RUTGERS

PRINCETON PLASMA PHYSICS LABORATORY
June 3, 2009

Institute for Advanced Materials, Devices, and Nanotechnology

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Rutgers University

http://iamd.rutgers.edu/

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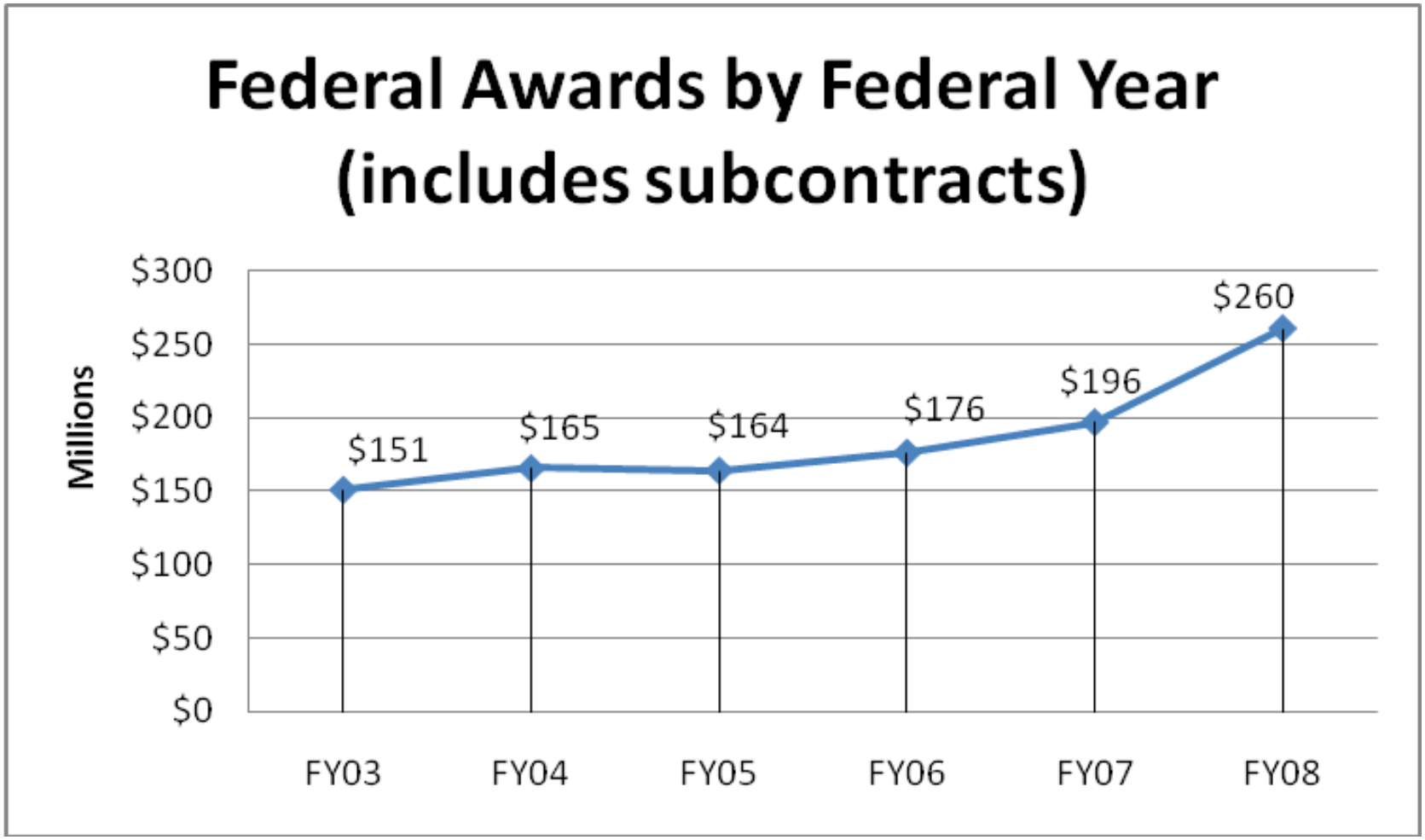
Rutgers Overview

- Faculty: 2700
- Undergraduates: 37,000
- Graduate and Professional: 13,000
- 100 bachelor's, 100 master's, and 80 doctoral and professional degree programs
- 370,000 alumni (200,000 in NJ)
- Rutgers is one of 60 AAU Research Universities
- 2008 Research Funding: $325M
- Honors
  - 19 members of the National Academy of Science
  - 13 members of the National Academy of Engineering

Federal Support for R&D

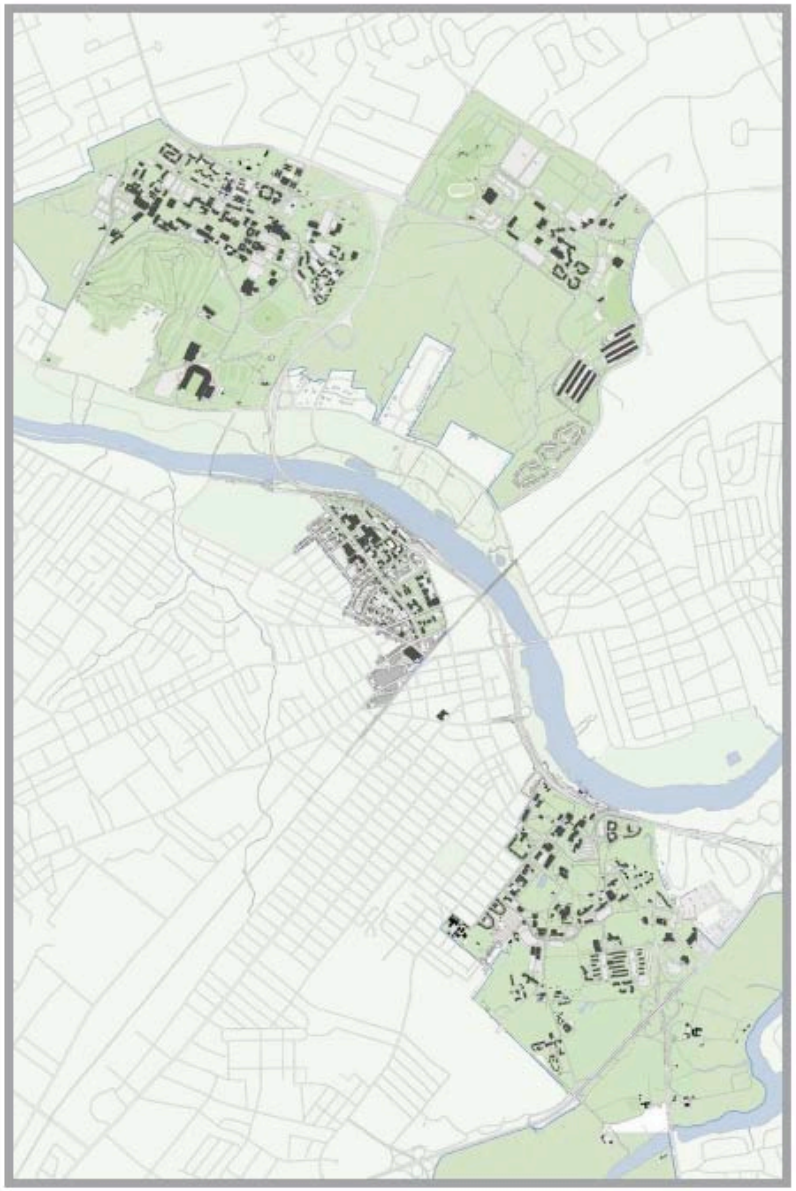


Economic Stimulus and Federal Agencies

- Provides $3 billion for the National Science Foundation
- Provides $1.6 billion for the Department of Energy's Office of Science
- Provides $10 billion for NIH
- Provide $610M to National Institute of Standards
  - Technology Innovation Program: Joint projects between university and industry: $9M over 5 years
    - Nanotechnology
    - Alternative Energy
    - Personalized Medicine

Some Rutgers Initiatives

- Expansion of Livingston Campus
  - "Professional" Campus
  - Major Expansion of Business School in N Brunswick
  - Hotel & Conference Center
  - Technology Park
- Creation of Professional Science Masters Degree
  - Combines Science and Entrepreneurship Education
- Recruitment of Dean of Engineering



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Research with an Impact

- The Rutgers Cell and DNA Repository has received $58 million from the National Institutes of Health to support investigation into the genetics of mental disorders and of metabolic and digestive diseases.
- A consortium spearheaded by Rutgers has been awarded $42.5 million over five years to create one of two academic groups that will form the Armed Forces Institute of Regenerative Medicine to help injured soldiers overcome severe limb, head, face, and burn injuries.
- Rutgers Center for Advanced Infrastructure and Transportation Awarded Federal Highway Administration Bridge Performance Program of $25.5 Million
- NSF Engineering Research Center on Structured Organic Composites: Research and Education on Manufacture of Pharmaceuticals for $15M
- DHS Center of Excellence for Command, Control, and Interoperability: $15M
- 1,921 Total Grants and Contracts

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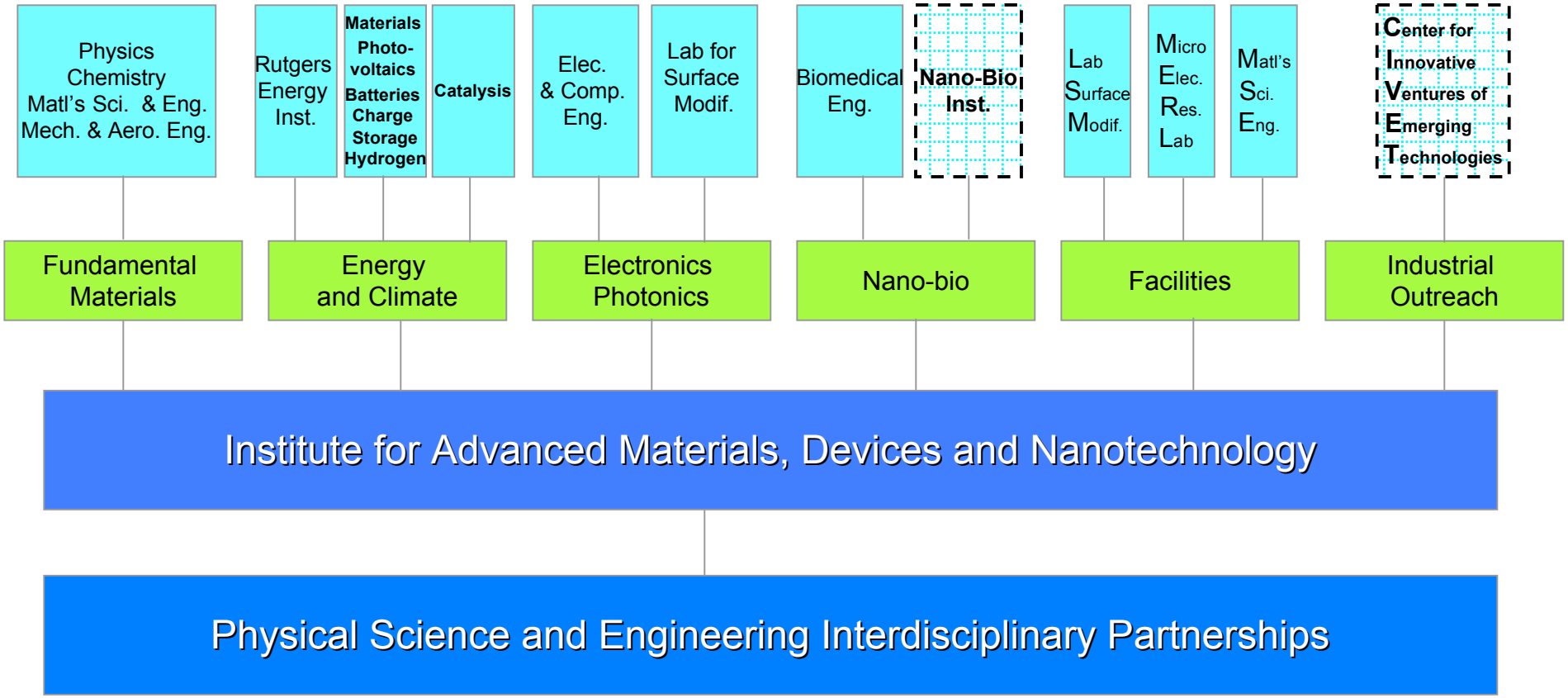
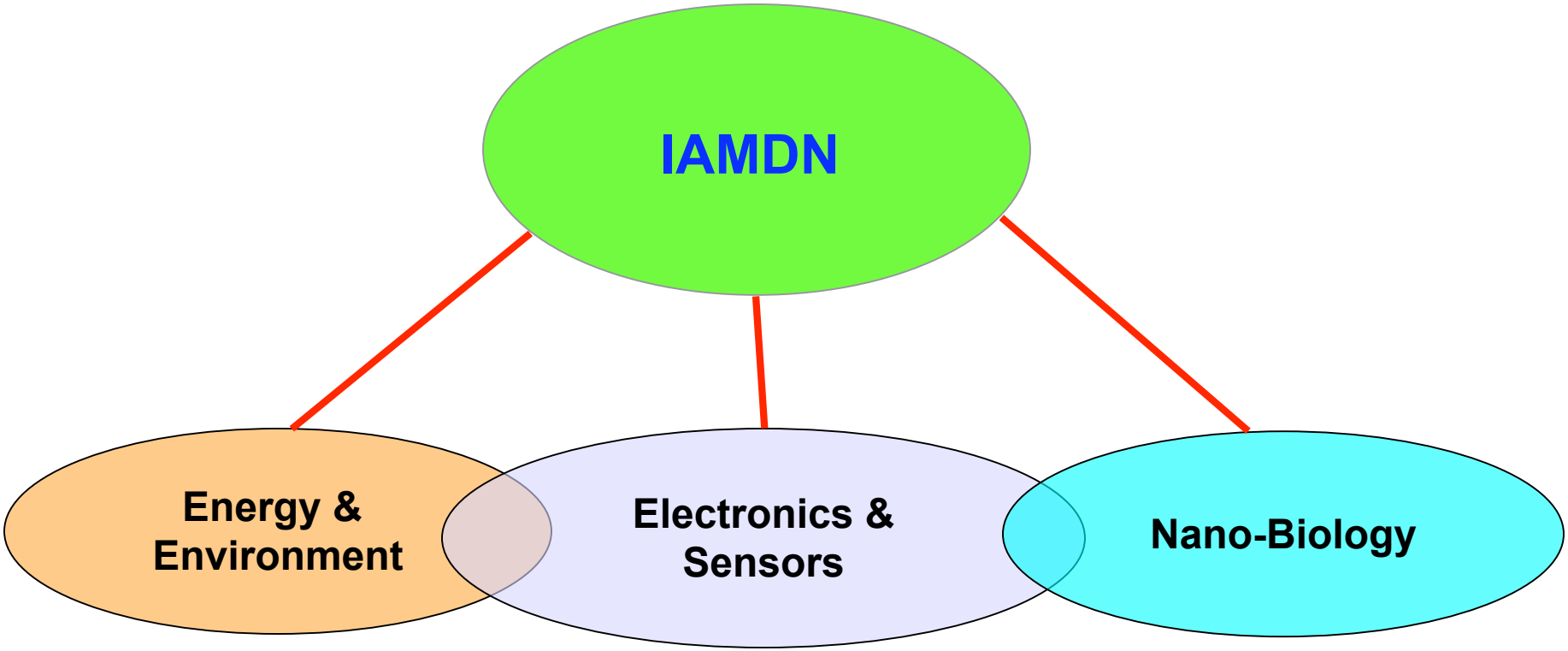


May 1, 2008

PROPOSED IAMDN RESEARCH THRUSTS



Energy and Environment - solar, hydrogen; fuel cells, batteries, chemical industry, catalysis, environmental remediation, green chemistry…

Electronics, photonics and sensors - computer, telecom, display, MEMS; sensors for health, environmental, energy, food, telecom, security…

BioNano – nano-biology, biomaterials, personal care, drug delivery/pharma…

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Facilities

We have a range of facilities available for use. Some instrumentation is clustered in large laboratories such as the Microelectronics Research Laboratory (MERL - the main Rutgers clean room), the Laboratory for Surface Modification (LSM). Other equipment is in smaller or individual faculty laboratories. All of the instrumentation listed on these pages is accessible to Rutgers as well as external users.

Laboratories

MERL

Micro Electronics Research Laboratory

LSM

Laboratory for Surface Modification

Facilities Clusters

- NJ NANO
- Nano-Fabrication Facility
- Ion-Beam Facility
- Electron Microscopy
- Nuclear Magnetic Resonance Spectroscopy
- X-Ray Diffraction Facility (XRD)
- Micro-Analytical Laboratory
- Laser
- Confocal Microscopy

FACILITIES

Nano-Fabrication Facilities—semiconductor, nano-bio, nanostructures (tubes, wires, dots), molecular beam epitaxy of oxides, ceramics, plasma deposition,

Ion-Beam Facilities- 10eV-2MeV, hi-resolution analysis

Electron Microscopy-SEMs, TEM, STEM, (Hi res STEM)

Nuclear Magnetic Resonance Spectroscopy

X-Ray Diffraction Facility (XRD)

Micro-Analytical Laboratory

Laser spectroscopy

RUTGERS FIRSTS AND STRENGTHS IN MATERIALS

Organic transistors

Thin film/surface analysis—structural, electronic

Theory—at all levels-DFT, Interfaces, correlated electron systems

Oxides—bulk and thin film

Graphene

Batteries, Charge storage

Ceramics and optical fibers

Semiconductor interfaces

Bio materials

Quantum computing systems

Nano-structured materials

Expertise that may be relevant

1. Hydrogen accumulation, hydrogen depth profiling
2. Embrittlement, impurity diffusivity
3. Mechanical properties of materials
4. Grain boundary effects in materials
5. Light element detection; Li, C, Be (nano-macro scale,)
6. Sputtering, charge state issues
7. Gas bubble formation
8. Custom test wall materials—ceramics, metals,
9. Modelling of the above--