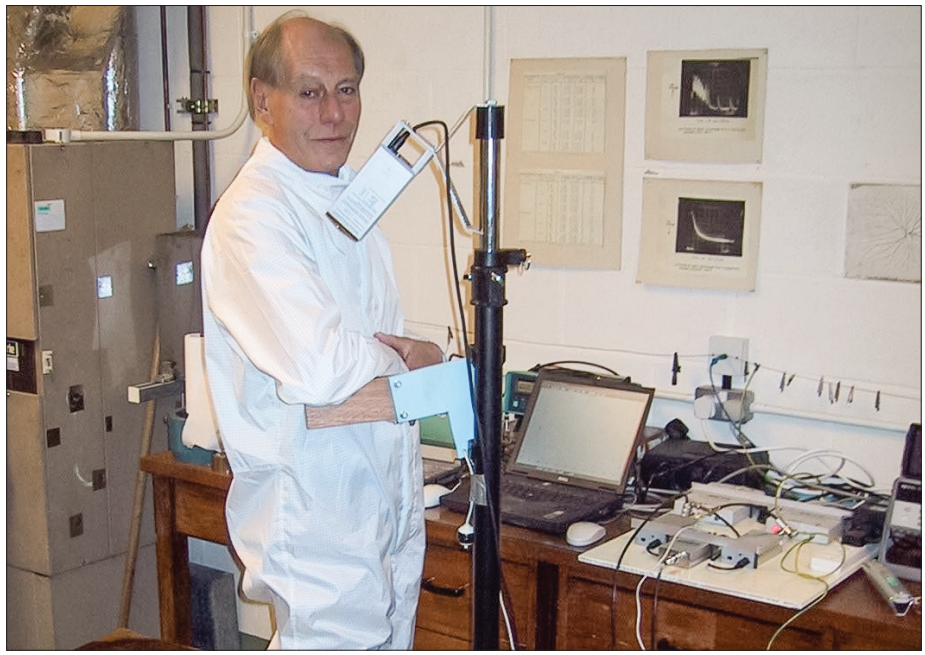
Careers

A 'static' business

John Chubb built his own small business developing electrostatic measuring instruments. Now retired, he relates his company's story and the lessons he learned from running it



Self-made John Chubb at work, using electrostatic measuring instruments developed by his own business.

Back in the early 1980s, when I was in charge of a small company at the University College of North Wales (now Bangor University), I encountered a dilemma. The university wanted the company to exploit "bright ideas" from research, but I found few ideas that I judged exploitable. I also recognized that entering a new market that you do not know (and that does not know you) is slow and expensive, and may not be successful. I was therefore faced with a decision: do I continue to try to run the company, or leave and start my own? I chose to leave, and John Chubb Instrumentation (JCI) was born.

The focus of my new company was electrostatics, an area that had fascinated me ever since the 1950s, when I did my PhD on the behaviour of particles during electrostatic precipitation. After completing my PhD in 1958, I did a graduate apprenticeship at English Electric in Stafford and then ran a small group developing high-power vacuum circuit interrupters. In 1962 I joined what is now the Culham Centre for Fusion Energy to work on condensation pumping of hydrogen on surfaces cooled by liquid helium. When Culham needed to diversify I ran a small group whose activities included development of a monitor for airborne fibres, large area computer typesetting and investigating electrostatic ignition hazards on large crude oil tankers.

Start-up phase

Thanks to this background in electrostatics and my experience at Bangor, I felt confident I could develop a more user-friendly and better-performing handheld electrostatic measuring instrument than any then available, and that this could form the basis for a range of instrumentation. Having some money in the bank, full ownership of our house and no dependent family, apart from my wife, I felt I could survive the initial start-up costs with perhaps just overdraft support from the bank. I did not wish to seek investor funding as I wanted to run the business my way, not with the constraints and the need to maximize profits for others.

When I started JCI, I expected to balance sales of instruments with some consultancy work in electrostatics. In particular, a good-sized consultancy project from the European Space Agency seemed in the offing. However, a colleague from my Culham days advised me not to employ anyone until I got the contract – wise advice, as the contract did not materialize! As the business developed over the years, though, I was able to employ a number of people, including a mechanical design engineer, three experienced electronics engineers and a practically minded physicist with great software skills, as well as someone to provide secretarial and bookkeeping assistance. All of these people were part-time consultants and most were near or over retirement age – an arrangement that gave me access to a wide range of capabilities.

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The business was not aimed, or expected, to become large or have a multi-million-pound turnover. Instead, our aim was to do things that we felt were interesting and likely to be of benefit to users, and to earn sufficient profit to be fully self-financing. In the event, it took a few years before we became profitable. A particularly low point came after we had successfully pursued funding through the SMART awards scheme set up by what was then the Technology Strategy Board (now Innovate UK). This funding allowed us to develop a new way to measure the capability of materials for shielding against transient electric fields, but although our approach worked, it turned out the market was not interested in it. Fortunately, I had an understanding bank manager who allowed me to move the company's debt from an overdraft to a mortgage on our house. From that point, our finances started to improve and eventually all debts were paid off and we were fully self-financing.

In business

Having developed an easy-to-use, high-performance handheld electrostatic field-meter, we enhanced this over the years and developed a number of applications for it. One of these was an electrostatic voltmeter (for zero-current measurement of voltage) and another was a so-called "Faraday Pail"

for the measurement of charge on objects. We also used our experience in measuring electric fields to develop a charge-decay test unit for assessing the suitability of materials and surfaces, with an eye towards both practical applications and the avoidance of electrostatic problems.

We never took out any patents for the technical approaches we developed. Instead, we described our work in scientific papers, which provided us with protection against counter-patents and was also a good public demonstration of our technical capabilities. This tactic seemed appropriate for the limited size of our market, and indeed, no-one has ever copied any of JCI's technical approaches.

Much of the marketing we did for the company was "technical push" rather than "market pull". In other words, we advised prospective customers what sorts of instruments would be appropriate for their interests, rather than accepting what they thought they wanted.

At Culham and Bangor, I had presented papers at conferences and summer schools, and I pursued this throughout my time with JCI as good promotion and as an opportunity to keep in touch with developments and market interests. This included travelling to various international conferences and writing papers on studies pursued during instrument development.

In 2008 it became clear that continued manufacture of one of our test units would require a new microprocessor, as the one we had been using would shortly become unavailable. We explored the possibility of redesigning an enhanced instrument around a replacement chip, but we could see it would take several years of continued business to pay for such an investment. As most of us were then well over retirement age it seemed the right time to sell the business. Luckily, a buyer was found and manufacture of JCI instruments continues.

Lessons learned

Looking back over my experience in running JCI, I think I learned several lessons. One is that it is good to have both a technical background (including practical experience in making things) and experience in managing business operations. It also helps to have an understanding bank, one that is willing to support early losses. In a specialist area, it is wise to concentrate on a limited and coherent range of own-designed products, avoiding the urge to produce "me too" products similar to those manufactured by others. Also, for a specialist firm, it is good to have a product that appeals to markets spanning a wide range of different industries, to cover ups and downs in any one area.

I learned the hard way that before proceeding too far with development of a new product, it is necessary to check prospective market interest. It is also necessary to support manufacturing and marketing with continuous product development, and to recognize the value of the people involved and to pay them consistently even in times when you cannot pay yourself. One of the last lessons I learned is that selling a specialist business can be very difficult – do not expect to make lots of money!

But perhaps the most important lesson I learned is that in manufacturing, the key is not just to appreciate the nature of a problem, but to decide what you are going to do about it. This very usefully feeds across into consultancy work – customers are not interested in the physics of a problem, but in what can they do, with confidence, to overcome it.

John Chubb retired in 2009 as the founder of John Chubb Instrumentation in Cheltenham, UK, e-mail jchubb@infostatic.co.uk

Careers and people

Spotlight on: Matt Mountain

The next president of the Association of Universities for Research in Astronomy (AURA), Matt Mountain, is an astronomy insider whose appointment comes on the heels of a nine-year stint in charge of one of the association's flagship observatories, the Space Telescope Science Institute (STScI).

As the new head of AURA – a consortium of 40 US universities and six international affiliate members that manages telescopes and observatories around the world – Mountain takes over the leadership of the organization during a crucial period in its 57-year history. At the top of his agenda will be the long-awaited James Webb Space Telescope (JWST), which is currently scheduled for launch in 2018 and for which Mountain has served as telescope scientist since 2002. As with its predecessor, the Hubble Space Telescope, science operations for the JWST will be based at the STScI, which AURA manages on behalf of NASA.

Mountain began his scientific career at Imperial College London, where he earned an undergraduate degree in physics in 1978 and a PhD in 1983. During a subsequent seven-year period at the Royal Observatory in Edinburgh, he worked on instrumentation for infrared astronomy, including the construction of a new spectrometer for the United Kingdom Infrared Telescope, located on Hawaii's Mauna Kea. In 1992 he became a scientist on the Gemini Telescope Project, which was responsible for building twin 8 m optical/infrared telescopes at locations in Hawaii and Chile. He then served as Gemini's director between 1999 and 2005, during which period both Gemini telescopes saw first light and began scientific operations.

Movers and shakers

Materials scientist **Long-Qing Chen** of Pennsylvania State University, US, has won the Materials Research Society's 2014 Materials Theory Award.

Mildred Dresselhaus has been awarded the Presidential Medal of Freedom, the US's highest civilian honour, for her research on electronics and nanomaterials.

Six US-based theoretical physicists have been honoured by the Simons Foundation. The new Simons Investigators in Physics, who will each receive an annual grant of $100 000 for five years, are: **Patrick Hayden** of Stanford University, **Marc Kamionkowski** of Johns Hopkins University, **Leo Radzihovsky** of the University of Colorado, Boulder, **Rachel Somerville** of Rutgers University, **Anatoly Spitkovsky** of Princeton University and **Iain Stewart** of the Massachusetts Institute of Technology.

Climate scientist **Michael Mann** has won a 2014 Pongo Environmental Award for his research on global temperature data and for being "one of the most important, resilient, outspoken and courageous climate warriors of our time".

Charles Marcus, who leads the Center for Quantum Devices at the Niels Bohr Institute in Copenhagen, Denmark, has won the Award for Research Excellence in Nanotechnology from the University of Pennsylvania's Nano/Bio Interface Center.

Adam Riess, **Saul Perlmutter**, **Brian Schmidt** and 47 other astronomers involved in the discovery of dark energy have been awarded the Fundamental Physics Prize. The $3m prize, established by the billionaire philanthropist Yuri Milner, will be split into two $1.5m chunks, with half going to Perlmutter's team and half to the team led by Riess and Schmidt.