



# Looking back at the John Mitchell Crouch Fellowship: the most prestigious research award of the Royal Australasian College of Surgeons

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## Abstract

The John Mitchell Crouch Fellowship is a generous endowment made to the Royal Australasian College of Surgeons (RACS) by the young neurosurgeon's family, following his death from a brain tumour. In this article, we examine the significance and legacy of the grant since its inception in 1979. This is the highest level of research fellowship awarded by the RACS recognizing early career excellence, as part of its significant research funding programme (over \$1.7 million in 2015). John Mitchell Crouch recipients have been pioneers in various areas of medicine where they have developed new technologies, established research centres, improved patient safety and military surgery and embraced evidence-based medicine. The funds they received have directly contributed to research published in numerous highly respected peer-reviewed journals such as *The New England Journal of Medicine*; established new laboratories, helped fund clinical trials and allowed new directions of research to be pursued. Recipients of the John Mitchell Crouch Fellowship have been recognized with many awards including 11 Australian and New Zealand Honours to date. Many other significant research funds have been subsequently bestowed, including over 120 National Health Medical Research Council (NHMRC) grants to Australian and New Zealand recipients subsequent to their Fellowship. This article also shows the range of disciplines in which the award has supported cutting-edge research leading to benefits for patients and health care.

## Introduction

Australian and New Zealand Surgeons cannot fail to be familiar with the name John Mitchell Crouch. Despite his early demise at the age of 36, his name has survived through the generous and prestigious endowment by his family to the Royal Australasian College of Surgeons (RACS) for the John Mitchell Crouch Fellowship. The aim of the Fellowship is to commemorate his life and work by supporting the research of outstanding surgeons. It was first awarded to Professor Robert Burton in 1979 for work on transplantation and tumour immunology and has continued to provide support for cutting-edge areas of surgical research for the past 36 years (a complete list of John Mitchell Crouch scholars can be found at [http://www.surgeons.org/media/20688135/john\\_mitchell\\_crouch\\_recipients.pdf](http://www.surgeons.org/media/20688135/john_mitchell_crouch_recipients.pdf)).

Recipients of the John Mitchell Crouch Fellowship are selected each year based on the highest quality proposal outlining how the funds would be used. Applicants must also be able to demonstrate that they have an outstanding body of work that has already made an

impact on the progress of surgery or has contributed significantly to fundamental scientific research. The Fellowship provides support to surgeons who are in the first 15 years of their College Fellowship (or overseas equivalent) and is used to progress and broaden their current active field of research.

The John Mitchell Crouch Fellowship is the highest level scholarship provided through RACS, being \$150 000 in 2015. A report is required at the end of the 1-year term and a short formal presentation is given at the Annual Scientific Congress of the RACS, describing the contribution that the award has made to their research.

## Overview of location and specialty of research performed during the John Mitchell Crouch Fellowship

A book of the John Mitchell Crouch Fellowship is produced periodically which provides information about the awardees, what research the Fellowship has funded and the significance of this

**Table 1** John Mitchell Crouch recipients (by region)

Region	Recipients
Victoria	16 (44.4%)
New South Wales	7 (19.4%)
South Australia	5 (13.9%)
Western Australia	3 (8.3%)
New Zealand	3 (8.3%)
Queensland	2 (5.6%)

**Table 2** John Mitchell Crouch recipients (by institution)

Academic Institution	<i>n</i>
University of Melbourne	13
University of Adelaide	3
University of Newcastle	3
Monash University	3
University of Western Australia	3
Auckland University	2
Flinders University	2
University of Sydney	2
University of Otago	1
James Cook University	1
University of Queensland	1
Macquarie University	1
University of New South Wales	1

**Table 3** Key research areas explored

Area of research	<i>n</i>
Anaesthesia	2
Cardiothoracic surgery	1
Neurosurgery	2
Ophthalmology	1
Orthopaedic surgery	3
Otolaryngology	2
Paediatric surgery	4
Plastic and reconstructive surgery	3
Urology	1
Vascular surgery	1
General surgery (various)	16

research.<sup>1</sup> Between 1979 and 2014, the Fellowship was awarded for research across a broad range of disciplines, at 13 Australian and New Zealand institutions. It should be noted that in the early years of the Fellowship, the Faculty of Anaesthetics came under the auspices of RACS and hence it was awarded twice for research in anaesthesia. Since their separation from RACS in the mid 1990s, anaesthetists are no longer eligible for funding. Tables 1 and 2 show the country location and institution, respectively, where the awardees held their academic positions at the time of their award. Table 3 shows the breakdown of research areas covered by this award, with some award recipients conducting research across a range of disciplinary areas. There is significant crossover between fields, particularly where cancer is concerned. Cancer is a global health issue with approximately 14 million new cases diagnosed annually.<sup>2</sup> The importance of this area of research is reflected in the fact that more than one-third of the Fellowship recipients have investigated some aspect of cancer as it pertained to their area of research.

## Legacy

To fully appreciate the breadth of the contribution to surgical research, it is worth considering the legacy of the Fellowship awardees, and it is evident that their cumulative contribution to surgical research has been vast.

Most are still active in research, if not in surgery, although sadly a couple have subsequently died: Mr Bernard O'Brien (1986 recipient, died 1993) and Professor Graham Hill (1984 recipient, died 2013), whose contributions are detailed later in this article. On only one occasion have two family members received this award; Professor Graham Hill (1984 recipient), the father of the 2014 recipient Professor Andrew Hill, who furthered his research into developing a mechanism to provide prolonged autonomic blockade following major abdominal surgery with the Fellowship funds.

## New technologies

Of particular significance to the history of surgical research in the development of new technologies is Professor Graeme Clark (1985 recipient), who pioneered the multiple-channel cochlear implant or 'bionic ear'. The cochlear implant technology was quickly adopted with the establishment of Cochlear Limited (Macquarie Park, NSW, Australia). This company has made the multichannel cochlear implant commercially available. Clark also established the Bionic Ear Institute in 1985, an independent, non-profit, medical research organization where he was the director until 2005. In recognition of his immense contribution, Professor Clark has received prestigious scientific prizes from diverse scientific disciplines.<sup>3</sup>

Another significant new technology was developed by the sometimes controversial, but undoubtedly innovative Professor Bruce Gray (1981 recipient). The funding supported research into adjuvant portal vein chemotherapy in colon cancer and adjuvant radiotherapy in rectal cancer, as well as radiotherapy using radioactive microspheres in the treatment of liver malignancy. These small particles were injected into the liver to directly target cancer cells, a treatment called selective internal radiation therapy. The treatment was effective and thus became the basis of SIR-Sphere microspheres sold through Sirtex Medical Limited (North Sydney, NSW, Australia). In 2013, Sirtex recorded high growth, with global revenue of AUD \$100 million, although by this time, Gray had sold down his shares in the company.

New technology always makes the news. This was seen recently with Professor Peter Choong (2008 recipient), who used the funds to develop his interest in primary malignant bone tumours, and went on to collaborate with CSIRO and Melbourne technologists, Anatomics Pty Ltd (Victoria, Australia), to replace a man's ankle bone with a three-dimensional printed titanium replica, after the original had to be removed due to cancer.<sup>4</sup>

## Research centres

A number of recipients established research centres or research units. Mr Bernard O'Brien (1986 recipient, died 1993) was a pioneer in the field of microsurgery. The grant funded a variety of research projects including revascularized composite tissue grafts and ischaemia and reperfusion injury that led to multiple publications and helped to obtain National Health Medical Research Council

(NHMRC) grants. Before receiving the fellowship, he established the Microsurgery Research Centre in Melbourne in 1970. Renamed the O'Brien Institute after his death, it is currently under the direction of another John Mitchell Crouch Fellow, Professor Wayne Morrison (1992 recipient) who also used the funding to conduct research on skin flaps that contributed to obtaining two NHMRC grants. Another research organization established by a John Mitchell Crouch Fellow, Professor Ian Constable (1988 recipient) was the Lions Eye Institute in Western Australia. Professor Constable furthered ophthalmological research using the funding to establish a biomaterials laboratory to produce novel biopolymers for surgical implantation and to further develop artificial corneas.

As a world leader in pain management, Professor Michael Cousins (1982 recipient) set up the internationally recognized multidisciplinary pain centres at Flinders Medical Centre and the Royal North Shore Hospital. The Fellowship funding further contributed to research in pain management as Professor Cousins identified the toxicity of inhalation anaesthetic agents using animal models and examined the treatment of cancer pain in a clinical randomized prospective controlled study.

Of significance to plastic and reconstructive surgery is the contribution made by Professor Ian Taylor (1990 recipient) who funded research on a study that resulted in advances in the understanding of skin, muscle and nerve flap design and went on to establish the Reconstructive Plastic Surgery Research Unit at the University of Melbourne in 1993. He had, however, already made his mark on surgical history long before this. In 1973, he and Dr Rollin Daniel performed the world's first successful free flap transfer from the groin. By better identification of vascular anatomy, he found a place in the history of vascularized composite tissue transfers. On the website of the Research Unit, it is written that 'he is to vascular surgery what global positioning is to navigation', which gives those of us not intimately involved in this field a sense of his significant contribution.<sup>5</sup>

## Safety

Also known for his work in patient safety and the dissemination of information is the anaesthetist Professor Bill Runciman (1987 recipient). Professor Runciman was able to establish a new laboratory with the Fellowship funding that performed pilot studies examining the toxicity of carbon monoxide. He later became involved with the concept and implementation of anaesthesia incident monitoring from 1988 and was a member of the Australian Council for Safety and Quality in Health Care and of the Australian Health Information Council.

## Evidence-based medicine

Not all contributions to surgery can be measured in terms of the value of company shares. Several John Mitchell Crouch recipients have had significant interest in the field of evidence-based medicine. Professor Russell Gruen for instance (2013 recipient) developed a keen interest in public health and policy following placements with leprosy patients in Nepal and remote indigenous communities in Northern Australia. This experience, combined with training in trauma and critical care, has led to his involvement with research,

practice and policy experts aiming to improve the quality of care through more effective treatments. He is an editor of the Cochrane Effective Practice and Organisation of Care Group, so is involved in using evidence to determine what works.<sup>6</sup>

A desire to ensure that surgical practice is about 'what works' has motivated other recipients of the John Mitchell Crouch Fellowship. Professor Guy Maddern (1998 recipient) used the funds to commence a randomized controlled trial to assess the efficacy of the ablative electrolytic treatment in patients. In the same year, Professor Maddern established the Australian Safety and Efficacy Register of New Interventional Procedures – Surgical (ASERNIP-S) programme at RACS. ASERNIP-S was set up to provide systematic reviews, establishment and facilitation of clinical and research audits, assessment of new and emerging techniques and technologies by horizon scanning and input into the development of clinical practice guidelines. This group is a world leader in evidence-based surgery, collaborating and working nationally and internationally. The key aim of this programme is to improve the quality of health care by providing comprehensive and up-to-date information on new surgical techniques and procedures.<sup>7</sup>

In line with disseminating accurate information and providing the best evidence is the requirement for well-conducted clinical trials. Professor Graham Hill used the Fellowship funds towards clinical studies on metabolic and nutritional care that culminated in a published book 'Disorders of Nutrition and Metabolism in Clinical Surgery – Understanding and Management'.<sup>8</sup> Likewise, Professor John Forbes (1980 recipient) established the Australia and New Zealand Breast Cancer Trials Group (based in Newcastle, New South Wales) with help from the fellowship funds and coordinated Australia's first multicentre trial in 1978.

## Military surgery

Professor Jeffrey Rosenfeld (2004 recipient) followed a different, but no less important trajectory. In addition to his qualifications as a surgeon, he is also a Major General and past Surgeon General of the Australian Defence Force Reserves. Having served on seven overseas operations that included Rwanda, East Timor, Bougainville, Solomon Islands and Iraq, he developed an international reputation on military trauma, particularly neurotrauma from bomb blast. He used the Fellowship funds to improve the outcome of patients with traumatic brain injury through a variety of projects including the efficacy of decompressive craniectomy, the effect of severe traumatic brain injury in young children and the intensive monitoring of patients with traumatic brain injury.

## National honours

Contribution to surgery can be measured in many ways, from a box of chocolates presented by a satisfied patient to an award presented by an organization or institution. Eleven Fellowship awardees have been recognized with Order of Australia or New Zealand medals:<sup>9,10</sup>

- Professor Christopher Christophi (2005 recipient) received a Member of the Order of Australia (AM) in 2012
- Emeritus Professor Graeme Milbourne Clark (1985 recipient) received an Officer of the Order of Australia (AO) in 1997 and a Companion of the Order of Australia (AC) in 1999

- Professor Ian Jeffrey Constable (1998 recipient) received an AO in 1988
- Professor Graham Lancelot Hill (1984 recipient) received an Officer of the New Zealand Order of Merit (ONZM) in 2009
- Professor John Medwyn Hutson (1989 recipient) received an AO in 2007
- Professor Glyn Garfield Jamieson (1993 recipient) received an AM in 2009
- Professor Andrew Henry Kaye (1991 recipient) received an AM in 2004
- Professor Wayne Allan John Morrison (1992 recipient) received an AM in 2001
- Mr Bernard McCarthy O'Brien (1986 recipient) received an AC in 1991
- Professor Jeffrey Victor Rosenfeld (2004 recipient) received an AM in 2011
- Professor Geoffrey Ian Taylor (1990 recipient) received an AO in 1999

## Publications and other contributions

All of the John Mitchell Crouch Fellowship recipients have publication lists that number in the hundreds; and many articles in journals with high-impact factors due to their scientific importance. In an obituary written for Graham Hill it was noted that 'In all he wrote 8 surgical books, 35 book chapters and published over 200 papers in the scientific literature and these papers are still consistently cited – over a decade since he retired, at almost 100 citations per year'.<sup>11,12</sup>

As well as having published widely as a result of their inspiring and innovative approach to surgical research, many have contributed to society in other ways. They have sat on national and international government and non-governmental bodies (Cancer Council, World Health Organization, Cochrane Collaboration, Australian Government Advisory Committee on Medical Devices), editorial boards and ethics committees. They have also contributed to their communities, to their hospitals, to the training of other surgeons, to improving safety and welfare of patients and to a national identity of excellence in research.

The funding has helped many of the recipients to produce quality research that attracted funding from the NHMRC, with over half of the recipients having been awarded an NHMRC grant within the last 5 years. Furthermore, the recipients of the Fellowship have been a chief investigator on NHMRC grants subsequent to their award that have collectively received over \$63 million. This is not to mention the many other awards and funding received by each of the recipients. This clearly demonstrates the prestige of the Fellowship and the ongoing significance their research has made.

It should also be remembered that no individual works in isolation and no area of research is isolated from other areas of research, and the contribution that these Fellows have made to their discipline has often been made possible by concomitant advances by other people, in other areas of science.

## Future directions

Reviewing the list of the Fellowship recipients and their achievements allows a certain satisfaction that Australia and New Zealand have produced so many leading lights in the area of surgical research. Perhaps, these Fellows can also be said to epitomize the RACS motto, 'FAX MENTIS INCENDIUM GLORIÆ' (The torch that illuminates the mind is the fire that consumes vainglory).

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