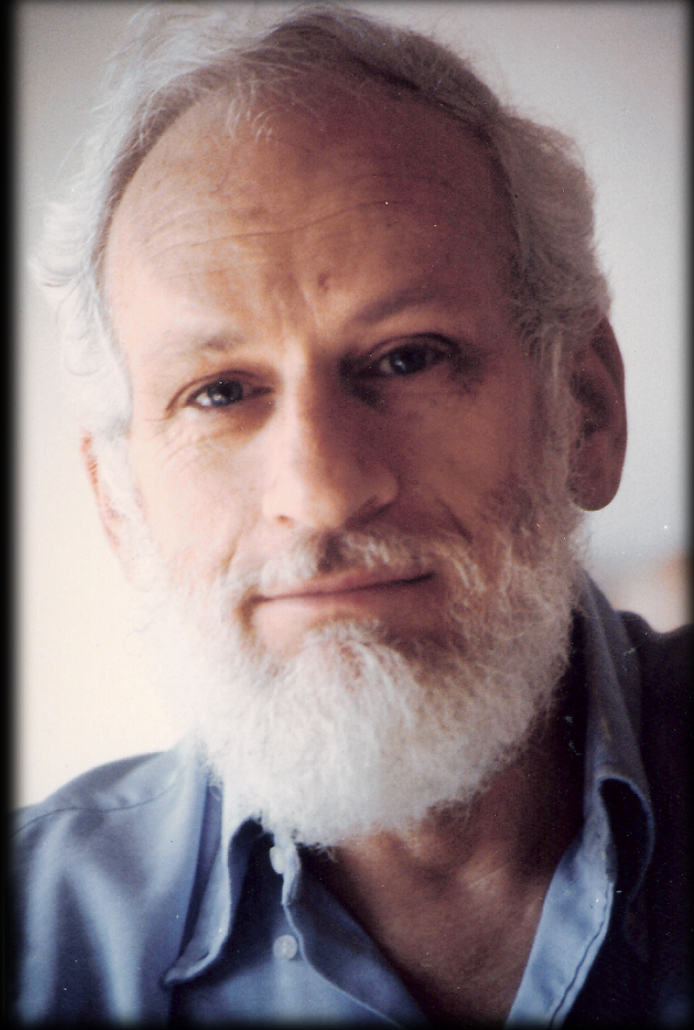


Inflation !

1964







Rolf Winter  
(1928-1992)

*...Small was to  
me as a father...*



## THE DEPARTMENT IN THE SEVENTIES

Plasma: experiment & theory  
Solid State: “  
Atomic & Molecular: “  
Nuclear & Particle: “

- \* Medium Energy Physics
- \* Exotic Atoms
  - \* electronic
  - \* muonic
  - \* pionic
  - \* antiprotonic
  - \* sigma minus
- \* Rare decays

## RARE DECAYS

First Observation of the Rare Decay Mode  $K^0_{\text{long}}$  into  $e^+e^-$

*The number of decays of this type is one in  $10^{11}$  of all decays.*

*“This result represents by far the smallest branching fraction yet measured in particle physics.” (1998)*

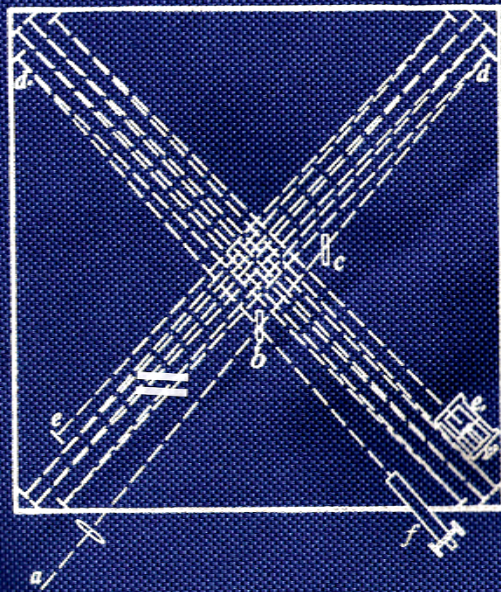
*“Only” 33 authors from 5 universities on the paper reporting the Brookhaven experiment.*

1987

The National Science Foundation announces a new program called REU (Research Experiences for Undergraduates).

William and Mary is one of the first participants in the country, and has continued to offer REU every year since then.

1993

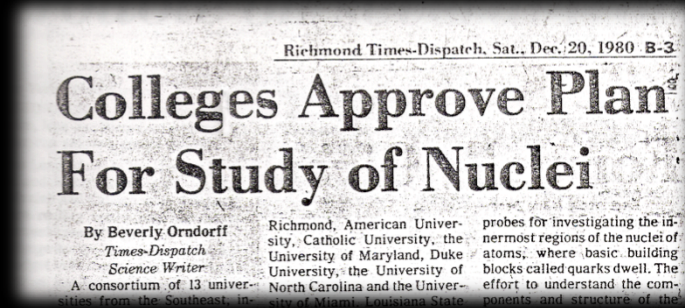


INTERNATIONAL  
PHYSICS OLYMPIAD

XXIV

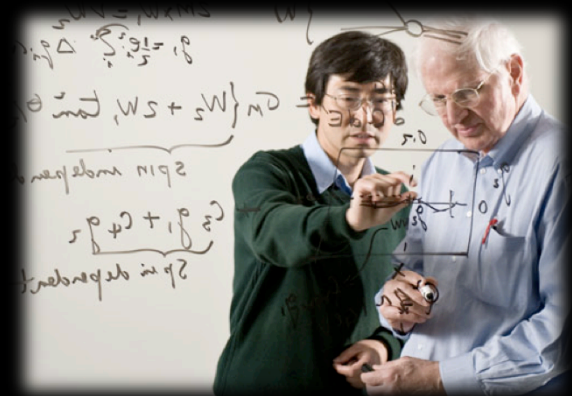
WILLIAMSBURG  
VIRGINIA • USA

1980



*SREL becomes obsolete and is replaced by CEBAF, which is renamed JEFFERSON LAB*

<Early History of JLab 2009.ppt>  
*by Franz Gross*



VIRGINIA GAZETTE, Williamsburg, VA February 23, 1983

VA GAZETTE 2-23-83

# W&M in running for accelerator funding

**Daily Press**

Thursday, May 5, 1983 — Page 17

# Universities Seek To Wrench Lab From Peninsula

Richmond Times-Dispatch, Wed., June 8, 1983 B-3

# Political battle over accelerator takes new turn

HOPEWELL NEWS  
HOPEWELL, VA.

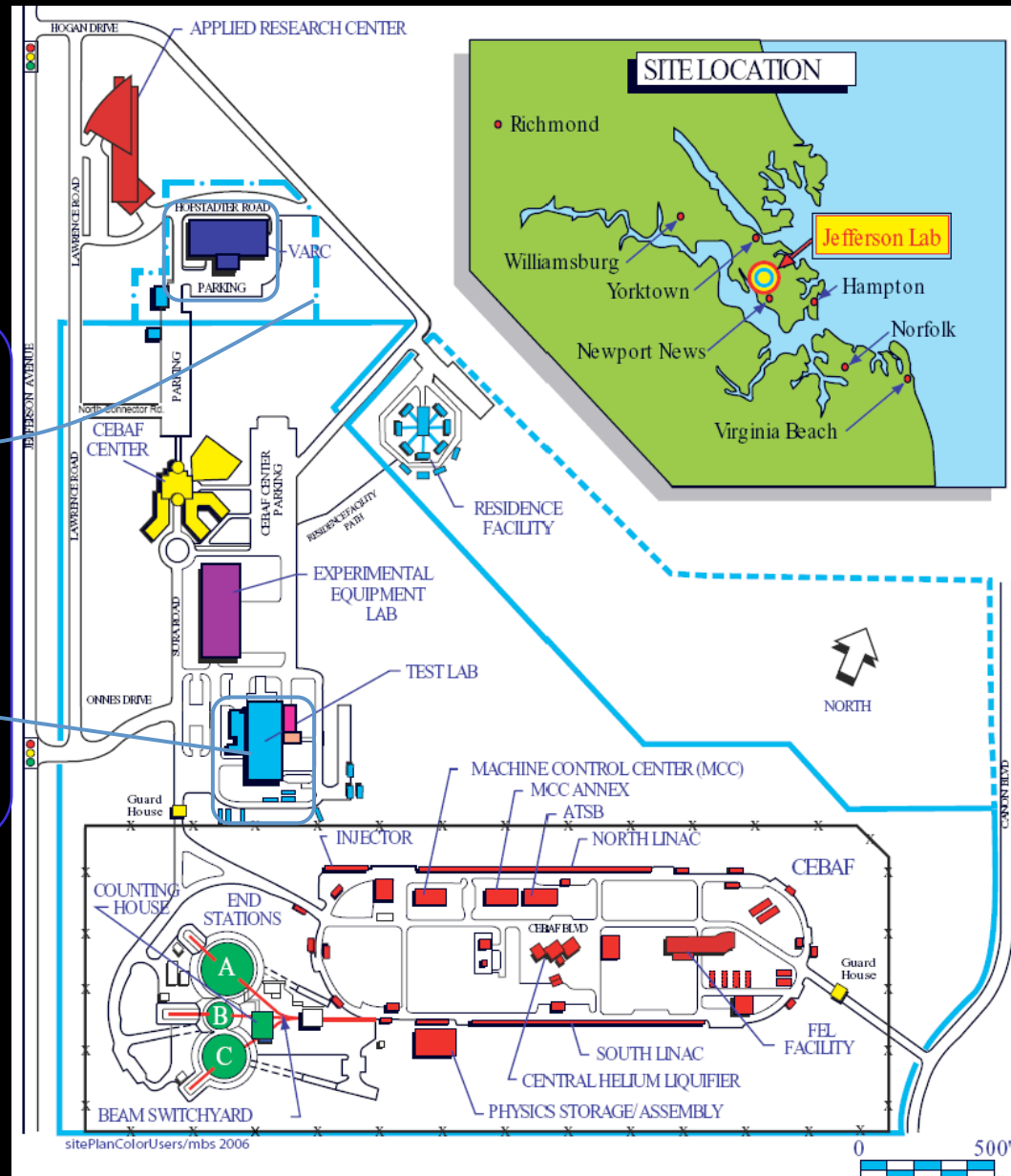
JUL 21 1983

# Nuclear research advancements falls to 'amateurs'

Existing in 1980

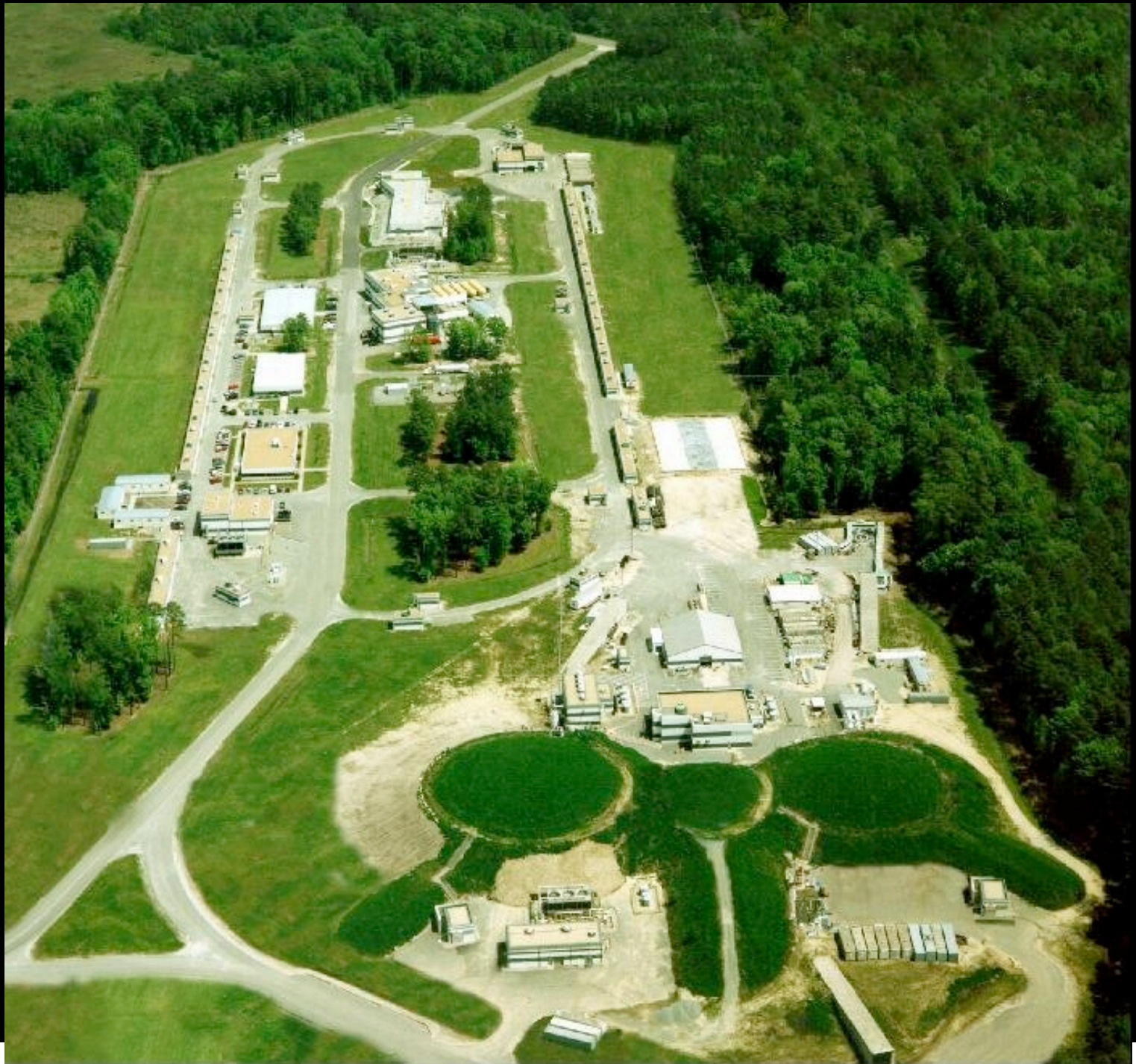
**VARC**  
Virginia Associated  
Research Campus  
&  
**SREL**  
Space Radiation Effects  
Laboratory

**CEBAF**  
Continuous Electron  
Beam Accelerator











## J. Dirk Walecka

- Joined Stanford faculty 1960
- Stanford chair 1977-82
- CEBAF Scientific Director 1986-92
- W&M chair 1994-2000

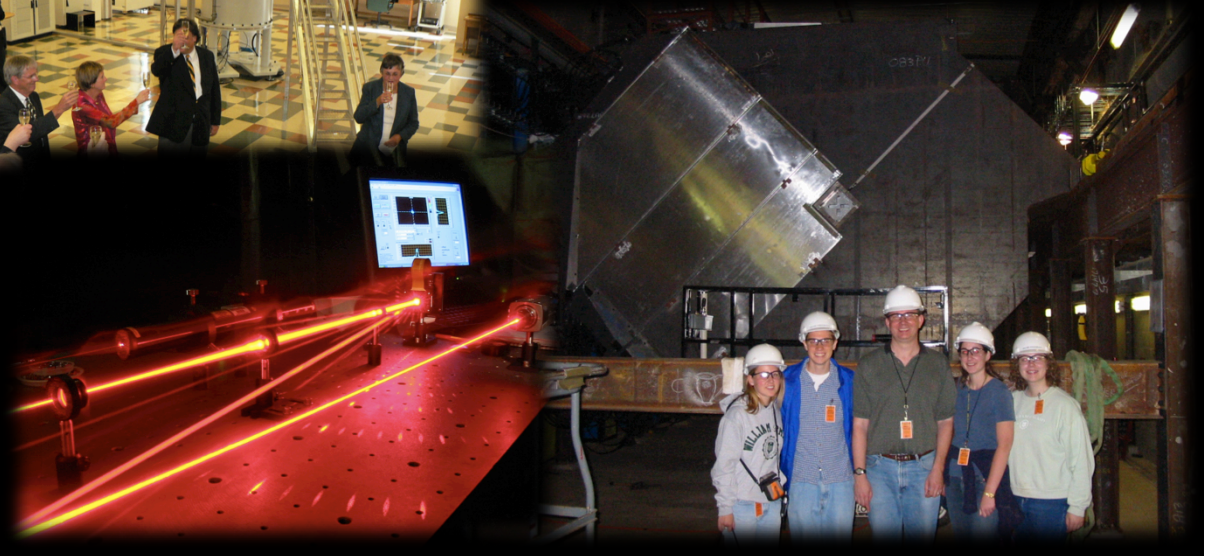
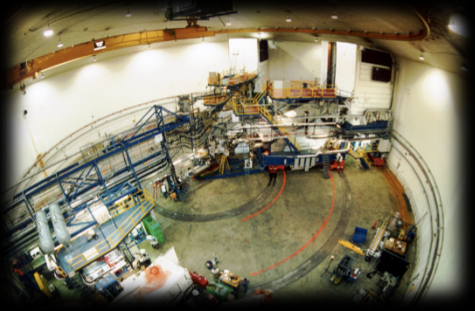
*plus many experiments, many faculty members, many papers,  
many Ph.D.s and many undergraduates*



# The World of Optoelectronics Laser Focus World

Free electron laser synthesizes nanotubes

- Tunable lasers address network needs
  - Membrane mirrors modulate light
  - Back to Basics: Organic LEDs
  - Avalanche photodiodes count photons
- OPTOELECTRONICS WORLD: Spectroscopy



2010





*Jefferson Lab 12 GeV Upgrade scheduled for 2014*

## Lessons Learned

\* *Provincial v. Metropolitan*  
(*amateur v. professional, underdog v. favorite,*  
*outsider v. establishment*)

*Cultivate self-confidence (but not hubris)*

\* *Mentoring*  
(*father-figure*)

*Care for your students*

\* *Serendipity*  
(*SREL, Jlab, REU, Olympiad...*)

*Say YES to unanticipated opportunities*

\* *Balance*

*Value fairness, democracy, and collegiality over  
unbridled academic competition*

*Thank you, William & Mary  
physics department,  
for four decades of  
friendship and support!*