Preface

> *On March 21, 1949, I attended a lecture given by Linus Pauling.... That talk was the best talk by anyone on any subject that I had ever heard…. The talk was more than a talk to me. It filled me with a desire of my own to become a speaker.*[1]
>
> –Isaac Asimov

At the first stop of a tour in Japan, Albert Einstein gave a scientific presentation that, with the accompanying translation, lasted four hours. Although his audience appeared to be attentive the entire time, Einstein worried about their comfort and decided to pare back the presentation for the next stop on his tour. At the end of the second presentation, which lasted two and a half hours, the crowd did an unusual thing in Japanese culture, particularly in that era. They complained. For Einstein, though, the complaint was a compliment—this crowd had wanted him to deliver the longer version.[2]

When was the last time that you sat through two and a half hours of a scientific presentation and wished that it would go longer? Unfortunately, such responses to scientific presentations are rare. Granted, Einstein was a brilliant scientist, but just because one is a brilliant scientist or engineer does not mean that one is an engaging presenter. Consider Niels Bohr, the great physicist who won a Nobel Prize for his proposed structure of the hydrogen atom. Despite being an inspiration for many physicists,[3] Bohr had difficulty communicating to less technical audiences. For example, his open series of lectures in the Boston area drew progressively fewer and fewer attendees because "the microphone was erratic, Bohr's aspirated and

sibilant diction mostly incomprehensible and his thoughts too intricately evolved even for those who could hear."[4]

So what is needed to make an excellent scientific presentation? This book addresses that question, but does so with the recognition that the styles of excellent scientific presentations vary. For instance, the delivery of Albert Einstein was humble and soft-spoken, while Linus Pauling's delivery was charismatic. Just because different presentation styles achieve success does not mean that any style is acceptable. For every truly excellent presentation in engineering or science, ten weak presentations take place that leave audiences bored, confused, or exasperated.

One common failing of scientific presentations is that the presenter states too many unnecessary details about the work. What often results then is that the audiences walk away from the talk without appreciating the main takeaways. Another common failing is that many presenters show a host of slides that follow the defaults of Microsoft's PowerPoint program, but that do not help the audience understand or remember the content. For instance, most of these slides lack focus because they begin with topic-phrase headlines such as "Background" that neither communicate much to the audience *during* the talk nor compel the speaker to grapple with the main assertion of that scene *before* the talk. Equally weak, those headlines are supported by subtopics presented in bulleted lists, which are inherently weak at showing connections. Worse yet, with these bulleted lists, many speakers adopt a mind-numbing delivery style in which they continually turn to refer to each listed item.

So how should scientists, engineers, and technical professionals present their work? Given the diversity of audiences, occasions, and topics, establishing a set of rules for how to give a strong scientific presentation is difficult. For that reason, most rules that do exist, such as *tell them what you're going to tell them, tell them, and then tell them what you told them,* have exceptions. This often quoted strategy, for instance, does not fare well with audience members who are strongly biased against the results.

Moreover, other guidelines for presentation slides, such as the often cited 6-by-6 rule, have *no* basis in research and, as this text will show, contradict what we know about how people learn.

Rather than state simplistic rules, this book grounds its advice in the traits of excellent scientific presenters. Included are those widely recognized as excellent presenters: Richard Feynman, Jane Goodall, Brian Cox, and Jill Bolte Taylor. In addition, the book presents the experiences of other scientific presenters, such as Heinrich Hertz, J. Robert Oppenheimer, and Chien-Shiung Wu, whose initial presentations were weak, but who became strong presenters later in their careers.

In addition to examining the styles of successful presenters, this book considers what causes so many scientific presentations to flounder. To this end, this book considers 13 critical errors that undermine scientific presentations at conferences, lectures, and technical meetings. Some errors such as a speaker losing composure (Critical Error 13) are weaknesses that everyone recognizes as errors. Other errors, such as trying to cover too much (Critical Error 3), are more subtle.

A third major contribution of this book is that it proposes a strong alternative to the commonly used, but inherently weak, topic-subtopic structure of PowerPoint. Instead of calling for slides to be built with phrase headlines supported by bulleted subtopics, this book recommends that slides conveying technical information be built with succinct sentence assertions supported by visual evidence. As this book shows, the assertion-evidence approach leads to more informative, memorable, and persuasive presentations. This book not only shows you results from recent tests that reveal the efficacy of the assertion-evidence structure, but also provides you with an array of examples to help you present your work with this slide structure.

By showing you the differences between strong and weak presentations, by identifying for you the errors that presenters typically make, and by teaching you a much more powerful slide structure for scientific presentations than what is commonly practiced, this book places you in a position to elevate

your presentations to a high level. In essence, this book aims to have you not just succeed in your scientific presentations, but excel.

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Notes

[1]I. Asimov, Foreword, in *Linus Pauling: A Man and His Science*, Anthony Serafini (toExcel, San Jose, 2000), p. xiv

[2]M. White, J. Gribbin, *Einstein: A Life in Science* (Penguin, New York, 1995), pp. 164–165

[3]R. Sime, *Lise Meitner: A Life in Physics* (University of California Press, Berkeley, 1996), pp. 96–97

[4]D.H. Frisch, private communication to Abraham Pais, Reminiscences from the Postwar Years, in *Niels Bohr: A Centenary Volume,* ed. by A.P. French, P.J. Kennedy (Harvard University Press, Cambridge, 1985), p. 247

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