ACPSEM Spring Focus - NZ Branch Edition

photo FBignell

October 2018

photo FBignell

Welcome everyone...

… to the Spring edition of ACPSEM Focus, brought to you from the land of the long white cloud and Pohutukawa trees! As you can see above and below, these are images of the beach about 200 metres from my house, and I certainly love being able to enjoy this location on a daily basis! After being asked to be the guest editor for this edition, I suggested that this should be a joint publication with the October edition of the NZ Branch Newsletter which I have been editing for a number of years now. And so this has resulted in quite a bumper edition that you see before you. I would like to thank all the contributors to this newsletter - we have a fine array of articles ranging from reports on image guided radiotherapy, diagnostic radiology physics, TEAP feedback and some history to boot! The ACPSEM has been collecting some member profiles to publish in the Focus, and in this edition you will find the profiles of 3 NZ colleagues..

Happy reading!

Fiona Bignell, Auckland

Message from the NZ Branch Chair...

Hello everyone,

Spring has definitely sprung here in Christchurch, with blossom on the trees and warmer days. However a few southerly storms have put enough snow on the mountains to enable some of the team to get in their last few days of the skiing season. Over the past few months I have been involved with the ACPSEM review of branches – without giving too much away, since the paper still needs to be sent to the Board, I hope that this will give more clarity to what the role of the branches is and how to go about getting it done, as well as making things more consistent across the branches. It's been a really interesting process to meet up with representatives from other branches and exchange ideas and thoughts and so I hope the final result will be a useful document for current and future branch committees.

Andy Cousins
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EPSM

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WELCOME TO EPSM 2018

Adelaide awaits you



The Organising Committee takes great pleasure in inviting you to join us in Adelaide in October 2018 for the Engineering and the Physical Sciences in Medicine conference, EPSM 2018. This is the premier annual event for medical physicists and biomedical engineers in Australia and New Zealand.

Our scientific program has the theme of Science Fusion: Innovation through Diversity, aiming to emphasize the need for scope expansion and collaboration of scientists across a variety of fields and backgrounds in order to provide the best health care and move the industry forward.

The program will include inspiring international keynote speakers, and feature research, educational and professional sessions as well as great social events.

Adelaide, South Australia, is home to one of the largest health and life sciences clusters in the Southern Hemisphere, bringing together research, education and clinical care. The precinct includes the new Royal Adelaide Hospital, SA Health and Medical Research Institute (SAHMRI1 and SAHMRI2) that will house a proton therapy unit in future, UniSA Health Innovation building and University of Adelaide Health and Medical Sciences Building. Additionally, at Tonsley (Flinders University), a new state-of-the-art hub for biomedical engineering has been developed.

We look forward to welcoming you to Adelaide in 2018.

Eva Bezak

Convenor EPSM 2018

It's not too late to Register for the ACPSEM Summer School preceding EPSM 2018

Quantitative Biomarkers in Medical Imaging and Radiation Oncology

ACPSEM summer school

ROYAL ADELAIDE HOSPITAL 26-27 OCTOBER 2018

We invite you to join in this year's combined summer school for radiology, nuclear medicine and radiation oncology medical physicists. This exciting 2-day programme will cover a variety of topics, ranging from an overview of quantitative biomarkers and their clinical utility, to in-depth analysis of biomarkers in nuclear medicine, MRI, CT and their role in radiation oncology. A session on the modelling of internal and external radiation dose will also be incorporated. Presenters will include local and international invited speakers.

Please see the full programme and speaker information attached along with a sneak peak at the exciting summer school presentations.

Register online: https://www.acpsem.org.au/events/event/summer-school-2018

Registration Fees:
FREE *for TEAP Registrars*
$200 + GST for ACPSEM members
$400 + GST for Non-members

**** Attendance at this Summer School will qualify for CPD points and should provide useful information addressing several TEAP competencies.***

Report: Clinical Practice and Implementation of image-guided stereotactic body radiotherapy, Porto, Portugal

What a week in the sunny city of Porto, Portugal. Travelling from the middle of winter from the other side of the world, I was looking forward to the heat that Portugal promises in the first week of September. And it did not disappoint. Thankfully there was a free afternoon to go to the beach and taste the finest port the region has to offer. It was my first time trying the Pasteis de Nata and I must say, thank goodness these are not readily available in New Zealand or my health would be in detriment.

The course was fully booked three months prior so I was grateful to secure my spot. The mix of participants was roughly 60% Radiation Oncologists, 20% Physicists and 20% Radiation therapists and Dosimetrists. This was also approximately the proportional focus of content specialised to the disciplines.

Each day alternated between the practical and fundamental principles, and the clinical evidence to support such techniques. This gave each discipline an easy-to-follow day alternated with a 'steep learning curve' day which made for great coffee break discussions with the other disciplines. Ample time was allowed during the course to ask questions and offer comments and with a course of 180 participants this was well utilised.

I was impressed with the amount of clinical evidence that the trainers were able to collate and present in the duration of the course. The faculty presented the material in such a way that it was fast paced but easy to follow and understand. It was invaluable to attend a single course compared to the months it would take to read the published data amongst our busy schedules. This year, the course covered in detail the following body sites; Brain, Liver, Spine, Lung, Adrenals, Prostate and Pancreas.

The breakout sessions for the individual disciplines were a highlight for me where colleagues from all over the world shared their experiences and solutions to the various problems we face with implementing, maintaining and progressing stereotactic programs.

Lunch was a very social affair, served with delicious Portuguese wine which you could delight in at your own peril for staying alert in the afternoon sessions.

One thing with running a multidiscipline course is you really gain an insight into the complexity of what is involved in each other's roles within the project team. I gained a wider appreciation for the decisions that clinical oncologists face with starting new treatment techniques, and in return, the work involved in determining appropriate margins and the technique development that occurs prior to a new treatment technique.

The key take home message was the importance in investing in adequate staff education and training and protocol development within your department before investing in expensive specialised equipment. The faculty recommend starting simple and then improving your technology as necessary once your team becomes more confident in the common problems etc.

The course is an excellent summary of the current status and future developments in all things stereotactic. I would highly recommend attending on a semi-regular basis to knowledge share and reflect on your practices and to take away inspiration for implementing the next site. This is a course for beginners and the experienced alike.

If you have recently started a stereotactic program in your department or are looking to start, this course is a must! I will be sure to attend again in the future as it was evident how fast evolving this field is and the faculty strive to update the course material at the rate that new data is available.

Katherine.Stanley@waikatodhb.health.nz

Katherine Stanley,
Medical Physicist
Waikato Hospital

NSW ROMP TEAP ~~Workshop~~ (Discussion Forum) for Supervisors and Assessors

T is for **T**ravel – attendees travelled across NSW (and beyond) to talk about clinical training.

E is for Eat – ACPSEM provided funding so we could enjoy yummy food and refreshments to fuel our discussions.

A is for Agreement – It wasn't 100% but we shared ideas and differing viewpoints to hopefully improve TEAP at our 17 NSW public departments.

P is for Physicists – 42 colleagues, including representation from every NSW public Radiation Oncology department and Marcus Doebrich, the other NSW CPC. Guests to the event were from ACPSEM, John Hunter Hospital, Sydney University and Radiation Oncology Departments Lifehouse, Riverina, ACT, GenesisCare Victoria and Sunshine Coast.

We walked down memory lane, discussed challenges and limitations of the Clinical Training Guide (V3.6) and the points spreadsheet, the impossible-to-attain perfect balance between clinical integration and TEAP consolidation and evidence, external brachytherapy training, DIMP clinical rotations, annual progress review and exam performance, Natalie Clement's 'sandwich' exam answering method, roles and responsibilities of all TEAP participants (hopefully eliminating the myth that self-directed means the sky opens up and all Medical Physics knowledge is magically beamed in to a Registrar's head), emphasizing the need for mentoring, ongoing questioning and open communication of expectations (in writing if needed), NSW Assessor question bank, efficiencies completing level 1, University collaboration and support and what's on the TEAP horizon!

We look forward to participating in the ROMP TEAP review that will soon be on the Specialty Group's door step.

Thank you to attendees for your active participation, which always makes it a very enjoyable and rewarding day.

Figure 1: Attendees of the 2018 NSW ROMP TEAP Workshop. Joerg Lehmann, photographer, is missing from the photo – thanks Joerg!

Lisa Wilfert,
NSW Clinical Program Coordinator (CPC) and workshop organiser and facilitator
Calvary Mater Newcastle, NSW

ACPSEM Member Profile: Bryn Currie

Bryn is an ACPSEM Ordinary Member and a Certified Clinical Medical Physics Specialist in Radiation Oncology Medical Physics. Bryn was amongst the first group of registrars recruited into the ROMP TEAP when it was rolled out in New Zealand in 2004. After graduating from the program in 2009, he spent the next 6 years in clinical practice. During this period, he took an appointment as a visiting academic at University of Canterbury in 2012 and the role of the NZ ROMP TEAP Clinical Training Coordinator in 2013. Starting a family required a bit of time management to be applied and he has briefly stepped away from the clinic while the little ones are in their pre-school years.

1. What got you into medical physics?

It was a bit of an accident really, I had been working on a PhD on general relativistic phenomenology in large area terrestrial ring laser gyroscopes at University of Canterbury and my supervisor suffered a stroke. I was subsequently shipped off to Germany, where our research collaborators were located, while he recuperated. Unfortunately, he didn't make a full recovery and it was unclear how the project would be completed. So, in 2003 I was looking for ways to turn my physics knowledge into cold hard cash to pay the rent and stumbled upon an ad for physics technician at Wellington Blood and Cancer Centre. After a taste of medical physics I haven't looked back!

2. As a graduate of ROMP TEAP and in your current position as the NZ TEAP ROMP Clinical Training Coordinator, you have obviously seen the program evolve and develop, in your opinion, what have been the most significant improvements?

The way in which the Clinical Training Guide has evolved is very impressive. It gets a lot of flak around the clinics for being unwieldy but is unique in its comprehensive scaffolding of the base requirements of a medical physicist in radiation oncology. This is evidenced by the way in which ROMPs from all around the world have come to recognise the merits of the CTG approach to assist in creating certifiable experts. Also, as TEAP has matured the ROMPs in the clinics involved in assessment have been very open to improving their own knowledge and skills. I see this in the improving quality of the work submitted for assessment by their registrars and the discussions I have with the registrar clinical supervisor and trainer groups. While there are always new technologies and techniques to incorporate into the CTG (e.g. proton therapy, oligometastatic disease treated with locally ablative therapy) the "soft" skills of communication and management have been developing very nicely.

3. What is most challenging about your current work?

Coming to grips with adult education and vocational training theory. As a physicist I have trained myself to think in a scientific (reductionist) manner, which, when applied to the human brain, fails miserably. Sure, we can develop workable theories for aspects of consciousness through the pursuits of psychology and the social sciences, but these really suffer from the inherent complexity of our brains. Hence, we don't really know what is the best way to create a competent practitioner of any type. It seems to me the fallback position is to apply filters (by way of exams, CTG points accrual, annual progress reviews…) and hope that the filter extracts the best candidate. More than likely I'm overthinking it.

4. What is most rewarding about your work?

Working with all the people whether they are registrars, ROMPs, radiation oncologists, university academics, vendor representatives, radiation therapists, the list goes on. It seems to me that to really understand something and bring about high quality lasting change you need to have exceptional people to bounce your ideas off. Luckily in my work I have plenty of them.

5. What are the skills important to your job?

At the risk of sounding like an American presidential candidate: communication, communication, communication. Whether it is an email, phone call, workshop presentation or casual conversation, communication is "the" skill for our job. Creating an expert narrative regarding radiation oncology medical physics in our own heads is all very well but then we must deliver it in a fashion consumable by our audience.

6. Where do you see yourself in 5 years from now?

Back in the clinic and collaborating with University of Canterbury in some way to advance radiation oncology – more on this in the next response!

7. What do you see as the future for medical physicists?

Ultimately, I'd like to think that irradiating humans with ionising radiation to resolve disease will be viewed as barbaric by future generations. Perhaps we'll have gene therapies or nanobots, who knows at this stage. Until that point I can't see ROMPs doing much different in terms of optimising dose delivery regardless of technology or technique. Given the current financial and political climate we may find all QA performed by technicians and ROMPs largely responsible for management of risk. I think we'll become PhD qualified consultants with a much more in depth radiobiological and radiation physics basis to our practice. Our role as experts in the clinic will probably require much closer working with ROs and as such we'll need a new suite of tools to do so. To that end I would hope that we emphasise the research and development part of our role and integrate with the universities and vendors to bring about better sources for dose delivery, and calculation and modelling techniques to predict outcomes more accurately.

Bryn Currie

Canterbury District Health Board
Te Poari Hauora ō Waitaha

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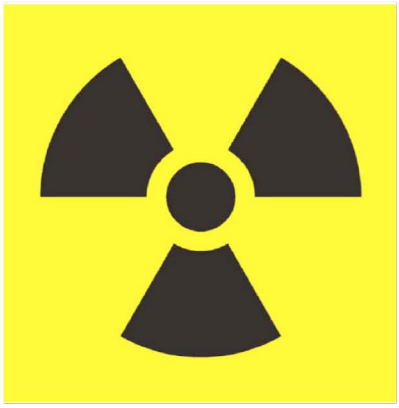
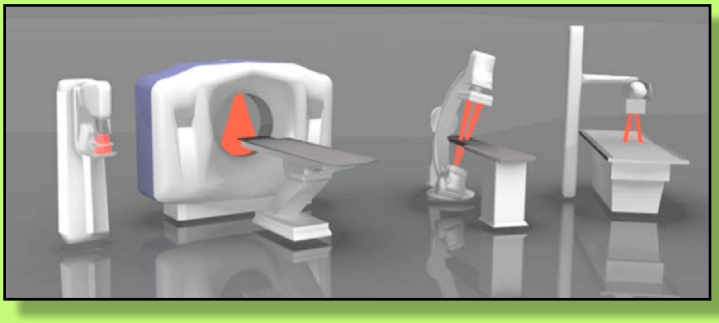
Who for? NZ Radiation Therapists, Physicists and Radiation Oncologists



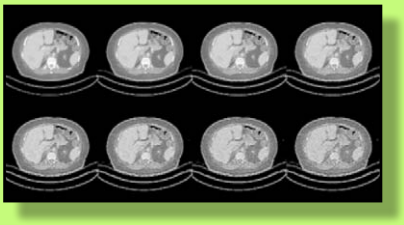
The Future Role of Physics in Diagnostic Radiology

Introduction



Medical physics involvement in diagnostic radiology has mainly involved technology verification and calibration, while input into the quality of day to day clinical imaging has remained mostly “out of scope”. This may have been by necessity due to the absence of sufficient time, resources and suitable methods to get involved in the quality assurance of clinical imaging. However there is plenty of evidence that significant opportunities exist for medical physicists to add value at the coalface of clinical imaging practice.

It may be calibrated but how is it being used?



X-ray equipment may be calibrated and performing as designed but producing poor images or being used at an unnecessarily high dose because of how it is being applied in practice.

Investigating the details of clinical practice is problematic. Without the tools or time, the size of the scientific and technical effort has kept the optimisation of clinical performance largely inaccessible.

By monitoring and advising on improving clinical practice medical physicists will also start to move from the physics and into the clinical domain where they may not have had adequate clinical training or experience. Similarly, quantitative metrics of image quality are not well understood by radiologists and radiographers. With these complexities at play, the use of physics methods to improve clinical imaging performance will necessarily require a multidisciplinary effort.

Dose Management is not Optimisation

Following Justification, Optimisation is referenced as the second pillar of radiation protection. Radiation protection documents tend to mention this cornerstone at the beginning and then singularly discuss dose management and Diagnostic Reference Levels (DRLs) for the remainder of the document.

DRLs may serve as a trigger to indicate whether the imaging system is not well optimised, but useful advice on how to actually optimise clinical image quality and dose is normally absent. Ensuring patient doses are within the DRLs may be a step in the right direction from a radiation protection perspective, but without understanding what clinical information is being traded off, only half of the information required to optimise practice is available.

Using DRLs as the starting point is also approaching the imaging optimization task from the wrong side. Adequate imaging must be achieved to answer the clinical question first, and only once this threshold is reached should the dose optimization efforts be applied.

It’s Time to Stop Sidestepping the issue

“The Radiologist/Oncologist/Radiographer will complain if the images aren't adequate.” While this may be true for patient positioning, or if noise, contrast or resolution blatantly affects the image appearance, the variety of imaging performance between systems demonstrate the wide variability in image quality occurring in clinical practice.

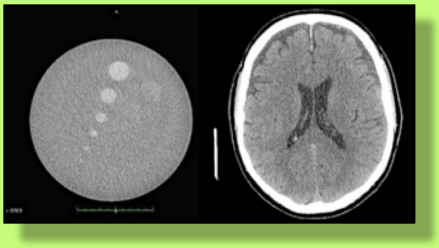
It is possible to demonstrate that lesion detection sensitivity varies with this changing imaging performance but complaints and user feedback aren’t driving change to a standardised optimal image quality. Radiology needs analytical tools to quantify imaging performance in a way that is meaningful to radiologists, radiographers, physicists and engineers. It also needs physics expertise to knowledgably interpret the analytical image quality results. Assuming that subjective feedback from clinical users in a complex clinical environment will correct technique issues is not supported by evidence and sidesteps dealing with the issue. Papers are starting to emerge on how to apply analytical methods for characterising the quality of clinical images.

Phantom Image Quality and Clinical Image Quality are not the Same Things

Mammography is one of the few modalities where simulated clinical lesions in a standard phantom are viewed under clinical conditions to check whether a clinical lesion may be visible, but even this is for a notional standard breast only. For other modalities, phantoms mostly consist of either an aluminium, acrylic, copper, or tungsten test objects in water or air or similar. They can be used to check if imaging characteristics are changing, or whether the unit

meets a technical performance specification under specific hardware and software test conditions. They don't provide information about what performance is being achieved in daily clinical practice.

The Software Layer is Real!



Multiple image processing settings are usually available in digital radiology systems. These settings influence contrast, resolution and noise and adapt to anatomical variations and process the image differently in different spatial regions of the same image. The influence of the software is complex but has a substantial and valuable role to play in making the image diagnostically useful. Tools to evaluate the image quality of the final presented digital image are needed to assess the full clinical imaging performance. Limiting the evaluation to the raw digital image is helpful in understanding the detector performance, but will not reveal any issues caused by the influence of the clinical image processing software.

Bridging the Language Barrier

An MTF value of 2.3 lp/cm at 50% modulation may have meaning to a physicist, but is unlikely to have any meaning to clinical users. What language can be used to relate the physical characteristics of an image to the clinical requirements to adequately visualise a lesion? Further clinicians have a well-developed language to describe the appearance of lesions in an image but few adjectives to describe image noise, contrast or resolution. This is understandable as the perceptual specificity to noise is not absolute or as well developed in the same way as say colour sensitivity. We can sense and describe specifically if a person's face is a bit green or blue but don't have either the sensory capability or language to bring the same specificity to describe the noise or contrast or resolution to discuss imaging performance. Putting a numerical value for image quality quantities such as noise on to familiar clinical images would help provide a language to bridge the communication gap.

Imaging protocols typically also have both familiar measurable factors such as kV and mA but also many settings such as "Very Strong" "Bone" "B30f" that also significantly affect the imaging performance. These settings may influence both the behaviour of the x-ray output and the processing applied to the clinical image and a description of the exact influence is mostly hidden within software algorithms. Methods for describing the influence of these settings on the image quality in a common language is also necessary if consistent diagnostic performance is to be achieved across different x-ray system makes and models.

Navigating the Data Mountain

In a complex imaging system such as a CT scanner, there may be hundreds of specific protocols. When this is multiplied by the range of patient sizes, the number of x-ray systems and volume of patients imaged the scale of the problem grows rapidly. The size of the challenge dictates the need to employ computational methods to bring it down to a manageable size.

Adapting Practice

Cultural change is often brought about by new technology. Radiologists, radiographers, physicists and engineers haven't had tools to quantitatively monitor and manage clinical imaging performance. www.MyXrayDose.com is a service that has been developed to fill this need and provide medical physicists and the clinical imaging community with a service to continuously monitor clinical image quality, patient dose, technique factors, and patient size. With this complete set of data in one place, the technology is now available for a multidisciplinary collaboration to tackle the clinical image quality and dose optimisation challenge.

To find out more about how medical physics can add value in clinical imaging practice, visit www.MyXrayDose.com.

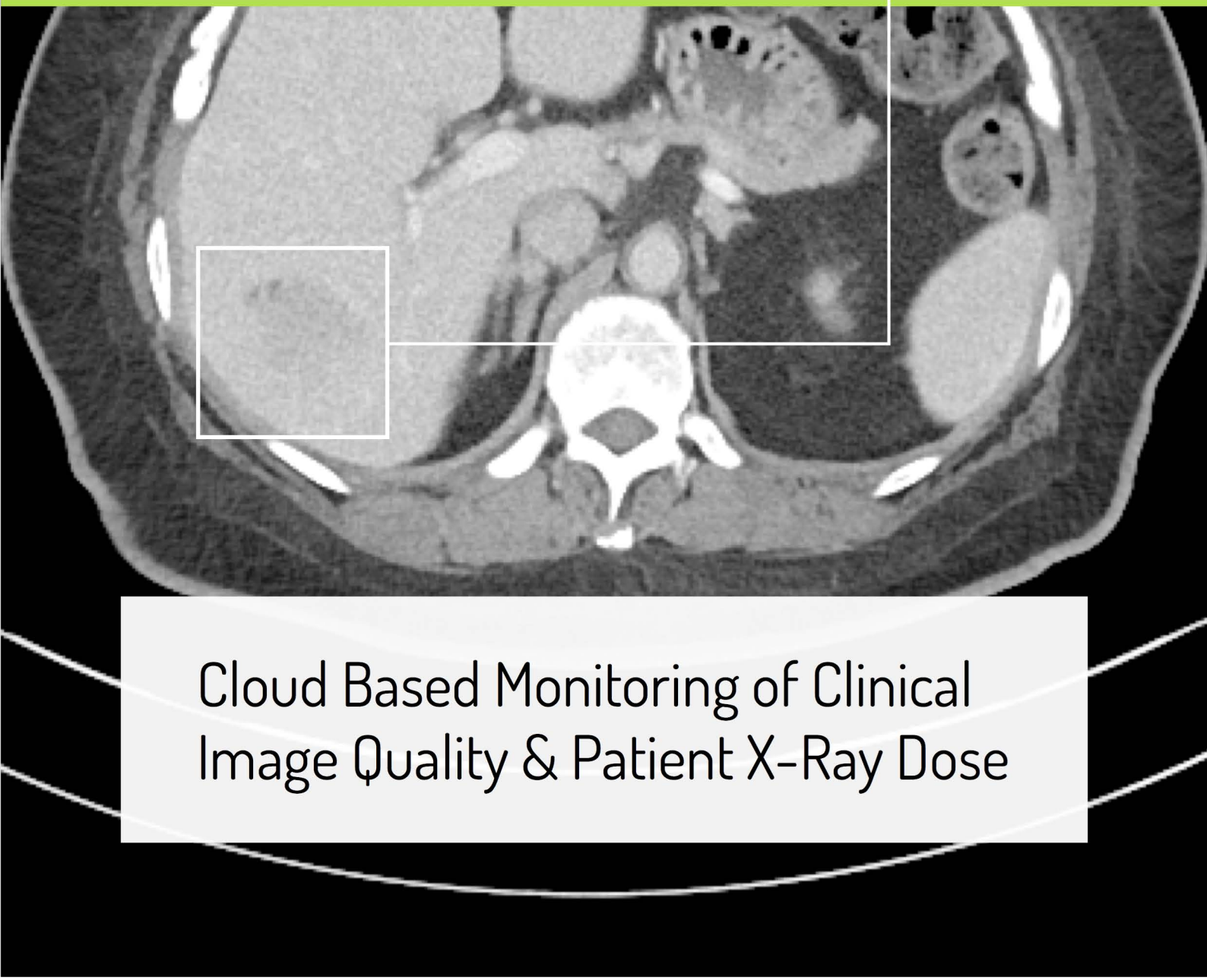
Medical Physicist
MyXrayDose Ltd
BrianLunt@MyXrayDose.com

References

Why Physics in Medicine? Ehsan Samei, PhD, Thomas M. Grist, MD J Am Coll Radiol 2018;15:1008-1012

Brian Lunt, Auckland

Quality assurance - where it matters the most



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ACPSEM Member Profile: Suzanne Lydiard

Is an ACPSEM member and a Radiation Oncology Medical Physics registrar at at Auckland City Hospital (NZ). Suzanne completed her undergraduate degree at the University of Auckland in 2014 and she is currently a part-time PhD candidate with the ARCF Image X Institute, University of Sydney.

In 2017 Suzanne Lydiard won the first runner-up award prize for your presentation "First Cardiac Radiosurgery MLC tracking Results" at the 2017 AAPM Conference in Denver, USA.

1. What is your PhD Topic?

My PhD project is investigating the clinical feasibility of a non-invasive treatment for atrial fibrillation; Stereotactic Arrhythmia Radioablation (AF STAR) on an MRI-Linac. Atrial fibrillation is the most common cardiac arrythmia and its prevalence is dramatically increasing with our aging population. We aim to develop a new treatment alternative by precisely delivering high dose radiotherapy to a specific region of the heart using real-time motion compensation and beam steering on an MRI-Linac. I am probably biased, but I think this is very exciting research (shout out to the people that thought of the concept and the previous students working on the project!). Radiotherapy has significantly advanced over the years and it would be great if we could extend this knowledge and technology to treat other medical burdens.

2. What inspired your interest to pursue a career in medical physics?

I didn't really know what career I wanted to pursue after school, but Physics was never something I had considered (am I allowed to say that?). I started a Biomedical science degree with an interest in cancer research but a guest lecture on Medical Physics (a career I hadn't heard of before) caught my eye. After doing some research and hassling NZ Medical Physicists who had their email addresses online, I decided to transfer to the Medical Physics Undergraduate degree. And it was one of the best decisions I've made.

3. What is most challenging about your work?

Never having enough time in the day! Whether that's balancing clinical demands, getting access to the clinical machines, keeping on top of both TEAP and PhD, and trying to maintain some sort of work-life balance.

4. What is most rewarding about your work?

The Medical Physics career is fairly unique in that it is a medical science profession based in the hospital with direct everyday involvement in patients' care. It is also a forever evolving career with ongoing technology and technique development. It provides both the daily satisfaction of providing for patients, and the long-term satisfaction of knowing that we are forever improving the quality of radiotherapy treatments.

5. What advice would you give to a new registrar at the start of their training?

As my mother always says, "Eat the elephant one bite at a time". There is no doubt that there is a lot to cover, but this also provides the opportunity to experience all aspects of the medical physics job before potentially becoming more specialised as a qualified physicist. So grab every opportunity you can to get involved! I have also heard being able to bake a good cake is a helpful skill in many departments.

6. Where to from here?

Well, I need to get qualified before I can even begin to think about that, but I am very excited about a career in this field. It is very insightful learning about how radiotherapy treatments were planned and delivered 50 years ago and I look forward to seeing what changes will occur in my career lifetime. The amalgamation of imaging, radiotherapy, and nuclear medicine in the likes of image-guided, adaptive radiotherapy and targeted radionuclide treatments is exciting and it will be great to be part of this.

Suzanne Lydiard

Deforming to best practice.... A workshop on deformable image registration presented by the NSW / ACT branch

A couple of years ago a few physicists around NSW were wondering how to commission and implement deformable image registration (DIR) in the clinic. We started getting together occasionally in person and virtually to discuss some of the problems we were having, considering TG-132 on the use of image registration and fusion algorithms and techniques in radiotherapy had not yet been released. Then TG-132 was released and we started talking about implementation, we figured we weren't the only people grappling with these issues, so we decided we needed a name and should put on a workshop. Anna Ralston came up with the Society for Medical Image Registration and Fusion (SMIRF) with members affectionately known as SMIRFs. Then, Jeff Barber, a SMIRF and chair of the branch volunteered to coordinate the workshop. So….

In June of this year the NSW/ACT branch organised a workshop on DIR at the University of Sydney. The target audience for the workshop was Physicists, Therapists, Oncologists and Computer Scientists. The workshop was held over two days covering a range of theoretical and practical topics on DIR. Day one saw a report on a survey of national and international centres on the use DIR in the clinic. This was followed by presentations on the theory and application of DIR, atlas segmentation and a comprehensive review of TG-132. A multidisciplinary panel discussion addressed case studies and controversial topics before attention was focused on deforming dose and adaptive radiotherapy.

All this excitement was topped with canapes, drinks and networking in the Holme building on campus.

Day two focused on practical issues related to implementing DIR and related technologies in a clinical setting. The audience was polled extensively using their smartphones to form consensus on topics including; commissioning, dose accumulation, re-treat, sharing atlas data, response assessment, DIR in brachytherapy, standard nomenclature, frameworks for sharing data and adaptation. There was an overview of available research platforms and discussion of TROG related concerns about image registration in clinical trials.

The response from the community was both overwhelming and encouraging. The registration site had to be closed well before the event as we ran out of space in the room (>120 people). Following the success of the Sydney workshop and support from the Victoria's Department of Health and Human Services a condensed program version of workshop was run in Melbourne, hosted at Peter Mac. Again, turn out and engagement was strong and there was plenty of lively discussion around some potential use cases for DIR and clinical cases.

Michael Jameson

APSIG Update

On assignment

Cambodia and Mongolia

Nikki Shelton is nearing the end of her 12 month assignment in Cambodia but managed to find time for a week of training in Mongolia. The photos show Nikki teaching radiobiology to RTs,

and the opening ceremony of the inaugural Conference on 3DCRT in Mongolia. Nikki has done an amazing job in Cambodia and we look forward to hearing more about it once she gets back to Oz next month.

Vietnam

Jeff Harwood and Gary Arthur recently completed five weeks volunteer work at the Ho Chi Minh City Oncology Hospital. The centre is currently commissioning two Varian TrueBeams and Jeff and Gary provided medical

physics education related to linac commissioning and other aspects of radiotherapy. Jeff in particular gave a number of talks which generated lively discussion and a barrage of questions.

Fundraising

So far this year we have raised $5000 through EveryDay Hero – thank you so much to all the fundraisers and of course our generous supporters! We've got more fundraising teams coming on board and of course there'll be the APSIG trivia night and silent auction at EPSM – can't wait!

Northern Territory: Team No Tears.

They make them tough in the Northern Territory and with sun 365 days round and crocs roaming the streets, there's no room for tears. The **TNT** team from the Alan Walker Cancer Care Centre in Darwin consists of a mix of RTs and Physicists fearlessly led by our Elekta Engineer, Anthony Herring who can

lift one of these bins with his bare pinky finger. The team has started their fundraising with a 'Cash for Containers' activity collecting bottles and cans from the department in exchange for a 10c refund going straight into APSIG. The team has also started a lunchtime training program, swimming laps in the hospital pool and doing intense workouts arranged by our Principal RT, Elly Keating. Stay tuned for some photos and milestones we are hoping to achieve, the first being swimming 1km in under 30 minutes! Please get behind Team NT who are Territory Tough and willing to sweat it out for APSIG. ***Note: Great Northern tinnies not consumed on site.***

Western Australia: A Step in the Right Direction.

It was a stormy Sunday morning, October 14 to be exact,

when members of the WAAF (West Australian APSIG Fundraisers) met at the bottom of what seemed like an impossible task. A far cry from the safety of the air-conditioned bunkers, the eleven strong crew tied their shoelaces and looked up the 242 concrete stairs that awaited them. The team had representation from ROMPs and DIMPs, public and private, physicists, RTs and nurses, all banding together for WA's first APSIG fundraiser. The adjudicators are still calculating the final step tally, but it is anticipated to be well over 10,000!

Victoria: Team Quality Melbourne

Daylight savings is coming up fast (at least in some states and territories). This means getting up earlier to stay up later and many of us are wondering how to cope with this. The answer is simple: coffee… **TQM** is fundraising by publishing a book with stories on coffee. Submissions should consist of one page with text, poems, photos, drawings, fingerprints or whatever can tell a compelling story about a beverage. The objective is to have fun and engage in some fundraising in support of colleagues with less resources in our region.

NSW: Team Supreme Sydney

TSS had a great turnout and perfect weather for the Beachside Dash (special thanks to Gamma Gurus for sponsoring the fabulous new APSIG T-shirts which attracted lots of attention at the course!). Jonathon Sykes also ran 35 km from Palm Beach to Manly - what an amazing effort. Well done Jonathon, that's exactly half of the 70 km the rest of TSS did combined!

News from VIC / TAS

Our recent student event attracted over 50 students & medical physicists on Tuesday 14 August. Organised by Vic-Tas Branch Committee member Tori Earl held at RMIT University.

The Vic-Tas branch of the ACPSEM is pleased to announce the winning speakers from our recent Student Presentation Night on Tuesday 14 August, 2018.
The evening was attended by over 50 medical physicists, postgraduate, and undergraduate students.

1st prize: Elekta Travel Grant of $1,000 awarded to Owen Vandenberg for his talk:
"Development of machine learning techniques to predict and grade prostate cancer in digital pathology data "

2nd prize: ACSPEM Vic/Tas Branch Travel Grant of $500 awarded to George Rouvalis for his talk:
"Optimisation of administered activities in PET"

We congratulate all speakers for the high quality of the presentations and look forward to seeing them as they progress in their careers. The evening was organised by Tori Earl who deserves much thanks for her efforts. We'd also like to thank RMIT University for hosting the evening and finally Elekta for sponsoring the travel grant and supporting medical physics in Victoria and Tasmania.

Alex Merchant

NZPEM
1-2 April 2019
Auckland City Hospital

Fisher and Paykel Clinical Education Centre

Fisher & Paykel Healthcare
Clinical Education Centre

… the early recognition of the scientist in the MDT?

From Australasian Bulletin of Medical Physics & Biophysics, No34, December 1, 1967
"The Scientist and the Greater Medical Profession" by D.J. Deller, Prof of Medicine University of Adelaide.
Opening address at the 7th annual meeting of Physics in Medicine and Biology, Adelaide, 22nd May, 1967

"However I believe that another significant development in this decade, although it may not appear so dramatic, is the growing recognition that doctors do not practise medicine alone. Let me illustrate this by referring to the numbers of people concerned in medical care. What is called the Health Services Industry is now the third largest in the United States. It employs over three million persons in its various categories and is exceeded only by those of in agriculture and the construction industry. Fifty years ago there was as many physicians as there were all other trained persons in medicine combined. However today only one in five of the professionally trained persons in the health field is a physician. These figures suggest that some thought should be given to the relation and attitudes to these various groups to each other, and in particular, the attitude of the medical profession to the others. The traditional attitude is that the physician is the captain of the ship, ultimately holding complete responsibility for everyone on the medical team. This authoritarian attitude has many origins. For many centuries the physician was the only person educated in the health field and he was also self sufficient in his work. His relationship with his patients demanded a decisive and authoritative attitude. The rigorous educational requirements of the medical course also added its share. Sit Theodore Fox wrote "Perhaps none of us is always and wholly free from a feeling that, having survived the medical curriculum, we are entitled to a kind of respect not normally accorded to chemists, engineers or geographers – and to corresponding amenities. We are conscious of having been anointed, if not by the Lord at any rate by the General Medical Council". Sir Theodore then goes on to say "Have we sufficiently adjusted ourselves to the change that is coming over medicine? Should we perhaps revise our ideas and regard everybody who does medical work as belonging to what one might call the greater medical profession." ……..

……"We in Adelaide are about to witness an exciting development in this field. A new department of nuclear medicine is being planned for the Royal Adelaide Hospital as a division of the Institute of Medical and Veterinary Science. Isotope equipment costing nearly a quarter of a million dollars has been approved and will be installed shortly. However the quality of this department will depend not only on the sophisticated counting equipment that is being purchased, but also on the specialised staff needed to service the department. The staff required will include clinicians, a physicist and a radiochemist as well as supporting technicians."

Martin Caon

Updates from the ACPSEM Office…

Recent Certifications

Our congratulations to the following members:

Stephen Dowdell, NSW – Medical Physics (Radiation Oncology)
Cameron Challens, QLD - Medical Physics (Radiation Oncology)
Simon Briggs, NSW - Medical Physics (Radiation Oncology)
Christopher Low, VIC - Medical Physics (Radiation Oncology)
Mounir Ibrahim, ACT - Medical Physics (Radiation Oncology)
Deepak Basaula, ACT - Medical Physics (Radiation Oncology)
Grace Healy, NZ- Medical Physics (Radiation Oncology)
Rakesh Joshi, NT- Medical Physics (Radiation Oncology)
Yuri Matyagin, SA -Medical Physics (Radiology)
Jordan Verschuer, NSW -Nuclear Medicine Physics

Recent ACPSEM Members

A warm welcome to the following ACPSEM members:

Wayne Benjamin, USA; Lotte Fogg, VIC; kevin Hiscoke, NZ; Guneet Kaur, NSW; William Ryder, NSW; Toby Beveridge, VIC; Paul Reid, SA; Maximilian Hanlon, VIC

Recent entries to the Qualified Medical Physicist Registrar

Our congratulations to the following members:

Stephen Dowdell (RO), Vikraman Subramani (RO), Simon Biggs (RO), Svetlana Sjostedt (RO), Pradeep Goswami (RO), Christopher Low (RO), Mounir Ibrahim (RO), Deepak Basaula (RO), Grace Healy (RO), Rakesh Joshi (RO), Yuri Matyagin (Rad), James Crocker (NM), Eoin O'Mahoney (NM), Jordan Verschuer (NM)

New TEAP Registrars

ROMPs
Onno Kamst, QLD; Jonathan Thompson, WA; Iliana Peters, NSW

DIMPs
Joshua Varcoe, VIC

ACPSEM Member Profile: Richard Dove

Richard Dove is the Clinical Manager, Medical Physics & Bioengineering, Christchurch Hospital and is also the current President of the ACPSEM Board of Directors. He originally trained in bioengineering and has over 30 years' experience in this field. For the last 10 years, he has managed all medical physics & bioengineering services at Canterbury DHB. For this article he was asked to provide some insight in the challenges of a career pathway in clinical management with the aim of improving outcomes in the delivery of healthcare services.

1. Can you begin by describing your current role as the Clinical Manager responsible for medical physicists and biomedical engineers?

At Canterbury DHB we have a multi-disciplinary department that combines radiation oncology physics, diagnostic imaging physics, radiation safety and a biomedical engineering team. My role as manager is to empower the teams to get on and do their work. This means setting direction and making expectations and roles clear, doing my best to provide resources and keeping unnecessary management noise at bay. The multidisciplinary department allows us to tackle problems that cross traditional boundaries and I try to encourage this. For example we are currently working on quantifying MRI distortion for radiotherapy planning; the engineering team have built a phantom, the imaging physicists are scanning and analysing the results and the oncology physicists will put the results into clinical practice.

2. How has your background as a Biomedical Engineer led to where you are now?

I started in the department way back as a biomedical engineer working, mostly, on physiological monitoring. After some time away doing other things I returned to the organisation to lead the biomedical engineering team (or electronics as it was then). We needed to set up a radiology physics service so I was tasked with that. Fortunately we had some engineers turned physicists in the department so we got to grips with the requirements, added some more imaging physics expertise and incrementally got something running. Along the way I did some post graduate study and picked up qualifications in management and quality. When the opportunity to lead the department came along I put my hand up for the challenge. Of course I didn't know at the time that soon after I'd lose my Chief Physicist in Oncology and I'd be left holding the baby while getting a crash course in what's important in oncology physics. While difficult at the time (no doubt for the oncology physicists as well as me) that year has given me a far better understanding of what happens in that world. I encourage you to get out of your silos and learn what your colleagues do.

3. What are the main challenges and the essential skill sets required for a role in management?

People! People have good days and bad days, good years and bad years. We sometimes don't know everything they're faced with at work, and inevitable don't know everything going on outside of work. This applies as much to managing your manager as it does to your staff and colleagues. But people also do some strange things, or don't do things they should do. As a manager you have to be prepared to have difficult conversations and face up to issues that need addressing. But you always have to be mindful that you're dealing with a person with a bunch of stuff going on that you're not necessarily aware of.

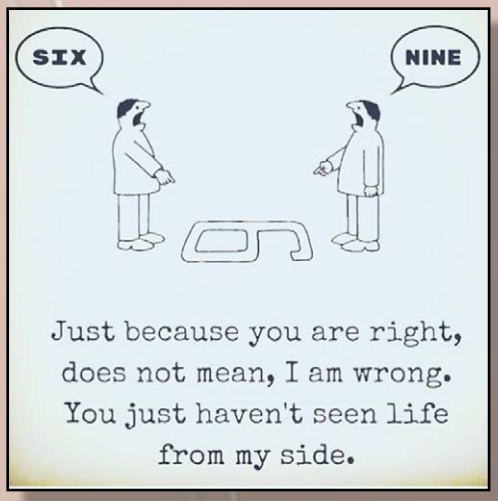
In a management role you're frequently required to make decisions with incomplete information. You do your best to obtain information and hear from people, but ultimately (and sometimes there isn't much time) you must make a decision and live with the consequences. I found it took a while to develop the confidence to do this, and to accept that sometimes any decision is better than no decision. As an interesting sidenote, I do a bit of mountain biking and moderate white water paddling and the same rules apply – make a decision and follow it until the next decision point. Changing your mind half way through a tricky section inevitably ends badly.

4. How significant a role do professional advocacy activities have in your current position?

Advocacy takes so many forms. Within a large organisation a manager needs to be the cheerleader for their team. So finding stories where my team has contributed and telling those stories to anyone who will listen is important in building our professions profile. I'm also active in a wider setting advocating for medical physicists and their training at a government level. My involvement in ACPSEM governance is because I believe in the value of high quality advocacy of the professions and see ACPSEM as a vehicle for that.

5. What advice would you give to early and mid-career ACPSEM members interested in Clinical Management?

Take every opportunity to get out of your scientific specialty and understand the culture and language of the rest of the organisation. So grab chances to join project groups or represent your team in wider circles. Open your eyes to other perspectives and realise we all bring a certain viewpoint to our work.



Richard Dove

A 30 year professional journey in snapshots

The transition from academia to medical physicist and then inventor and entrepeneur

I first arrived in Australia exactly 30 years ago today (3/9/1988) and my professional life has been busy, exciting and eventful! Of course, it also has its ups-and-downs. As we grow older and our memories fade faster, I feel it is worthwhile reviewing my past to share my experiences with others, hopefully to help younger generations in planning their life journeys. For this purpose, here is my journey in four snapshots taken every ten years.

1988

As an academic researcher at Monash University Melbourne and holding a scholarship from the World Bank, I worked on a research project to experimentally study the spectrum distribution of copper-vapor laser light generated by a novel and patented device that had scary, high voltage sparks and fast-flowing gas at room temperature… The title of my research was long and confusing! But thankfully with the advice of Dr. R. Tobin and help from many others, I completed the project quickly and smoothly, and luckily enough, the results were published in the following year in the *Journal of Applied Physics Letters*, a top-rated scientific

journal of the American Institute of Physiccs.

Melbourne, Australia 1988

1998

As a medical physicist with 4 years' experience, I joined the then ADAC Laboratories Inc. (HQ: San Jose, California), now Philips Medical Systems to support the clinical adoption and application of the Pinnacle^{3} radiotherapy treatment planning system, a top and complex computing package for treating cancers with radiation beams, which was widely used in the Asia-Pacific region from Japan, China to New Zealand. My days were fast paced and packed with phone calls, emails and meetings. I felt my time spent on travel in the air was more than I was on the ground, excitingly enough?! Time zones changed frequently, hence it confused my sleeping pattern. I attended so many conferences and met so many people, I completely exhausted myself… Luckily enough, I travelled in business class most times and I made many friends globally!

The Peace Park (at atomic-bomb ground-zero), Hiroshima, Japan 1998

2008

Working as Deputy Chief Physicist in beautiful Tasmania, my professional skills excelled and were recognised by peers and colleagues globally. After completing a training in Las Vegas, USA, I commissioned a new linear accelerator with novel functions, 4D (time-resolved) CT system, introduced the ever-in-demand IMRT with sophisticated quality assurance measures (such that it is now a standard treatment technique worldwide), to the local practice and benefited many Tasmanian cancer patients! My clinically oriented research activities were at the best and busiest, and I made numerous presentations in Australia on


the Royal
infocus
The newsletter of the Royal Hobart Hospital
Award to Holman Clinic

different topics with awards and a growing reputation…

2018

After 4 years of silent endeavour and sometimes very bitter struggle, my proudly Australian invention of a rather unique and novel device - ChestPhan^{4D} for better and more accurate treatments of lung and breast cancers, has been commercially recognised by the medical equipment industry. Fraunhofer-Gesellschaft, Europe's largest application-oriented research organization, has invited me to visit Germany and will sponsor my tour to meet with German elite medical technology R&D companies and to visit industrial hubs. The first device made by my company in Melbourne has since been exported to Germany. My invention has also been granted with a PCT in EU recently while patent applications in USA, China and other countries

are pending to grant …

In 30 years, starting as a young professional migrant from China, I have transformed from a junior scientific researcher to a medical physicist who has worked in many hospitals, from an industrially trained and experienced specialist to an inventor and entrepreneur who has founded and owns a high-tech start-up company!

This is my journey. Of course, I am very grateful to the colleagues and friends around me during my journey, and I am very fortunate to be living in a beautiful country. I just want to say thank-you to Australia and I am looking forward to up-coming new adventures!

Chuan-Dong Wen, **ROMP MACPSEM EMAAPM**

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gust.com/companies/inwentech_(Company Website)
researchgate.net/profile/Chuan-Dong_Wen
research-in-germany.org/innohealth-australia/Participants/Australian-Researchers.html

Australian InnoHealth Tour by Fraunhofer DE, Melbourne, Australia 2018

Chuan-Dong Wen

We invite you to join us for a stimulating day of particle therapy discussions at the Particle Therapy Workshop on Thursday 1st November 2018 at the South Australian Health and Medical Research Centre, Adelaide.

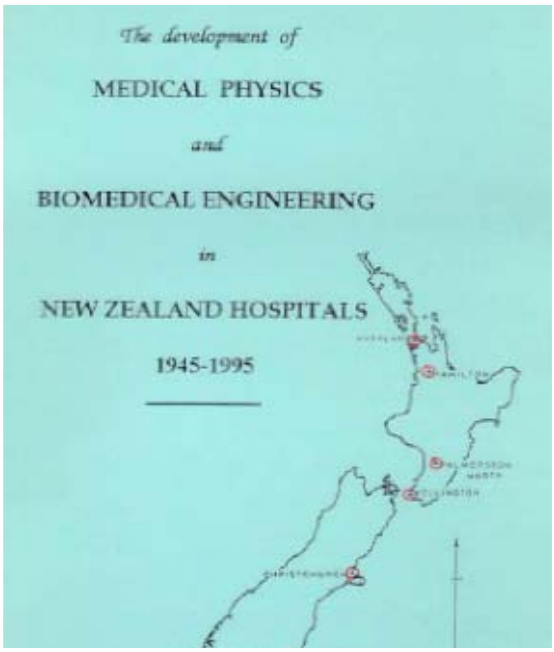
With Australia poised to join the international particle therapy community, it is important that professionals involved in cancer treatment become familiar with this form of external beam therapy.

The Particle Therapy workshop has been prepared by the newly formed ACPSEM Particle Therapy Working Group (PTWG) for this purpose. In addition to talks delivered by experienced members of the PTWG, the Workshop will feature clinical presentations by Radiation Oncologists from the Adelaide proton therapy project, and a horizon scanning lecture by EPSM Keynote Speaker, Prof. Harald Paganetti.

Details of the workshop program and to register: https://www.acpsem.org.au/events/event/particle-therapy-workshop

Registration fees:
$100 + GST for TEAP Registrars;
$200 + GST for ACPSEM, ASMIRT and RANZCR members;
$300 + GST for Non-members

A piece of NZ Medical Physics history



This gem of a document has been provided to me by Danny Warren from Dunedin with the suggestion that I publish some snippets from it in the newsletter. It was edited by Hugh Jamieson, with contributions from Bruce White, Ray Trott, Jack Tait and Gordon Monks. It certainly is a fascinating insight into how medical physics and biomedical engineering started up around NZ!

COMPUTING IN HOSPITALS:

I was first introduced to the possibilities of computing in 1956 by a very senior forward-looking accountant in Dunedin. His interest was of course in commercial possibilities, but together we started in on an American correspondence course in programming. Another friend, who later became a University lecturer in accounting, dismissed the whole idea of the widespread use of computers as preposterous. He thought that in time, there could be commercial use for one computer in the North Island, and one in the South. Last week a local kindy here was talking of computers for their pre-schoolers.

In 1963 while on study leave in the UK, I attended a computer workshop at Elliott Computing Services ("803 Computer hire at 4 pounds per hour"). (Earlier, they charged for their courses; now they were free to encourage users who could then hire (or buy!) an 803. Their Computing Centre opened in 1953; by 1963, "...Over 100 National-Elliott 803 Computers have been delivered to customers throughout the world..."). But I digress.

The Health Dept by 1975 saw computing as another high-cost-nightmare ahead so, as it were, they seized the bull by the horns, and decreed it would set up a stand-alone Health Computer Unit. This was obviously going to be a total disaster, in itself and also in the inhibiting of progress in hospitals. The budget was $28M to be spent over 5 years; there would be initially three "core" national systems, payroll, unique patient identification, and a laboratory system. Centres were established in Auckland and Christchurch (to the familiar tune: "Two units will serve the country.."); staff employed, including people who flew madly up and down the country to talk to everyone, at great expense; work began on the "core" systems. No purchases of computers were allowed in hospitals. In all centres, hospital physicists began lengthy and frustrating report-writing on a variety of computing proposals. Somehow Christchurch Hospital beat the system and obtained a PDP-11 which they used enthusiastically. A ponderous payroll system was set up; timesheets appeared, causing great fury; the 'national patient identification system' ground along (does it exist yet?); the laboratory system was overtaken by technology as computerised auto-analysers appeared in hospital laboratories. The $28M disappeared; more money was poured in...

Along that weary road, the question of radiotherapy treatment planning arose. National meetings were held with hospital physicists; the Health Computer Unit produced an instant 'expert' who asked endless questions and proceeded to write a programme....It has of course all come to nothing, with sophisticated RTP systems in use in all centres.

Efforts were actually made, by hospital physicists and others over a number of years, to show up the gross inefficiences of the whole Health Department Computer system, but admissions from the Health Dept of total failure were never made.

Rumours of large rooms full of unused PDP 11/34's (soon to be obsolete) circulated; they were true, as Wallace Armstrong told us in his 1994 Strong Memorial Lecture, with the Met Service being given a cobweb-covered unit which came from this store. The whole Sad Saga was on a monumental scale of waste of money, waste of time and effort by many people who just wanted to make progress in their part of the hospital scene; total waste.

To end on a cheerful note, and to demonstrate that scientific progress cannot really be constrained by administrative means, all centres soon found alternative access to computer facilities. This varied from purchases with outside funding, (eg through a local Cancer Society); use of a computer bureau; use of a University Computer Centre; or by access to computers already in use by other hospital departments.

All centres rapidly got into usage of radionuclides. The first recorded NZ use of intravenous P-32 for polycythaemia was in July 1952 in Palmerston North (Don Urquhart again, with Athol Rafter from Nuclear Sciences, DSIR). The use of I-131 followed in that year (1952). In Auckland, the Dept of Endocrinology under Prof Kaye Ibbertson was using radionuclides for diagnosis and treatment from 1954. In Wellington, Eugene Lynch (radio-therapist) started up thyroid tests in January 1952. The use of P-32 for polycythaemia began there on April 28 1953 under Verney Cable (physician). There is a semi-whimsical comment added about this in Allan McArthur's paper "The Evolution of Nuclear Medicine in NZ", 1989, which is still thought-provoking from a protection aspect: "...Many prominent personalities gathered in a lean- to room adjacent to the old Radiotherapy Dept to witness this procedure. Besides Verney Cable there were George Roth, Athol Rafter, Bill McCabe, Eugene Lynch and John Logan. On this day George Roth discovered a small amount of unsealed radium overlooked during the shift of the radon plant to Christchurch. The source was sealed and quietly transported to Christchurch for safe disposal. 36 years later there is still detectable activity in this area, but as it is not occupied, there is no staff hazard...."

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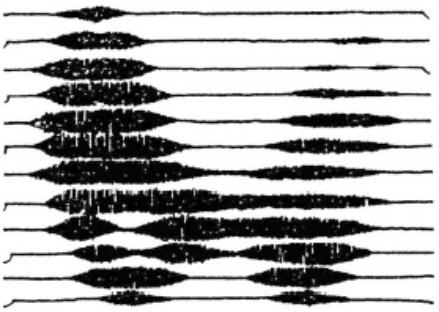


Typical thyroid scan, using phantom, taken on the Christchurch Hospital original rectilinear scanner (see later)

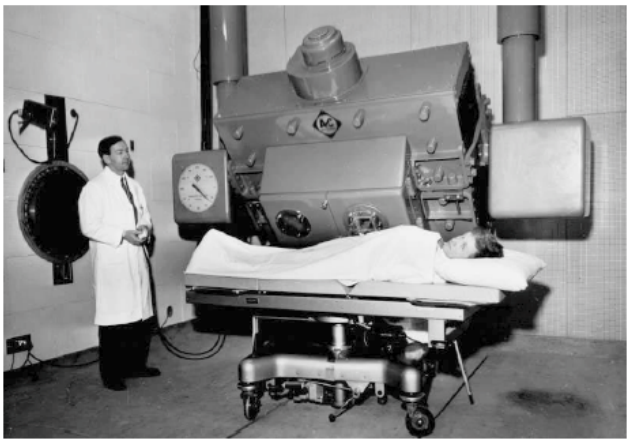
'Himalayan interlude', showing some of the equipment carried on willing backs up into the mountains, and the view! People (L-R): ? ; Kaye Ibbertson ; Jack Tait ; Ed Hillary

The Betatron:

The choice of the A-C betatron, with 40 years hindsight, was still an excellent one. The betatron was more-or-less 'condemned' by several visiting committees over the years, as being noisy (correct), non-isocentric (correct), limited in field sizes available (correct) - but then most members of these supposedly investigative committees had no personal experience of clinical supervoltage radiotherapy; none had any experience of electron beam therapy. On the positive side, the photon beam had an adequate if not high dose-rate; % depth dose was ideal; the electron beam energies which became available after our local developmental work (6-20 MeV) came to be regarded everywhere as those essential for a modern unit; the reliability of the betatron over its active working life of 32 years (!) greatly exceeded that of any competitive machine. Its original cost was about that of linacs then available. The photon energy (24 MeV) has also come to be the high energy required of modern replacements, 30 years on.

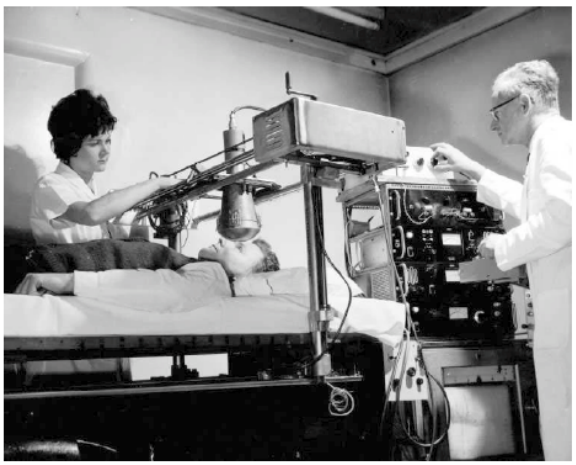
The problems with the betatron were largely physics matters - dosimetry in 1958 (when this machine was commissioned) for high energy photons had all sorts of question-marks; there was little clinical physics data available (although we obtained some isodose curves from Memorial Hospital, they differed from our machine); X-ray collimators had to be designed and built; beam flattening was unique to each machine, as was beam monitoring; we had to develop our electron beam operation completely, starting with only a dual beam donut (photon / electron) and an Allis-Chalmers' transmission monitor. This work included beam scattering foils; collimators; added protection; totally reliable beam energy/scattering foil selection. We ran daily dose calibration checks throughout the working life of the betatron, and never ever had any clinical problems due to machine malfunction. This was, and is, a great tribute to our small medical physics team of physicists and physics technicians, and X-ray servicemen, who worked together over all that time. The only problems came when the engineers (Chief Engineer and Electrical Engineer) tried to, or did, interfere, claiming that they were the proper people to 'look after' the betatron. They caused some unpleasant problems. A saga familiar to all centres in NZ, and many in the UK!

21 MeV 'natural' electron beam at open aperture in door, showing asymmetry caused by fringing magnet field; the problem was to achieve a uniform 'scattered' beam for use. 1961 developmental work; Kodak 'Translite' pearl-based film.

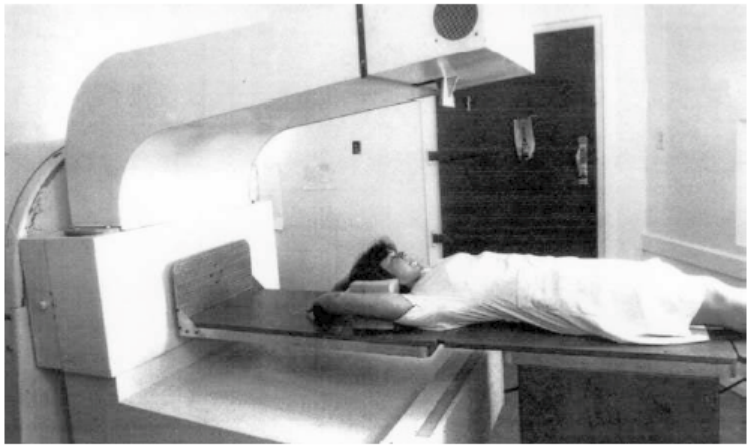


Allis-Chalmers 24 MeV Betatron, Wakari Hospital, March 1958 (Dr Frank Ramsay holding pendant controls; Howard Tripp as simulated patient. Note 60 cm dia water window; TV camera.

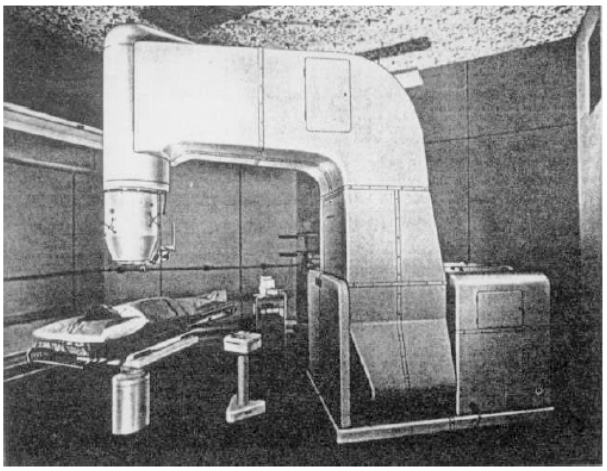
...some examples of the equipment back in the day! How technology has advanced!



Early rectilinear scanner, designed and built by Medical Physics staff, Christchurch Hospital, with Jack Tait at the controls, and Tom Rogers as a 'simulated' patient.



Christchurch designed-and-built X-ray CT scanner



Metropolitan-Vickers 4MV Series-1 Linear accelerator, with 1 metre waveguide: identical to the Auckland Hospital unit, installed 1958

Palmerston North Hospital first supervoltage unit: Barazzetti Co-60, 55 cm SAD unit, installed 1958.