University Thumbnail

• Degrees
  – Undergraduate : 68
  – Masters : 30
  – Educational Specialist: 2
  – Doctoral : 6
  – Total : 106

• Students
  – Undergrad Degree-Seeking: 16,619
  – Graduate Degree-Seeking: 1,136
  – Non-Degree-Seeking: 209
  – Full-Time: 17,078
  – Part-Time: 886
  – In-State: 70.3%
  – Out-of-State: 29.7%
  – Total on-campus enrollment : 17,964

Student population ~ 60:40 Female:male
The End of Physics?

Physics, you might want to know, is dead. James Madison University (JMU) in Harrisonburg, Virginia, has issued an announcement that it will be eliminating its physics major and minor programs by the end of the spring 2010 semester. JMU is the largest US physics program in the region and the only one in the state. The move is part of a broader budget-driven restructuring of the state-supported school, which is currently facing severe financial pressures. The university has been forced to cut costs in order to remain viable. JMU is one of many universities that have made significant cuts to their science programs in recent years, with the number of physics programs in the United States declining by more than 25% since 2000. The decision to eliminate the physics program at JMU is a blow to the local community, which relies on the university for research and teaching opportunities. The move is also likely to have a negative impact on the state's economy, as the physics program has been a significant contributor to the local economy, providing jobs and research opportunities for students and faculty. The decision to eliminate the physics program at JMU is a reminder of the broader challenges facing higher education institutions, as they struggle to balance budget pressures with the need to maintain high-quality programs and services. The move is also a reminder of the importance of supporting science education and research, as it is critical to the development of a globally competitive workforce and the advancement of scientific knowledge.
Plan for Growth

• Revise curriculum: diversify
  – Include tracks in the major
• Embrace the teaching of general education
  – Make the department more cost effective & indispensable
• Renewed focus on undergraduate research
  – Create and market a clear identity

• Find a new university president
Student Population Evolution

Number of Students

Academic Year

- Freshmen
- Astronomy Minors
- Graduates
- transfer
- 3/2 grad
- Total Majors

September 12, 2009
Student Recruiting

• Get list of applicants from admissions in January (~90)
• Invite the better students to campus (~70)
  – Students visit with parents at time they choose
  – Student takes scholarship exam
  – Have lunch with faculty, give ‘em the hard sell
  – Tour department, meet students, see facilities
• Award scholarships (≤10)
  – 1 endowed, 3 JMU funded (ongoing)
  – This year, 6 additional Second Century Scholars - 4 year awards (for the next few years)
• Yield: ~25-30 freshmen
Physics & Chemistry Building

- Occupied in 2005
- State provided ~$2.7M for equipment
- >40% increase in space for the department
- Additional classroom space in adjacent building
- Clean room and additional lab space next door

- Now out of office and lab space
  - Faculty in three other buildings
- Minimal storage available
Introductory Lab

Nuclear Laboratory

Hydrogen Distillery

Microscopy Lab

Faculty/Student Machine Shop

Student Library/Lounge

September 12, 2009
In progress …

• Applied nuclear physics
• Geophysics
Recruiting History

- Applicants
- Took Exam
- Admitted

Engineering program started

September 12, 2009
Distribution of SAT Scores for Fall 2009 Applicants

- **Verbal**: Enrolled $V_{ave} = 645$
- **Math**: Enrolled $M_{ave} = 688$

Number

SAT Score

300 400 500 600 700 800 900

Math

Verbal

Enrolled $M_{ave} = 688$

Enrolled $V_{ave} = 645$

September 12, 2009
Comparison with Virginia Institutions

2007-2008 Physics Degrees

Washington and Lee University
Roanoke College
University of Richmond
Randolph College
Randolph-Macon College
Lynchburg College
Hampton University
Hampton-Sydney College
Emory and Henry College
Bridgewater College
Virginia Military Institute
University of Virginia
Virginia Commonwealth University
Virginia Tech
Radford University
Old Dominion University
Norfolk State University
University of Mary Washington
Longwood University
James Madison University
George Mason University
College of William and Mary

September 12, 2009
AIP 2007 Data

Number of Institutions

Number of Juniors and Seniors

All Institutions

Undergraduate Institutions

JMU 2007 (50)
Faculty Snapshot

15 T/TT + 1 one-yr + 4 perm. non-TT + TIR = 21

Of the 15 T/TT faculty
- 11 are externally funded and involve students in research
  - Grants in effect 2008-2009: $3,362,678
- Research is both on- and off-campus
  - Astronomy, nuclear, materials, granular/non-linear, computational
  - We have a REU grant for materials (1 of 4 at JMU)
- Three are women

This year we search for two faculty
- Replace a retirement and a junior faculty who left
- Search for nuclear physics and soft condensed matter
Current Department Profile

The median faculty employment date is 2003.
Our department, like all physics departments, generates a lot of student credit hours in general education and cognate courses.

Load has been roughly constant.

As Physics load increases (engr., university growth) we try to cut back on Gen Ed offerings.
Balancing Teaching & Research

• Teaching accommodations
  –Introduced LON-CAPA (2007)
    • Prepare in- and out-of-class experiments
    • A student in lab every two weeks
    • Extensive use of part-time faculty
  –Use student assistants in selected labs (~2003)
  –Reformat Intro Astro lab for larger enrollments (2009)
    • Three faculty share course, divide into sections
      –Planetarium, observation, classroom
  –Allow some GenEd section sizes to grow (<2000)
  –Restructured advanced lab to encourage students into research labs (2006)
• **Research Accommodations**
  – Define “Research Active” faculty
    • engage in an on-going program of scholarship with clearly defined goals;
    • routinely disseminate their work in refereed journals and at conferences and workshops;
    • actively seek external funding;
    • meaningfully engage students in their scholarship.
  – Teaching load for Research Active Faculty: 2/2
    • Other faculty have heavier loads
    • Permit load sharing between faculty pairs: 1/3-3/1
  – Research Semester
    • Internal sabbatical w/ only grade reporting duties: every 6-7 years
      – Report Advanced lab and for-credit research grades
    • 1st semester is for untenured faculty in 3rd-4th year
    • Provides contiguous summer and semester dedicated to research
    • Flexible: Can supplement/complement university sabbatical
– Technical support
  • Currently only one technical staff member
  • Hope to add technician for nuclear physics

– Shared facilities/support
  • All tools are shared across departments and colleges
    – SEM, TEM, AFM, optical microscopes, FTIR, X-ray, clean room, etc.
  • Computer technician shared with Chemistry
  • Chem/Phys adding materials technician this year
Advanced Lab: Research/Teaching Interface

• Identify a set of ~15 laboratory competencies
  – Eg., low temperature, optical, historical, etc.
• All faculty contribute & supervise projects
  – Include research activities as part of this
    • Two credits of research are required of all students
  – Require a few traditional projects
  – Instructor of record is faculty on Research Semester
• Students move directly from intro lab to Ad lab
  – Three semesters to complete requirements
Applied Nuclear Physics

- CCLI proposal for equipment
- New courses
  - Two labs and one intro lecture
- Existing courses (Jr/Sr level)
  - Nuclear, particle and nuclear chemistry
- Established relationship with local hospital
  - We are now beginning internships in medical physics
- Prepare students for:
  - Medical physics
  - Nuclear engineering
  - Nuclear/Particle physics
  - Homeland security applications
Applied Nuclear Physics

- Hospital has donated equipment
  - Two 15 MeV electron linacs
  - 140 KeV x-ray machine
- University bought hospital
  - Take occupancy in 2012
  - Physics gets shielded vaults
    - Item in the university master plan
- Need a technician to support this program
John C. Wells Planetarium

- Originally built in the mid-'70's
- Rebuilt after a fire in the late '70's
- ~$1.5M remodel and upgrade in 2008
- GOTO Hybrid system
  - Full dome video aligned with star projector
  - Full digital control, Dolby sound system
- Total audience this year ~6800
Radio Astronomy

- One ~2 meter radio telescope online
- Second dish has arrived and will be mounted soon
- Used in astronomy methods class, advanced labs

- Green Bank is ~1 hr west and annual trips are made with the students in the astronomy methods class
Astronomy Park

- Provides on-campus venue for star-gazing
- Fixed telescope mounts to permit rapid set-up
- Gives the department visibility on- and off-campus
Opportunities & Challenges

• Increasing service teaching load
  – A faculty member was added last year to help
  – Try to shift to Phys not Gsci
  – Replacing retirements with research active faculty adds pressure
    • Space, teaching loads, ...

• Strategic plan finalized this year
  – Three retirements in next five years - set dept. direction
  – Build case for resources

• Need more support staff
  – Technical (nuclear), administrative, recruiting/advising
  – Move tasks from faculty to staff to make more room for teaching and research

September 12, 2009
• Lobby admin. for dark-sky observatory
• Educate administration about our needs
  – P&A often lumped in with STEM as a whole
    • Recruiting focus lost in hoards of Bio & Eng students
    • Retention initiatives are typically one-size-fits-all
• Completely out of lab and office space!
  – Department is already dispersed into 3 bldgs & a trailer
  – Facilities/layout have strong effect on communication and culture
• Faculty at a critical size
  – At ~20, decisions as a committee of the whole are difficult
    • Committee structure more important
    • Hallway conversations - politics become more apparent
  – Unwritten rules are now being formalized
    • http://acadine.physics.jmu.edu/cgi-bin/manual
  – Research groups begin to acquire identity
    • Young faculty - ‘institutional memory’ fading
    • Some priorities being discussed are those of groups not the whole
    • Need to work harder at maintaining department coherence
Lessons Learned

• Balance & integrate teaching and research
• Visibility on- and off-campus
• Curriculum reform
• Student recruiting
• Exploit opportunities
• Hire carefully
• Develop a strategic plan
JMU is larger than 618 of the 690 reporting departments of any type.

JMU is larger than 451 of the 461 reporting undergraduate departments.