



## The science behind thoracic surgery: a brief preface

*If you can't explain it simply, you don't understand it well enough.* —Albert Einstein

Science could play a significant role in thoracic surgery because thoracic surgery is a field where the researchers, from data and techniques derived from more disciplines, are combined to solve problems where solutions are beyond the scope. It is the rapid development of physics and chemistry, underpinned by mathematics, which has made medical advances possible: the development of the microscope; the discovery and use of radiation for diagnosis and therapy; the explosion of clinical laboratory investigations for diagnosis and prognosis. Therefore, it behoves every thoracic surgeon to have a basic understanding of the underlying science to obtain a three-dimensional point of view of surgery, as not just a technical art but also as a precision science. Since it is from science, or how things work, that technology, or how to get things to work, emerges. The modern-day thoracic surgeon should understand the fundamental basis of the functioning of technological instruments used. Because, as stated by Grady Booch *a fool with a tool is still a fool*, the technological instruments are as safe or hazardous as the surgeons who are using them.

Everything occurs in circular sequences: revolution, change, adaptation to change, acceptance of the new standard, organising the new establishment, resistance to further change, revolution, and the cycle begins again. In surgery, this cycle had been occurring about every 100 years, but recently there has been a perceptible acceleration of this cycle. New scientific advancements could privilege thoracic surgeons in expanding an existing skill set or could achieve thoracic surgeons to perform new procedures outside the traditional boundaries of thoracic surgery.

Nonetheless, science is accelerating quicker than ever, and we are on the edge of another revolution. This is a time, in the history of thoracic surgery, when the truthfully revolutionary transformation is occurring at a rate never seen before. While it is a historical fact that each generation of physicians significantly exceeds the accomplishments of the previous generation, the magnitude of actual changes is extraordinary. The surgeon of the future will need to absorb a broader range of the modern sciences, quicker than ever before. Although the exact sciences (like mathematics, physics, engineering) are perceived by most people as far away from the more experimental surgery, indeed the modern surgery has its foundations in them.

This special issue of the *Shanghai Chest* would like to make the bold effort of inquiring the scientific laws, mathematical principles and new technologies behind thoracic surgery by involving engineers, mathematicians, physicists, biostatisticians and medical doctors and creating a sharp dialogue between all these disciplines. All that in the conviction that mutual exchanges can improve knowledge in thoracic surgery field and promote the progress.

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