

The Industrial Leadership in Physics program at Georgetown University



Mid-career earning potential of physicists

| | |
|----------------------|----------|
| 1. Engineering | \$53,268 |
| 2. Math | \$51,584 |
| 3. Computer Science | \$50,509 |
| 4. Pharmacy | \$50,480 |
| 5. Physics | \$50,128 |
| 6. Accounting | \$49,500 |
| 7. Economics | \$49,377 |
| 8. Engineering Tech. | \$45,799 |
| 9. Chemistry | \$44,989 |
| 10. Business | \$44,865 |
| 11. Nursing | \$44,677 |
| ALL FIELDS | \$43,199 |
| 12. Architecture | \$42,603 |

Data from NSF and BLS 1993 (courtesy of Bo Hammer, AIP)



Late-career earning potential of physicists

| | |
|-------------------------|--------------|
| 1. Physics | \$61,965 24% |
| 2. Engineering | \$59,213 11% |
| 3. Mathematics | \$56,388 9% |
| 4. Accounting | \$54,737 11% |
| 5. Economics | \$52,263 6% |
| 6. Chemistry | \$52,146 16% |
| 7. Computer Science | \$51,943 3% |
| 8. Engineering Tech. | \$51,278 12% |
| 9. Pharmacy | \$51,026 1% |
| 10. Business | \$50,895 13% |
| 11. Communications | \$49,984 28% |
| 12. Poli. Sci. & Gov't. | \$49,922 22% |
| ALL FIELDS | \$49,390 14% |
| 13. Geology | \$49,007 16% |

Data from NSF and BLS 1993 (courtesy of Bo Hammer, AIP)



Demand for physics training is
high in the marketplace!



Job Titles of Physicists in Industry

- **Test engineer**, automotive seat design.
- **Analytical systems engineer**, fluid control system.
- **Airframe design engineer**, industrial & commercial architecture.
- **Semiconductor process engineer**, thin films.
- **Manufacturing engineer**, plant & safety maintenance.
- **Senior design engineer**, communications satellites.
- **Senior engineer**, optical processors.
- **Systems engineer**, GUIs, vision code.
- **Senior scientist**, software for underwater acoustical data analysis.
- **Computer programming contractor**, mapping and database software for a telephone company.
- **Systems analyst**, communications routing systems.
- **Software developer**, object-oriented software.
- **Computer consultant**, automated business & engineering processes.
- **Software engineer**, CAD preprocessor algorithms.
- **Owner**, computer graphics & multimedia production firm.
- **Quality supervisor**, plastics testing.
- **Plant engineering manager**, capital purchases.
- **Divisional VP of operations**, Wall Street firm.
- **Manager of geometric analysis**, aerospace systems.
- **President**, optical manufacturing firm.
- **Marketing director**, electronics company.
- **Technical manager**, VLSI design transfer to IC manufacture.
- **Engineering technical manager**, digital signal processing.

Source: Bo Hammer, AIP ($\Sigma\Pi\Sigma$ Survey)



Why is it that physicists who
make money are called
engineers?

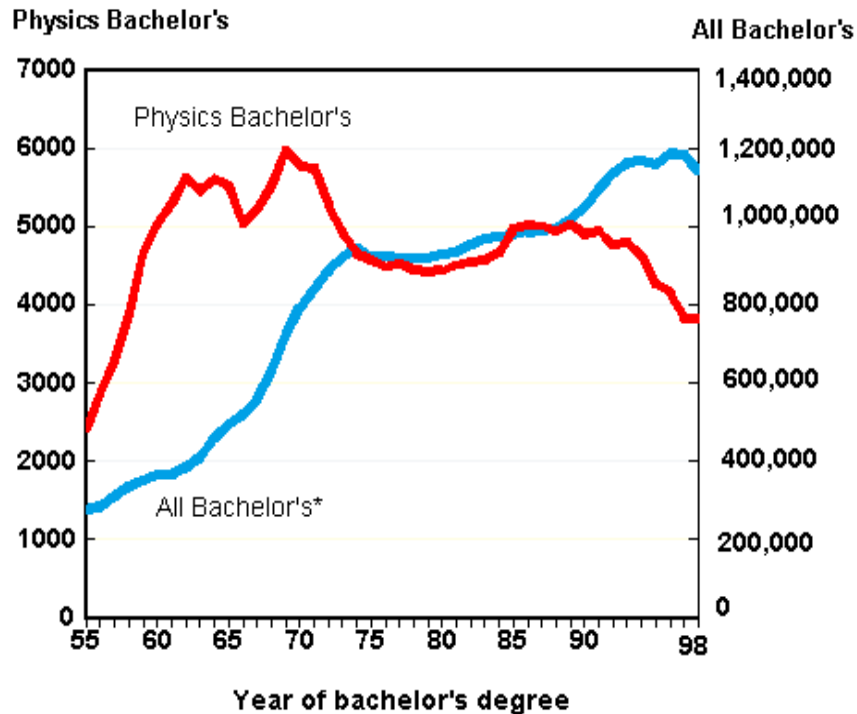


They are really industrial
physicists!



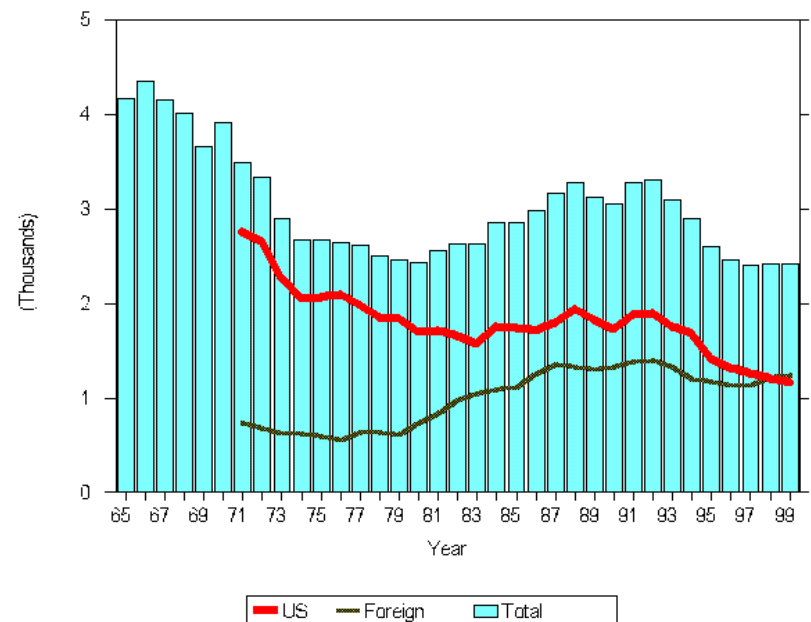
Training of physicists is on a decline

Bachelors Production



First Year Grad School Enrollments

Number of first-year students



Sources: AIP Statistics Division (Courtesy of Bo Hammer, AIP)



Supply of physicists is low

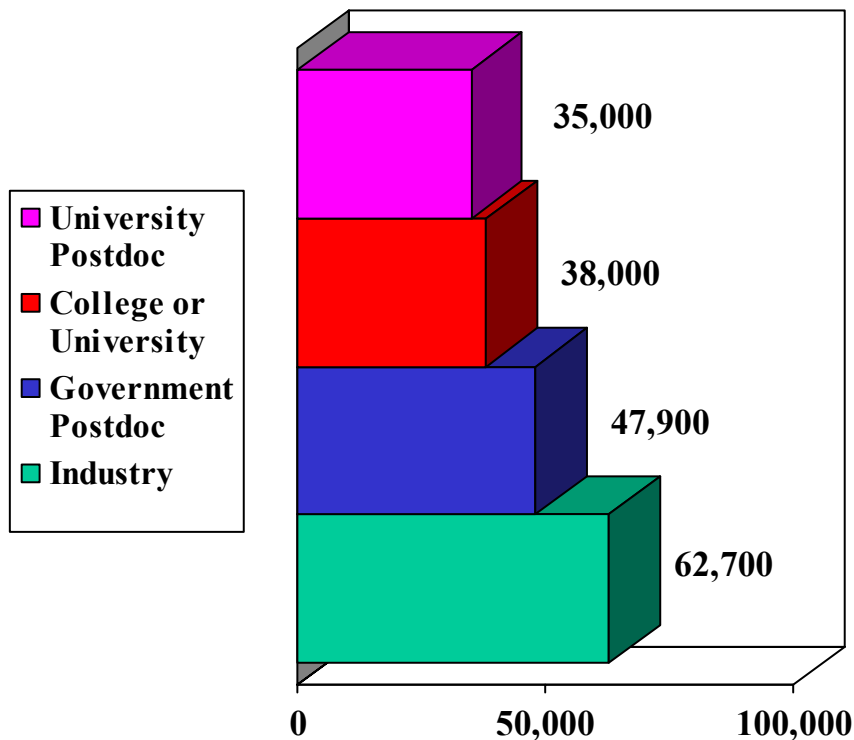


Law of supply and demand implies
great opportunities for students!



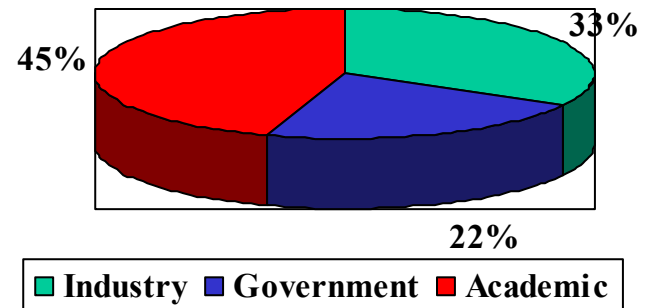
Employment demographics

Median Starting Salaries:
Physics Ph.Ds class of 1998



Source: AIP Statistics Division

Employment sector



Starting salary for PhDs in industry is higher than median salary of bachelor's degree holders!



But



Industry's needs are different from academe's needs

- Industry employees must work well in teams.
- Communication skills are in demand.
- Workers must be able to meet deadlines.
- Knowledge of how a business functions and how it makes money is critical for success.
- NAS, NSF, IRI, and APS all call for more value to be added to the physics Ph.D.



The ILP program fills this gap

- Georgetown Physics Department has a condensed matter physics focus with over \$1.5 million in external research funding per year. Most research has an applied bent in fields like nanotechnology, chemical and biomedical MEMS-based sensors, optoelectronics, magnetic storage, complex numerical simulation and so on.
- The McDonough School of Business, with its focus on entrepreneurship, has both the expertise and the interest in contributing to training these future leaders of high-tech industry.



Curriculum

- Modular format to allow vertical and horizontal integration, significant week-long team projects, and adaptability to the needs of our students.
- Combination of physics coursework (39 credits) with business coursework (10.5 credits).
- Novel opportunities for students (Industrial Problems in Physics, Entrepreneurship Module, etc.).
- Five year program with coursework, industrial apprenticeship, and dissertation research.



Industrial Apprenticeship

- 12-month apprenticeship in industry required for the Ph.D. Industrial mentor coordinates work program with Georgetown faculty to ensure the quality of the educational experience.
- Intellectual property is maintained by the corporate partner during the apprenticeship.
- Students benefit from experiencing the industrial environment firsthand; companies benefit from a “year-long” interview.



Other degree options

- Masters of Science degree (18 month long program based entirely on coursework).
- MS-MBA program (2.75 years long, students must be admitted to both the Physics program and the MBA program).
- PhD-MBA program (6.5 years long, MBA degree completed after the Ph.D.), students apply after returning from their apprenticeship in industry.



Advisory Committee



Charles Duke
Senior Research Fellow



Lynn Melton
Professor of Chemistry
University of Texas,



Barbara Jones,
Manager Magnetic
Materials and Phenomena



Carnegie Mellon

Department of Electrical and Computer Engineering

Robert White,
University Professor of Electrical
and Computer Engineering
Carnegie-Mellon University



Bill Lewis,
President and CEO



Bill Graver
Vice President and Director of
Applied Physics
Advanced Technology Group

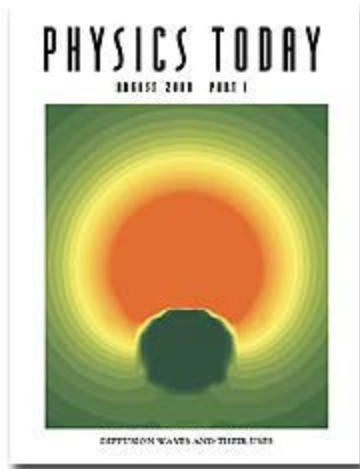
Carl Widell
Chief Financial Officer and telecommunications
Third World Organization venture capitalist



Georgetown University
Department of Physics

The Robert Emmett McDonough School of Business

External Press

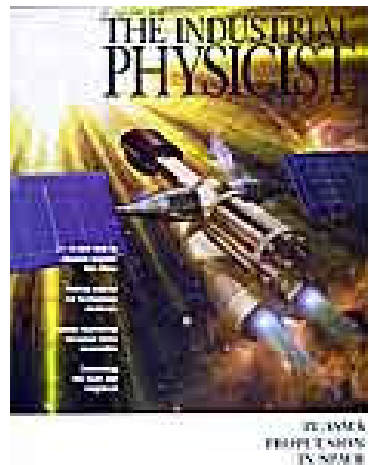


Article on our graduate program appeared in the June 2000 issue of Physics Today, which is reaches over 120,000 readers from ten professional societies that involve Physics research.

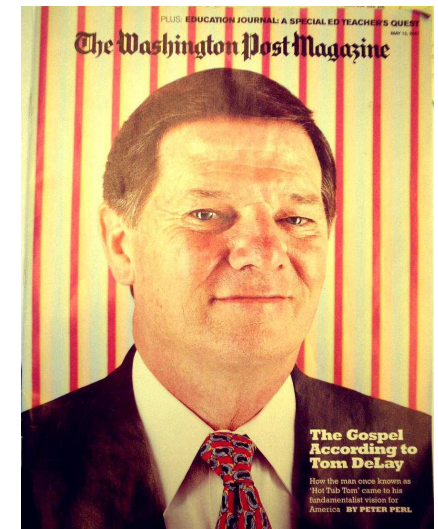


Featured in Naturejobs in November, 2001. Article described the innovative features of our program and the focus on team-based problem solving.

Georgetown Answers Industry's Call appeared in the Fall of 2001 in the Industrial Physicist



Featured in the Sunday Magazine of the Washington Post in May of 2001.



Georgetown University
Department of Physics



The Robert Emmett McDonough School of Business

ILP students



Ling Chen,
2001
IBM



Katie Magnuson
2002
Placed next winter



Sascha Joura
2002
IBM (winter 2004)



Changbao Ma
2001
Placed this summer



Kristen Perlot
2001
Placed this summer



Yanfei Yang
2002
Placed next winter

Drew Monica
2002
Placed next winter

