

何毓琦 著  
何 姣 等译

# 科学人生纵横

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Letters From America

— Blog articles on sciences and life  
by Yu-Chi Ho

清华大学出版社

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北京

## 内 容 简 介

科学、教育、人生——美国工程院院士、哈佛大学终身教授何毓琦博士在他的科学网博客中展现了一个多姿多彩的科学家生涯，一个完整而丰满的人生。

何教授将他半个多世纪的科研教学和人生体验浓缩在数十篇博文中：美国大学教授的真实生活是怎样的？如何设计研究课题？如何指导学生？教学与研究的关系是怎样的？如何到国外做博士后？等等。不论是资深的教授，年轻的学者，抑或刚刚迈入科学大门的学子，都可以从这本书中受益。

作为世界知名的自动控制专家，何教授很擅长化繁复为简洁，化深奥为通俗。这本书收录了数篇介绍决策论、博弈论等方面的科普佳作，图文并茂，深入浅出，实属难得一见。

此外，何教授以一位杰出科学家的眼光审视这个纷乱不断的世界，写下了诸多见解独特、精辟深刻的时事评论。

何教授还拥有令人羡慕的完美婚姻和家庭。与夫人长达半个世纪相知相恋、相濡以沫，儿女成才，子孙满堂。本书中何教授也将与您分享婚姻成功的秘密、幸福的秘方。

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## 非前言

何毓琦院士的网坛(<http://www.sciencenet.cn/blog/何毓琦.htm>)近来热闹非凡,年内网民点击者数十万次。坛主布网帖 200 余篇,谈天说地,立意清新,文笔流畅,引人入胜;不恃尊位,不炫师道,促膝谈心,淳若兄长,文如其人,每篇都有粉丝数千。盖网络时代的奇观!

吾坛主在哈佛执教 40 年,桃李满天下。从青年时代就迷恋于科研,著作等身,对控制论科学的发展做出了多方面的贡献,爱闻达于学界。他鼓励有志从事科学研究的青年学者,勇于登高远眺,越界览胜,从自然世界中寻求新知识,从实践中发现新问题。他说,“科学研究的生命力在于新思想和新知识。解决新问题,不囿于旧方法,不苟且于常规”。彻悟新思路和开创新方法又有助于更深刻地认识和提炼新问题。创新是科学研究的灵魂,取得成功的座右铭。何毓琦院士所发表的科学论文总含有新思想和新方法,从而成为若干新命题的创始人。“创新”是他的切身经验,他开创的“离散事件动态系统”(DEDS),“扰动分析”(PA)和“序优化”(OO)等,均成范例。

然则,对从事工程技术的科学家和工程师又有不同的要求和规则,当属必然。“大科学”、大工程,系统复杂,工期长,投入资源多,经不起失误和反复,系统设计师们都要求理论正确、设计无误、方法可信,子系统可靠,保证建成后能安全运行,一次成功。避免那些实验尚不充分、经验还不丰富的新风险,防止反复折腾带来的损失,这是技术科学常伴有“保守性”的原源。何况,像坛主所指出的,保存和继承先知,传播经验和推广应用是任何一门科学得以生存和发展的必要条件。故创新和保守都是现实世界的客观需要,如保护自然和改造自然那样,因情而异罢了。

博雅妙语多为科学论文所讳,却常能触性导情,佐生活之愉悦。科学网和清华大学出版社集选院士网帖,中英对映,付梓出版,雅飨于青年,怡芹于大人,开网络文化之先河,真格创新也。

宋健

2009 年 3 月 5 日



## A non-Foreword

Prof. Yu-Chi Ho's blog has enjoyed a huge success with hundreds of thousands of view times up to now. Crisp and clear, the 200 plus articles of the blogger present invaluable insights and perspectives on a wide range of topics. High-ranking as the blogger, he does not distance himself from the general readership and never shows off his experience as a renowned professor. On the contrary, he kindly converses with the young on equal footing like an elder brother, just like what he does in real life. It is no wonder that every article has attracted thousands of view times. Isn't it a wonder of the digital age?

As a professor at Harvard for more than 40 years, the blogger has graduated many students, who have grown into the leaders of various fields. Prof. Ho was devoted to science since he was young and published a lot. He has made significant contribution to the control theory and made his name in the field. He inspires the young to follow his path, to be the best in their respective fields and to take on the real world problems. He once said, "The rigor of science lies in new ideas and new knowledge. When facing new problems, do not confine yourself to the old tools and old routes." Innovative ideas and tools will bring in fresh perspective and deeper understanding. Innovation is the soul of scientific research and the thumb rule of success. Prof. Ho's scientific papers are the best examples of innovation. That is how he became founder of several scientific branches, such as "Discrete Event Dynamic Systems", "Perturbation Analysis" and "Order Optimization", etc. He lives the concept of Innovation.

However, academic engineers and industrial engineers necessarily have different priorities and rules. "Big science" and "mega projects" are complex and resource-consuming. Any mistake could become disastrous. Therefore the designers of the complex systems must ensure the theory behind the systems is correct, the original design faultless, the methods applicable, and the sub-system well constructed. Only thus, the whole system can be put into immediate application when the project is completed. Risk can be reduced to

minimal and huge loss can be prevented, if we make sure the experimental support or applicable experience are not lacking. This is the origin of the conservatism of technology. Furthermore, just as the blogger has wisely pointed out, it is the prerequisite for the development of any field of science to inherit and preserve existing knowledge, to share experience, and to promote application. Therefore, innovation and conservatism are both needed by the real world, just as nature preservation and nature exploitation are equally necessary. It is just a matter of circumstances.

Scientific papers do not welcome witty wording. However, beautiful language touches on the reader's head and heart and makes our life more pleasant to live. ScienceNet. cn and Tsinghua University Press are certainly innovative by publishing the original English blog articles of Prof. Ho and their translations side by side. The collection will certainly serve the noble purposes to educate the young and to entertain the old.

SONG Jian

March 5<sup>th</sup>, 2009

(translated by HE Jiao)

## 序

众所周知,近代科学诞生并主要发展于西方。建国六十年来、特别是改革开放三十年来,中国取得了举世瞩目的发展成就。然而,一个挑战性的问题是未来如何持续发展?毫无疑问,科学、技术和教育将在其中起关键作用。

对于立志在科学研究中早日做出重要贡献者来讲,不可能不关心下列问题:选择什么样的问题来研究?基本的学术规范有哪些?如何交流自己的成果?对于有意使学术机构的管理和人才培养产生更好效果者来讲,也自然会关心如下问题:如何科学地评价科研成果和人才?吸引什么样的优秀人才?如何更好地指导研究生?此外,对于重视国际交流者还可能会关心华人在美国的生活情况、特别是中美之间文化与习俗的差异等。所有这些,在何毓琦先生的这本博客书中都可找到相关论述。

榜样的力量是无穷的。何先生学术成就卓著,桃李满天下。他本人就是自己许多思想的实践者,这些思想也是他近半个世纪在美国工作经验和智慧的结晶。他注重从工程实际中提炼新的科学问题,开创了离散事件动态系统的扰动分析等研究方向;他在比较年轻时就获得了国际学术声誉,35岁担任哈佛大学冠名教授,38岁当选 IEEE Fellow,53岁当选美国国家工程院院士;他精彩的学术报告更是众口称道,他曾经创记录地先后三次被邀请在三年一次的国际自动控制联合会世界大会上作大会报告。此外,正如何先生所言,他的经历使得他对中国的认识会有别于西方专家,同时又可有一种不同于国人对美国的看法。读何先生的文章是一种享受,可以处处感受到他希望祖国发展得更好的热切愿望,以及期望中国青年学子健康成长的谆谆教诲。

何先生的博客已经受到众多网友的热烈欢迎,我相信本书的出版定能使更多人从中受益。

郭雷

中国科学院数学与系统科学研究院



## An Introduction

It is well known that modern science originated and mainly developed in the west. Since the establishment of P. R. China sixty years ago, and especially since the opening and reformation policy thirty years ago, China has made enormous progresses that are recognized internationally. However, China faces the grand challenge of how to achieve sustainable development. It is of no doubt that science, technology and education will play a critical role.

Anyone determined to make remarkable contributions to science cannot ignore the following questions: What research problems one should choose? What are the basic academic ethics? How to promote one's result? Anyone devoted to improve the quality of science administration and student training must be eager to ask the following questions: How to evaluate academic performances and progresses? What talents to attract? How to better educate graduate students? Besides, people keen on international cooperation are interested to learn about the lives of Chinese Americans, especially the cultural gap between China and the United States. All these can be found in Prof. Yu-Chi Ho's blog collection.

Models are very influential. Prof. Ho is both a great researcher as well as a great mentor. He practices what he preaches. What he put down in his blog is the essence of his experience in the profession and his wisdom in life in the past half a century. He is good at abstracting scientific problem from industrial need, and founded the perturbation analysis of Discrete Event Dynamic Systems. His contribution was well recognized when he was still relatively young. He became endowment professor of Harvard University at the age of 35, IEEE Fellow at the age of 38, and academician of American Academy of Engineering at the age of 53. His presentation has gained a brand-name in the science community. He held the record of having been invited to give three plenary congress addresses over the years on the World Congress of the International Federation of Automatic Control (IFAC). Besides, just as he said in his blog, due to his unique background, his view of China is different from

that of the westerners, and his view of the US is different from that of the average Chinese. It is a great pleasure to read Prof. Ho's blog. You feel all the time his enthusiasm to see a better, stronger and more prosperous China, as well as his sincerity in helping the young scholars on their way up.

Prof. Ho's blog is very well received by ScienceNet's readers. I believe the publication of this book will benefit still more people.

GUO Lei

(translated by HE Jiao)

## Preface

In the Spring of 2007, at the invitation of Editor-in-Chief of ScienceNet China, Zhao Yan, I started blogging on ScienceNet. cn. To my surprise, the reception of my English language blog articles was very enthusiastic. Over a period of 24 months (to April 2009) I wrote a total of 245 articles and had a visit count of over 880,000. Average readership per article was 1500. Young scientists and university students to whom articles my blog was mostly aimed find the articles particularly beneficial. As a result people suggested that a collection of my articles be assembled and published as a book so that more persons can have access to them more conveniently. Tsinghua University Press agreed to undertake the publication. And ScienceNet agreed to translate all articles into Chinese and print the translation side-by-side with the original English text. This way, readers can also use this as aids to English learning. This book is a result of such considerations.

There are two main purposes of my writing the blog articles: 1. To record my 47 years of experience in education and research for the benefit of young scholars, 2. To write about life in these United States from my over half century of living here. I mentioned these as well as my background in my first blog article and subsequently. See

“Introduction and my first blog”

[http://www.sciencenet.cn/m/user\\_content.aspx?id=1663](http://www.sciencenet.cn/m/user_content.aspx?id=1663)

《中文的自我介绍及一个月来做博客的感触》

[http://www.sciencenet.cn/m/user\\_content.aspx?id=2562](http://www.sciencenet.cn/m/user_content.aspx?id=2562)

《开博一年了》

[http://www.sciencenet.cn/m/user\\_content.aspx?id=22498](http://www.sciencenet.cn/m/user_content.aspx?id=22498)

“Chinese Americans in the US (III)—the 1.5th Generation”

[http://www.sciencenet.cn/m/user\\_content.aspx?id=16643](http://www.sciencenet.cn/m/user_content.aspx?id=16643)

《开博到一段落》

[http://www.sciencenet.cn/m/user\\_content.aspx?id=215225](http://www.sciencenet.cn/m/user_content.aspx?id=215225)

Blog articles are to be distinguished from formal writings in a textbook or research monograph. They are more like a personal diary, not formal, and more streams-of-consciousness thoughts. 99% of my articles are written in English which has now become my first language. The articles are mainly divided into three groups: 1. Education and research, 2. Life in the US, and 3. Comments on current affairs. Some of the articles in the third category are not relevant due to the passage of time. A very small percentage of the articles are transcribed from other sources such as the *New York Times* and by other authors. They were posted originally on my blog with attribution since I thought they were timely, well written, and have some points to make. For timeliness and copyright reasons, these were omitted from this collection. Similarly, only selected comments and responses of my blog articles were included. But the readers can always find everything on [sciencenet.cn/blog](http://www.sciencenet.cn/blog). There is no attempt to hide anything.

I'd like to take this opportunity to thank my wife and family for giving up their share of my time and their support so that I can write these blog article; my good friends, Drs Song Jian and Guo Lei for writing introductions to this book; Tsinghua University and my colleague there, Professor Guan Xiao Hong for making the publication of this book possible; and the support of all ScienceNet readers over the past two years. The Chinese translation of the articles were done by the able editorial staff of ScienceNet under the leadership of Ms He Jiao. She can in fact be considered as a co-author of this volume.

Yu-Chi Ho

April 25, 2009

Lexington, MA, USA

## 自序

2007 年春,应科学网总编辑赵彦的邀请,我开通了我的科学网博客。令我惊讶的是,我的英语博文竟然受到了读者们的热烈欢迎。在过去 24 个月里(截至 2009 年 4 月),我一共写了 245 篇博文,总访问量 88 万,平均每篇博文的访问量是 1500 次。我的博文主要面向年轻的科学家和大学生,他们是最大的受益者。因此有人建议说应该把我的博文整理出版,这样可以方便更多的人读到。清华大学出版社同意出版该书。科学网同意将所有博文译成中文,与英文原文并列出版。这样也可以帮助读者们学习英语。本书的创意就是这样来的。

我写博客主要出于两个目的:一、记录下我过去 47 年在教育和研究领域的经验,希望对年轻的学者们有所帮助。二、记录下过去半个多世纪在美国的生活。我在我的开博第一篇博文以及一些后续博文中提到了这两个目的以及我的背景。请参考:

### 《自我介绍及我的第一篇博文》

[http://www.sciencenet.cn/m/user\\_content.aspx?id=1663](http://www.sciencenet.cn/m/user_content.aspx?id=1663)

### 《中文的自我介绍及一个月来做博客的感触》

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### 《开博一年了》

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### 《美籍华人在美国(三)——第 1.5 代美国人》

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博客与课本或者学术专著之类的正式出版物有很大的差别。博客更像是私人日记,是非正式的、意识流的。我的博文 99% 都是用英语写成的,因为英语已经成

了我的第一语言。我的博文主要有三类：1. 教育与研究类，2. 美国的生活，3. 时事评述。随着时间的推移，第三类中的某些博文已经不再重要了。很少一部分的博文转载自《纽约时报》等。我最早转载它们的时候都注明了来源，因为我觉得这些文章很有时效性，写得很好，而且观点鲜明。因为现在这些博文已经没有什么时效性了，而且还涉及版权问题，这次就没有收录。同样的，我们只收录了部分精选评论以及我的回复。不过读者可以在科学网博客上找到所有内容。我们并不想隐藏任何东西。

我希望借此机会感谢我的太太和家人，正是他们的慷慨“出让”，我才得以有时间撰写这些博文；感谢我的好友宋健博士、郭雷博士为本书作序；感谢清华大学和我那里的同事管晓宏教授，正是在他们的努力下，本书得以出版；感谢所有在过去两年中支持我的科学网读者。科学网的编辑们在何姣女士的领导下完成了本书的中文翻译工作。她实际上可以算是本书的共同作者之一。

何毓琦

2009年4月25日

美国，马萨诸塞，列克星敦

（何姣译）



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