



BUILDING A SUCCESSFUL CAREER IN SCIENTIFIC RESEARCH

A Guide for Ph.D. Students and Post-docs

Phil Dee

剑桥科学素养读本

如何创建成功的科研事业

修志龙 注译



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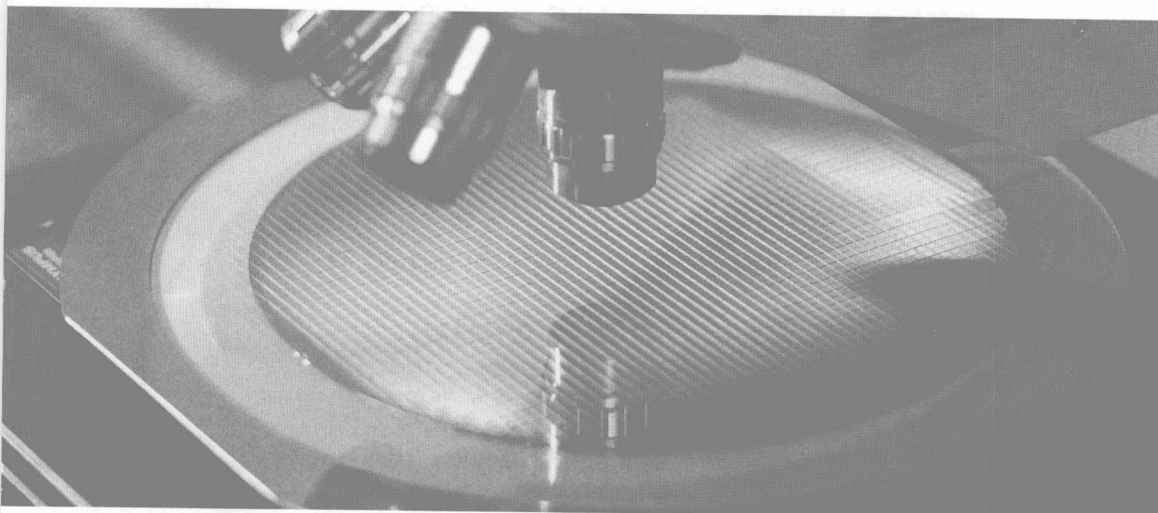
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感谢郭峰、刘晓庆、马成伟、牟晓佳、张江红、李雪芹、梁志霞、李丹对本书注译版做出的贡献。

编者的话

科学研究的目的是发现新事物并将之应用于改善人类及动物的生活状态。但是,现在的科学研究本身则很费力气,不仅仅需要对科学的热爱。如果你正在考虑将科学研究作为自己一生的职业,或者已经踏上自己的职业之路,或者想有所成就但尚不确定未来的路线,急需一些从事科研工作的建议、训练和指导,《剑桥科学素养读本》丛书将给你提供满意的答案。

《剑桥科学素养读本》丛书全部从英国剑桥大学出版社引进。特邀大连理工大学几位有留学经历、具有丰富相关教学及科研从业经验的教授,对本套丛书逐一进行点评式注译。本系列丛书相辅相成,互为补充,涉及如何规划及实践科研职业,如何写作和发表科研论文,乃至如何作科学报告。我们认为,这套丛书将成为中国读者案头一套必备的科研实战指南。对于有志于从事科研事业的读者来说,实为甘醇雨露,春风化雨。

本套丛书具有以下特色:

- **题材广泛,内容丰富,表达地道** 本套丛书直接选自国外原版,内容广泛。读者可细细品味欣赏,也可随手借鉴,均有开拓视野、提升能力之功效。

- **作者学识渊博,有丰富的教学科研经验** 作者均是在各自学科领域颇有建树的专家学者,他们绝不单纯是知识技能的传授者,更是引导人生道路的前辈。读者在书中可随时感觉到其爱心和耐心,也感受到科学研究作为职业乃至事业的独具魅力的意境。他们的写作风格不尽相同,但能够洞悉母语为非英语的学生学习和使用英语的心态,均使用浅显易懂的语言对各种问题及对策加以解说、诠释,像和朋友在聊天,更像导师在引导你一步步上路。对这套丛书,读者们完全可以用一种轻松的心情去品读。

• **英语原文与中文点评相得益彰,易学易用** 为了让读者品读原文的韵味,丛书采用了点评的注译模式,特别有助于读者在潜移默化中掌握地道的英语、培养英语语感,减少许多不必要的摸索时间。

• **装帧精美,常读常新** 丛书的装帧设计精美大方,品质高雅,以国际水准的精美版面呈现于读者的面前,令读者赏心悦目。加之内容实用可读,在科研的不同阶段,均能从本套丛书中得到不同的收获,颇具收藏价值。不但收藏起图书,更是收藏起你科研道路的足迹。

从作者的“闲言絮语”中,读者尽可体会个中的激情与周到:

“我喜欢作为一名科学家的我。这是一个让我为之陶醉、为之痴迷的职业。科学领域中像我这样的人比比皆是,他们都专注于在常人看来很抽象的目标。他们很忙碌,甚至全神贯注。这使得通常的交往远非容易。一下子投入到科研领域……职业道路很不稳定……对于一个新加入者来说,看起来前途是如此暗淡。但是,如果你能坚持下来,回报将是巨大的……当你发现了前人没有发现的规律时,这种兴奋会使你义无反顾,这就是一切。”

“当人们决定要成为一名科研工作者时,通常是因为他们喜欢科学,而不是因为想成为作家。然而,一旦人们开始职业生涯,很快就会发现,一个管道工可以不会写关于管道的文章,也可以生活得很好,而科学工作者的成功则依赖于其写作能力。”

建议读者通读本套丛书,若时间有限,也可以根据自己的需要,以按图索骥的模式选择性地阅读其中的一本或其中的有关章节。相信读者通过本套丛书的帮助,能够增强自己进行科学研究的兴趣和信心,驾驭未来的能力会有质的飞跃,会更自信地应对未来的各种挑战,满怀信心地踏上科研之路。

我们期待着本套丛书能够为读者的事业之鹰插上腾飞的翅膀,能够帮助读者达成理想,从此走向成功。

Foreword

写在前面

没有人天生就是成功的科学家,在科学上取得成功是靠后天努力得来的。有些人或许比别人有天赋,也有部分人或许比其他入更具有创造性,但是,仅靠聪明和创造性并不能保证一个人成为科学界的明星。科学团体有其独特的价值观和行为规范,科研工作者面临着复杂激烈的竞争。以科学为职业的人需要学习的东西很多。

本书为科研工作者,尤其是那些刚入门的新人提供了丰富的信息,真诚希望本书能够成为科研工作者创建成功的科研事业的指南。

Being successful in science is an acquired trait. No one is born an eventually successful scientist. Some people may be better endowed than others with core traits that help lead to success: Being very smart is useful, and we know there's a genetic contribution to intelligence. Some people seem to be temperamentally more creative than others. But just being smart and creative does not ensure stardom in science. Just as one has to learn the substance of one's field and the details of scientific methods and technologies, there is much to learn about science as an enterprise and a community of diverse individuals.

There is a sequence of educational phases one must go through before becoming an independent researcher, and much to know about how to thrive at each stage. The scientific community has its own set of unique values and behavioral norms. These need to be learned and incorporated into one's way of working and dealing with one's colleagues. Speaking of one's colleagues, scientists can be an extremely competitive bunch of people, and there is much to be learned about working within that club.

Finally, being a scientist is not a unitary thing. Science pro-

vides a very wide variety of wonderful career options, although few people really are aware of the breadth of them. Scientific careers can also be quite complex and take many different forms. Few people only do research. Most do some combination of researching, teaching, giving talks, and serving on institutional and organizational committees, often at the national or international level. Working in a university is quite different from being a scientist in industry.

Scientific training is almost always only about the substance and methods of one's discipline. There are very few formal courses about the culture of and careers in science. Some mentors do a very good job helping their students prepare for life in the real world of research, but others seem to think one should learn on the job.

About a decade ago, the staff of AAAS and its journal, *Science*, recognized the need for a resource where scientists could turn for comprehensive career advice. They created the website called *Science's* Next Wave. This site contains a very wide array of up-to-date articles written for developing scientists around the world interested in careers in academia, government and industry settings. Pairing *Science's* Next Wave with its partner job-posting site, called *Science* Careers, enabled AAAS to offer the most comprehensive career resources available to scientists from the entire spectrum of fields.

One very popular feature of *Science's* Next Wave has been the regular columns by Phil Dee. Collected together in this book, they provide a wonderfully written guide to navigating the pitfalls and paths to success in the very complex and competitive set of careers that make up the scientific enterprise. The style is light, the tone at times quite witty, but don't underestimate the wealth of information and frequency of useful insights. This is a book that should be read by every scientist, preferably before they get too far along in their developing careers.

Alan I. Leshner, Ph. D.
Chief Executive Officer, American Association
for the Advancement of Science
Executive Publisher, *Science*

Preface

I love being a scientist. It's the most infuriatingly rewarding profession on the face of the earth and daily drives me mad. Science is full of people like me, concentrating really hard on usually abstract subject matters. They are busy and often pre-occupied. This makes maintaining relationships less than easy. Throw in the lack of a stable career path, lower than average financial rewards, often repetitive, boring work and more personal rivalry than you'd find in a large multi-national company and it can seem a daunting prospect for any newcomer. But the payback is great if you can hang in there. I don't care what anyone says, science is about the massive rush you get when you see something previously unseen by anyone; end of story. This book is intended to help the novice scientist wise up fast when they find themselves facing the seemingly impenetrable and incomprehensible world of science for the first time. It's also about cutting it as a professional scientist once you've jumped all the fences and 'been approved', however long that process is supposed to take in your particular institution and country. In between these two extremes lies a plethora of down-to-earth and sometimes humorous advice. I make no apologies for taking a sideways look at science – it often needs it.

This book emerged from a series of articles I wrote for the AAAS's *Science's* Next Wave web magazine whilst studying for my Ph. D. and working in my first post-doctoral position. The advice and suggestions in this book are based on my own experiences as a developing scientist and on the countless informal 'interviews' I have conducted during my own private

research into how science works. I would like to thank all the people, both humble and egotistical, who influenced my thinking during the long backbreaking years of study and research when I reinvented myself as a scientist. I now know who I am. Without their unwitting input I would not have such a clear idea of what on earth happened to me in these past few years. My sincere thanks to Kirstie Urquhart for that impromptu chat at the conference that led to the Next Wave column and for all she has done since. Thank you also to Elisabeth Pain, Anne Forde and Katrina Halliday.

To my wife and family I can only say, you know that I know what's really important. I love you all.

前言

我喜欢作为一名科学家的我。这是一个让我为之陶醉、为之痴迷的职业。科学领域中像我这样的人比比皆是，他们都专注于在常人看来很抽象的目标。他们很忙碌，甚至全神贯注。这使得通常的交往远非容易。一下子投入到科研领域，与在大型跨国企业工作相比，职业道路很不稳定，收入达不到这些企业的平均水平，工作常常是反复重复、单调乏味、竞争残酷，对于一个新加入者来说，看起来前途是如此暗淡。但是，如果你能坚持下来，回报将是巨大的。我不在乎别人怎么说，当你发现了前人没有发现的规律时，这种兴奋会使你义无反顾，这就是一切。本书旨在帮助科研道路上的初来者在第一次面对无法逾越、无法理解的科学世界时，尽快适应它！当你跳跃了所有栅栏，“小有成就”时，本书也可帮助你继续前行，尽管这段时间的长短因不同国家或研究单位而不同。大多时候你处于这两种极端情况中间，本书给出了大量现实的建议，其中不乏富含幽默的忠告。我在此以一位旁观者的角度看待科学，这没有什么过错——有时需要这样。

本书来源于我做博士论文及第一个博士后职位期间为 AAAS 的《科学》网络版写的专栏文章。本书给出的意见和建议都来自于我作为一名正在成长的科研工作者的亲身体会，以及在我私下研究科学的发展规律时进行的非正式的访谈。

在此，我想感谢所有的人们，无论是谦逊的，还是自负的，在我重返科研队伍期间，日复一日，承受着繁重的学习和研究任务时，他们影响了我。我现在真正明白了我是谁。没有他们无意的“打扰”，我就不会如此清晰地认识到，在过去的几年中，在我身上究竟发生了什么。真诚感谢 Kirstie Urquhart，没有她在会上临时的交谈，就没有随后的专栏。还要感谢 Elisabeth Pain, Anne Forde 和 Katrina Halliday。

对于我的妻子和家人，我只能说，你们知道我认为什么是真正重要的，我爱你们。

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PART I

The first couple of years

开始的年月



1

Choosing and handling your Ph. D. adviser

博导的选择与相处

本章介绍了如何选择课题,如何与导师相处。

首先,做博士或博士后要设计自己感兴趣的研究计划,只有对自己的研究计划充满希望,才会保持长久的精力。然后,介绍如何寻找合适的课题,建议广撒网,并且要解放思想,主动出击,最好直接进入所选学校,直观感受大量的课题。

随后就如何搞好与导师(老板)的关系,提出了六条非常有效的规则:

规则1 与老板交流。即使你的研究达不到国际水平,老板也会对你感兴趣,并利于提交论文,允许你进入他们的科研和联系网,改善你找工作的前景。

规则2 与老板保持联系。在实验之前同老板协商,保持有规律的联系,让老板了解你的进展。

规则3 了解你的老板。交流时仔细斟酌措辞用语,避免误解,从而建立真正有效的工作关系。

规则4 获得老板的尊重。展示出自己的独立思考能力,用好的假设和建议来接近老板。

规则5 坚持自己的权利。慢慢习惯对位高权重的人提出要求,把自己训练成一个独立的科研工作者,并使自己处于一个