Chapter 8 - Industrially Employed Physicists: Primarily in Computer Science

Employers

This profile is based on the responses of 64 mid-career physicists employed in industry and working primarily in the field of computer science. Many physics PhDs working primarily in computer science were employed by renowned computing companies like Google, Apple, Microsoft, IBM, Oracle, Cisco, Yahoo, and Dell. Physicists working primarily in computer science were not distributed equally across respondent cohorts, with 73% from the PhD classes of 1996 & 1997 and only 27% from the classes of 2000 & 2001. This difference is likely due to fluctuations in the computer science job market in line with the dot-com explosion around 1996 and the subsequent bust in the early 2000s.

Job titles

Table 8.1 lists common job titles of mid-career physicists who were working primarily in computer science 10 to 15 years after earning their PhDs. Most of the PhDs working in computer science had software engineering positions. Many physicists in this part of the economy had titles that were preceded by words like “senior”, “principal”, or “lead” reflecting a higher level of responsibility.

Table 8.1: Common Job Titles of Industrially Employed Physicists in Computer Science, 2011
Software Engineer
Manager; Product Manager
Chief Technology Officer
Director
Consultant
Scientist
Systems Engineer
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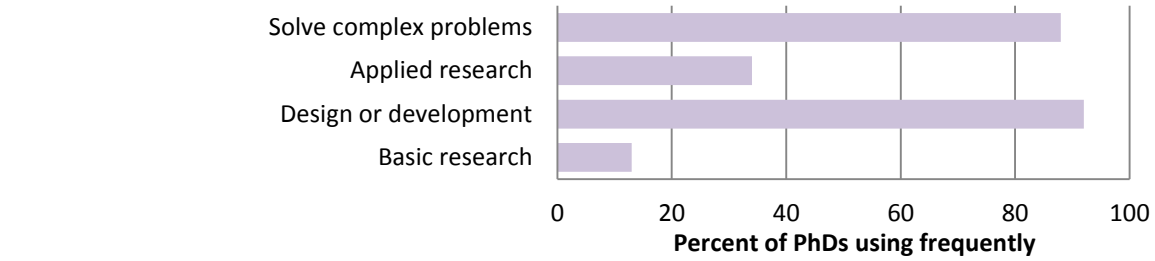
Job duties

Physicists employed in industry and primarily engaged in computer science described working on software design, development, testing, debugging, optimization, programming including database development and maintenance, product implementation, and software maintenance. A few Chief Technology Officers (CTOs) described researching and choosing new technologies to align their companies’ or customers’ technological futures with their business needs. CTOs, directors, and managers led teams in the design and development of software and related

Figure 8.1: Cognitive Skills Used Frequently by Industrially Employed Physicists Working Primarily in Computer Science



"Frequently" combines response of "daily", "weekly", and "monthly" from a 5-point scale to the question "How often do you use the following in your current job?" Data include US-educated physicists who earned their PhDs 10-15 years earlier, who were working in the US in 2011, and whose primary field of employment was computer science.

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Figure 8.2: Interpersonal Skills Used Frequently by Industrially Employed Physicists Working Primarily in Computer Science

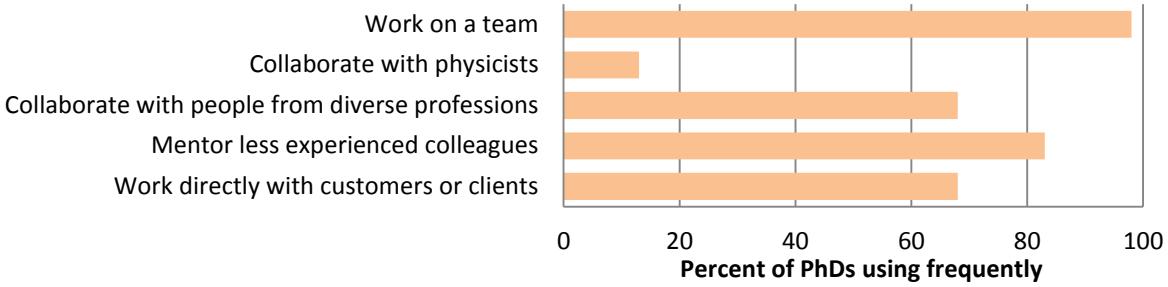

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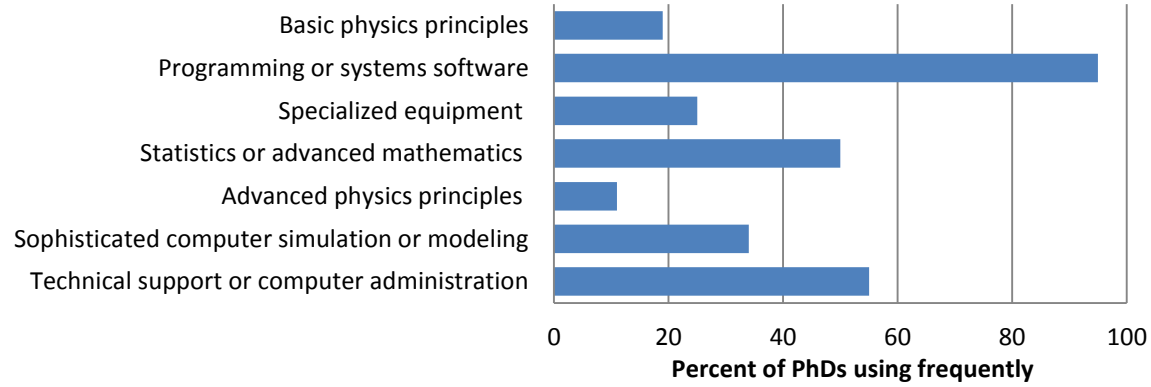
Figure 8.3: Scientific and Technical Knowledge Used Frequently by Industrially Employed Physicists Working Primarily in Computer Science



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(Job duties - cont.)
technologies. Computer science professionals also provided information technology consulting services, managed data servers and networks, trained or collaborated with clients on the use of unique software, designed and administered networked systems, and marketed and sold their products and services.

Knowledge and skills used on the job
Nearly all mid-career physicists working in computer science reported that they were frequently engaged in programming or in systems software (Figure 8.3). About 90% reported that they were frequently involved in design and development, and solved complex problems (Figure 8.1).

Interpersonal skills were very important for physicists who worked in computer science. Physicists who worked in industry and were primarily involved in computer science worked on teams, and many were frequently involved with mentoring less experienced colleagues. A significant percent indicated that they regularly collaborated with colleagues from diverse professional backgrounds and regularly worked directly with customers or clients (Figure 8.2).

Managing projects (Figure 8.4) and writing for a technical audience (Figure 8.5) were essential skills for physicists who worked primarily in computer science.

Most rewarding aspects of working primarily in computer science
Mid-career physicists working in computer science described various aspects of their work that they found rewarding. They typically cited one or more of the following:

- The intellectual challenge was the rewarding aspect of work that was cited most frequently by physics PhDs who worked in computer science. A few commented that they enjoyed that their work involved multiple disciplines - computer science, business, and psychology, for instance - to achieve their objectives.
- Many mid-career physicists appreciated that their work would have a real-world impact and that their applications would be used by people.
- Many physics PhDs working in computer science enjoyed the opportunities they had to work with smart people, often collaborating on teams.
- A fair number described satisfaction in serving their clients' needs in a timely and effective manner, which also contributed to their companies' success.

Figure 8.4: Managerial Skills Used Frequently by Industrially Employed Physicists Working Primarily in Computer Science

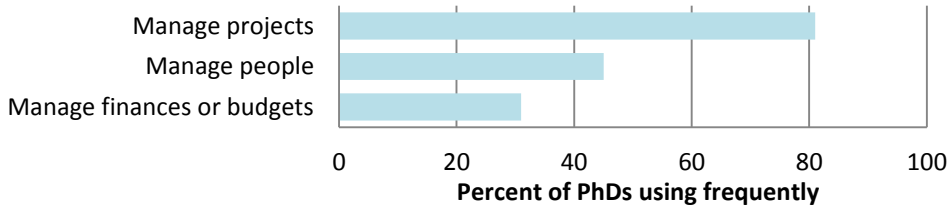

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Figure 8.5: Communication Skills Used Frequently by Industrially Employed Physicists Working Primarily in Computer Science

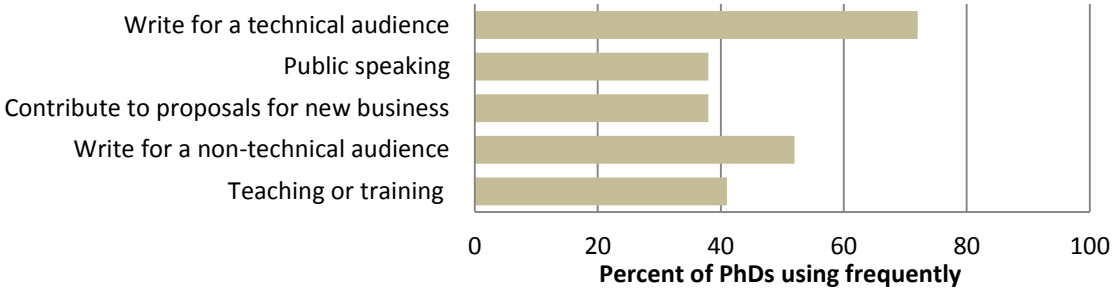

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Table 8.2: What Are the Most Rewarding Aspects of Your Job?
Selected verbatim comments from PhD physicists working primarily in computer science, 2011
Working with smart people and solving complex problems. While my job is not related at all to my background in physics, I find that rigorous training in problem solving and deep understanding of underlying physical processes has helped me enjoy and advance in every position I have held. *Knowing that my work directly impacts tens of thousands of people.* *Challenging work, engaging with multiple teams and companies, design and implement practical solutions.*
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