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

<table>
<thead>
<tr>
<th>Field</th>
<th>Earnings</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>$61,965</td>
<td>24%</td>
</tr>
<tr>
<td>Engineering</td>
<td>$59,213</td>
<td>11%</td>
</tr>
<tr>
<td>Mathematics</td>
<td>$56,388</td>
<td>9%</td>
</tr>
<tr>
<td>Accounting</td>
<td>$54,737</td>
<td>11%</td>
</tr>
<tr>
<td>Economics</td>
<td>$52,263</td>
<td>6%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>$52,146</td>
<td>16%</td>
</tr>
<tr>
<td>Computer Science</td>
<td>$51,943</td>
<td>3%</td>
</tr>
<tr>
<td>Engineering Tech.</td>
<td>$51,278</td>
<td>12%</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>$51,026</td>
<td>1%</td>
</tr>
<tr>
<td>Business</td>
<td>$50,895</td>
<td>13%</td>
</tr>
<tr>
<td>Communications</td>
<td>$49,984</td>
<td>28%</td>
</tr>
<tr>
<td>Poli. Sci. &amp; Gov’t.</td>
<td>$49,922</td>
<td>22%</td>
</tr>
<tr>
<td><strong>ALL FIELDS</strong></td>
<td><strong>$49,390</strong></td>
<td>14%</td>
</tr>
<tr>
<td>Geology</td>
<td>$49,007</td>
<td>16%</td>
</tr>
</tbody>
</table>

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 (ΣΠΣ 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

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

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

Source: AIP Statistics Division

The Robert Emmett McDonough School of Business
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

Barbara Jones,
Manager Magnetic Materials and Phenomena

Bill Lewis,
President and CEO

Lynn Melton
Professor of Chemistry
University of Texas,

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

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

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

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

*The Robert Emmett McDonough School of Business*

ILP students

Ling Chen, 2001 IBM

Changbao Ma 2001 Placed this summer

Kristen Perlot 2001 Placed this summer

Katie Magnuson 2002 Placed next winter

Sascha Joura 2002 IBM (winter 2004)

Drew Monica 2002 Placed next winter

Yanfei Yang 2002 Placed next winter