

How to Make Your PhD Work: A Guide for Creating a Career in Science and Engineering

By Thomas R. Coughlin
John Wiley and Sons Inc., October 2023, 224 pages
ISBN-13: 978-1394193141
Paperback: \$29.95

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In the first edition of *How to Make Your PhD Work*, author Thomas R. Coughlin argues that the job market for PhDs in science and engineering has shifted dramatically over the last decade, with graduates following increasingly diverse career paths spanning both academia and industry alike. Identifying and outlining many of these potential paths, the book attempts to highlight their respective benefits and dispel their potential misconceptions, while also providing guidance on how one may practically step through the process. This discussion is reinforced through reports included from 13 scientists who detail their personal motivation for pursuing doctoral work, reflect on their PhD (and any postdoc) experiences, discuss how this helped position them for their current professional role, and offer key takeaways from their journey. Aspects of this book will appeal to multiple audiences – senior undergraduates deciding whether to attend graduate school, first-year graduate students weighing options of lab selection and how they can potentially make the most of their experience, mid-degree trainees navigating challenging/unexpected situations, and senior graduate students seeking information on the academic and non-academic job application process.

The book's opening half focuses on the graduate experience, identifying one's research advisor, the overall environment, and the research project – in that order – to represent the most important and defining characteristics of a successful PhD. Hallmark attributes, both positive and negative, are discussed (e.g., advisors who are present, caring, and consistent versus those who are aloof, demeaning, and unfocused). Such discussions are supplemented with a self-assessment diagnostic test meant to help readers regularly and objectively evaluate their own graduate or postdoc positions. In cases where challenges are identified, the author outlines proactive steps that can be used to overcome such academic obstacles (e.g., strategies to improve relationships with advisors, correct a toxic lab culture, and move beyond stagnant/uninteresting projects).

The second half of the book highlights different career paths that one could meaningfully pursue post-PhD, starting with those in academia. Here, Coughlin describes the

varying career trajectories (e.g., a principal investigator at a research-intensive institution, teaching positions at a community college, and a staff scientist position at a national lab). With an extended focus on tenure-track positions at R1-type institutions, the author presents a good discussion of the often-misunderstood distinctions between the Assistant, Associate, and Full Professor ranks and highlights how salary support can depend on teaching, research, and/or administrative service – core aspects of academia that similarly escape both undergraduate and graduate students. The book outlines the postdoc and faculty job application process, providing some practical tips on how to appropriately develop a competitive CV.

Recognizing that > 95 % of all PhDs will go into nonacademic roles, the book next presents an impressively diverse list of potential carrier paths available to science and engineering doctorates. Some of these are conventional – startup companies, venture capital, scientific management – but other less-obvious paths – equity research, regulatory bodies, consulting, technology transfer, scientific editors – are presented in a compelling way that is sure to excite some students. The author highlights differences in the academic- and industry-oriented mindsets, outlines a typical interview, and then offers some tips on preparing a resume and elevator pitch. Since graduate students train almost exclusively amongst faculty who have solely pursued an academic path, this portion of the book stands out as particularly valuable and complementary to what may be learned firsthand in a university setting.

Supporting the written content are Piled Higher and Deeper (PhD Comics)-like cartoons, infographics, supplemental worksheet tools, and key summaries for each of the 14 chapters. Thoughtfully peppered in throughout the book, these tools help maintain reader engagement while appealing to those with different learning styles.

This book will prove useful to senior undergraduate and graduate students alike, primarily as a resource that can be revisited with different lenses throughout these years. The content is likely too broad to be required, at least in its entirety, for formal coursework. Additionally, the guide to “How to Make your PhD Work” almost fully ignores opportunities available to graduate students beyond their research lab, many of which can be the make-or-break factor in landing that next position. Community-based and professional networking, coursework and seminar series, outreach, fellowship and award applications, undergraduate mentorship, teaching assistantships, science communication, internships and research exchanges, collaboration, seeking input from your thesis committee, and more are un- or underdiscussed. Despite this potential shortcoming, the text provides a valuable overview of the career options available to science and engineering PhD graduates and should be recommended to aspiring PhD researchers. □