

“From Engineering to Clinical Practice”

Professor Gianni Angelini British Heart Foundation Professor of Cardiac Surgery at Bristol University.

Professor Angelini initially studied mechanical engineering before changing to medicine and then surgery. He became the British Heart Foundation Professor of Cardiac Surgery in 1992 and the head of the Foundation's Bristol Heart Centre in 1995 which now has a team of more than 200. The centre performs about 1700 bypass operations a year and operated on Sir Ranolph Fiennes only a few weeks before he completed seven marathons in seven continents. For the past 15 years it has pioneered improvements in techniques by using engineering solutions to surgical problems.

Until the late 1990s, most forms of heart surgery required the patient's chest to be opened and an artificial pump taking over the work of their heart during the operation. Although the success rate for such operations was excellent, surgeons sought alternative less invasive approaches to repair damaged hearts.

Professor Angelini, applied an engineering approach and pioneered a technique to keep the heart beating during heart bypass surgery, avoiding the need for the artificial pump. This 'beating-heart surgery' is now known world-wide as "The Bristol Technique". It has been shown to lead to reduced blood loss, fewer post-surgery complications (more recently proven using retinal fluorescein angiography), quicker recovery times and result in up to 25% cost savings. More than 80% of all bypass operations at the Centre now adopt this technique.

Some of the more recent developments include heart restructuring, where dead sections of enlarged hearts are removed, mitral valve replacement through a small incision in the chest and a study of the possible use of stem cells to regenerate dead heart tissue. Many of the improvements have only been possible as a result of the development of instruments/devices using engineering thinking.

Professor Angelini demonstrated these techniques with real time video clips of actual operations that clearly showed the simple yet practical advantages of using engineering solutions.

Given on Wednesday 11 May at the Royal Agricultural College