



ARDENT MID-TERM REVIEW

ESR 8: BRACHYVIEW

KEVIN LOO

- INSTITUTE OF EXPERIMENTAL AND APPLIED PHYSICS, CZECH TECHNICAL UNIVERSITY
- CENTRE FOR MEDICAL RADIATION PHYSICS, UNIVERSITY OF WOLLONGONG

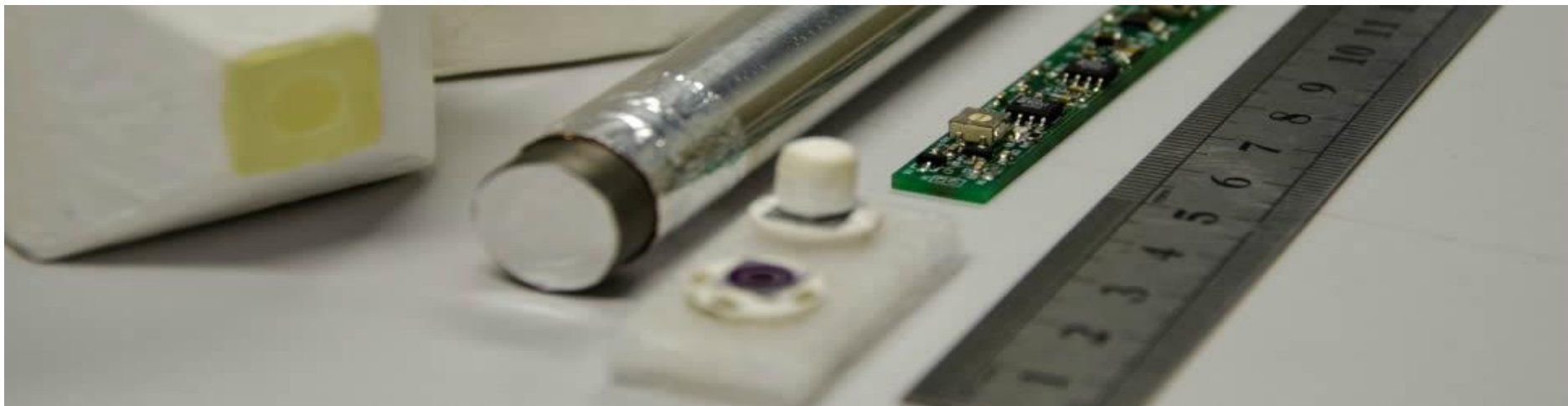
Education

- Illawarra Christian School (Wollongong, Australia): 1995-2005
- Bachelor of Medical Radiation Physics: 2006-2009
- Honours research: 2010
 - ▣ Eye cancer radiation therapy
- PhD research: 2010-present
 - ▣ Prostate cancer brachytherapy radiation therapy



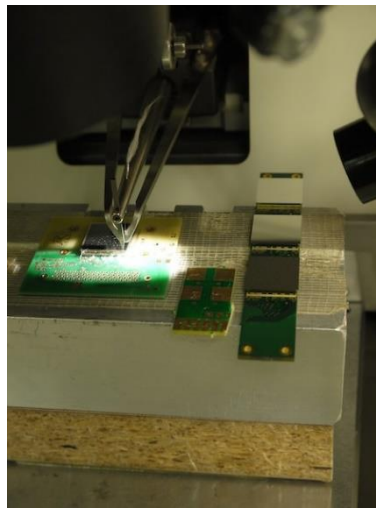
CMRP, UOW

- Specialise in:
 - ▣ Radiation dosimetry
 - ▣ Radiation protection
 - ▣ Detector development



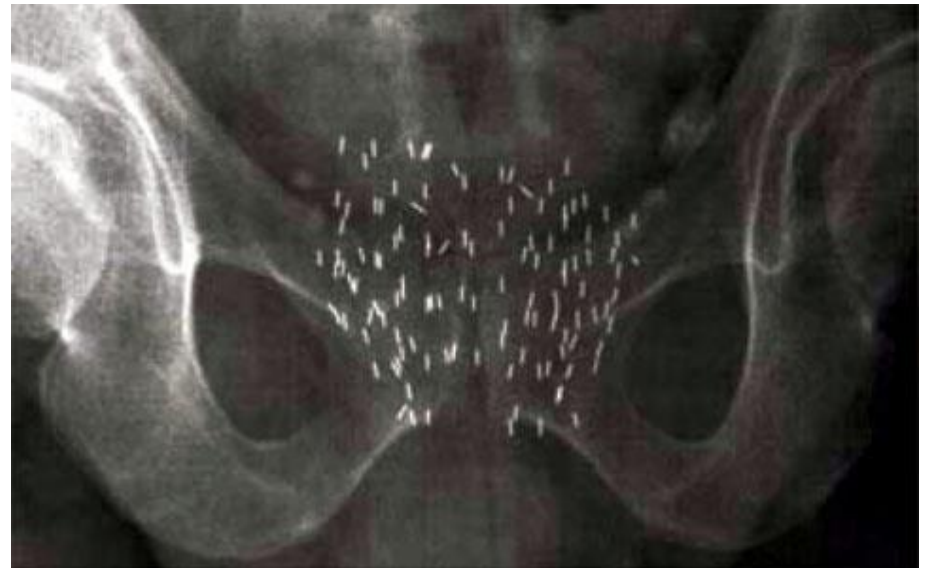
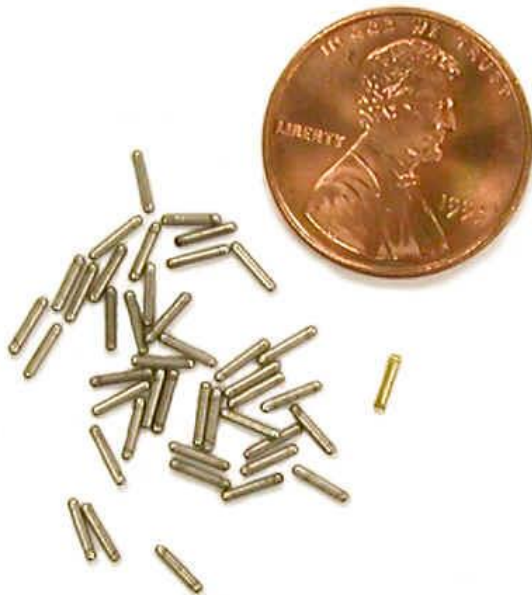
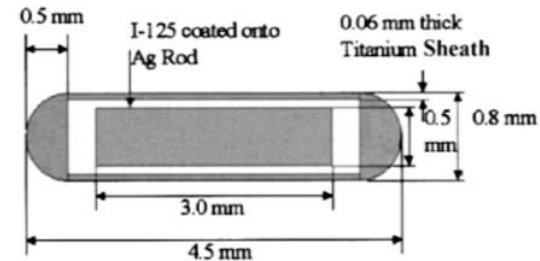
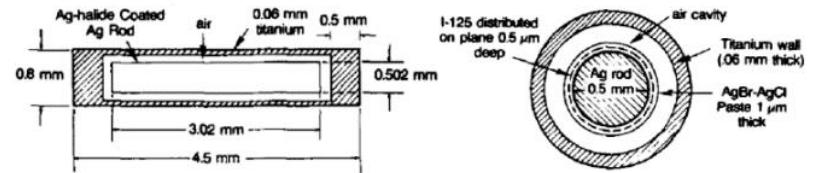
IEAP, Prague, Czech Republic

- Institute of Experimental and Applied Physics, Czech Technical University in Prague

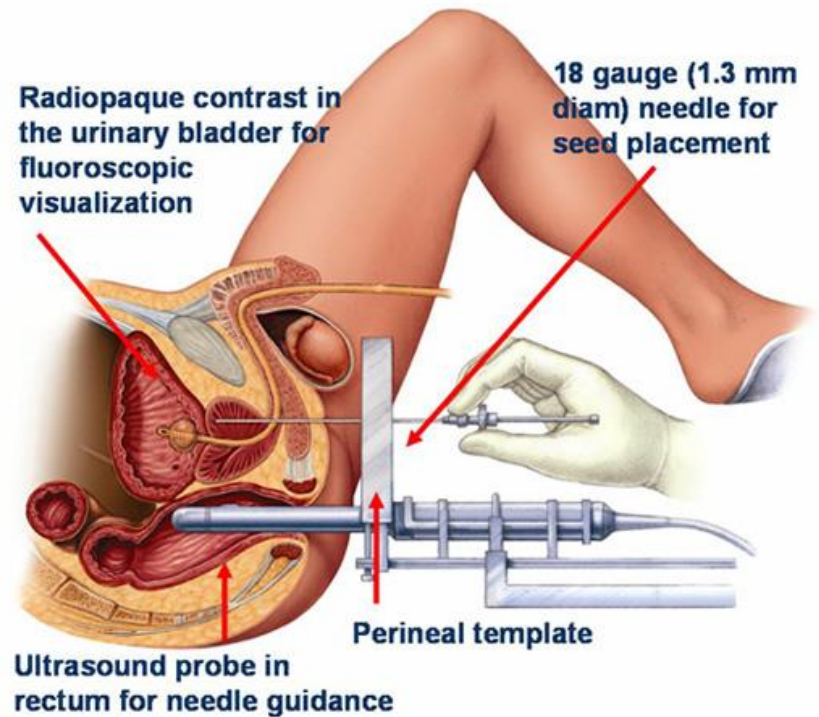
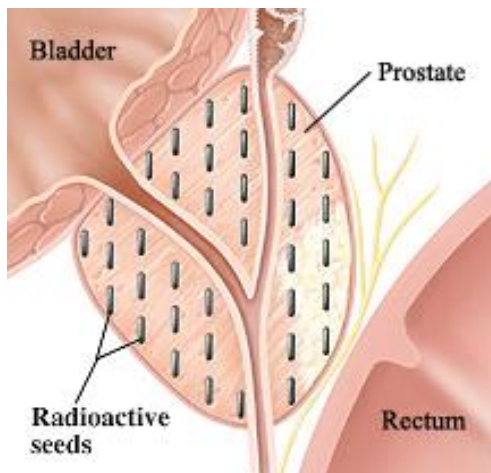
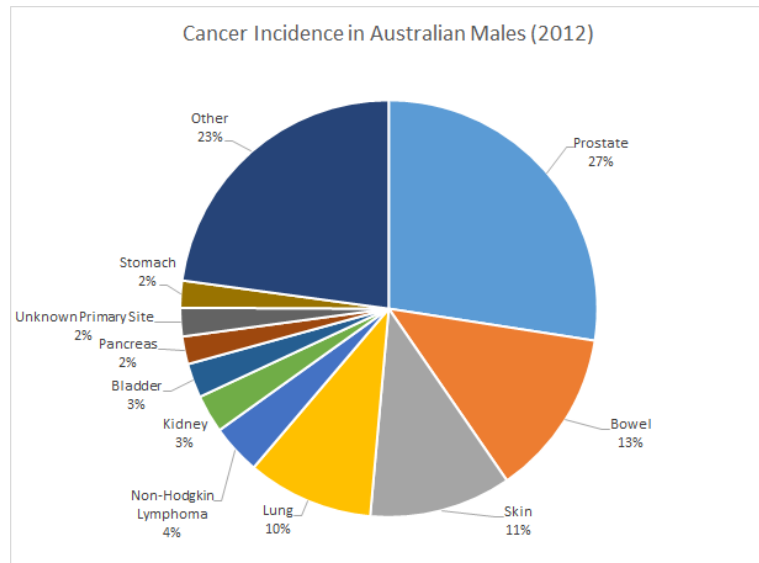


Brachytherapy for cancer treatment

- 'Brachys' = Greek for short, near, close-distance
- Direct delivery of therapeutic radiation to tumour
- HDR: Ir-192
- LDR: Iodine-125



Prostate Brachytherapy



Complications

□ **More Radiation** = better cancer control

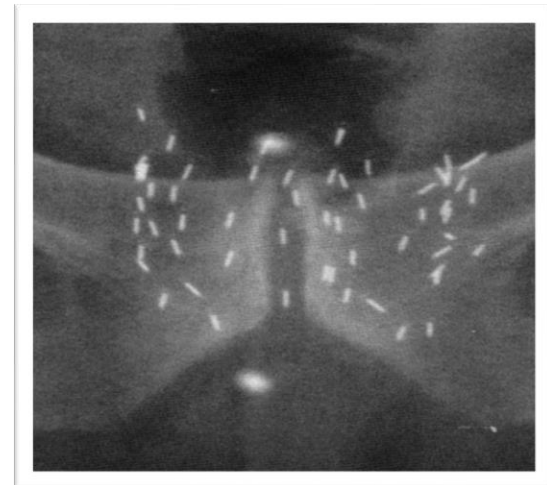
□ Urethral toxicity

- ▣ Incontinence
- ▣ Retention
- ▣ Dysuria, hematuria
- ▣ Frequency, urgency

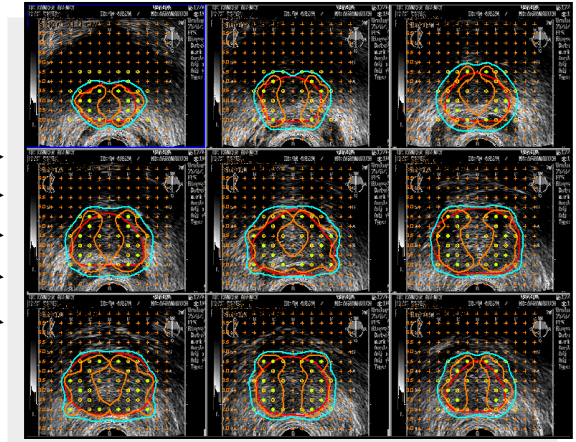
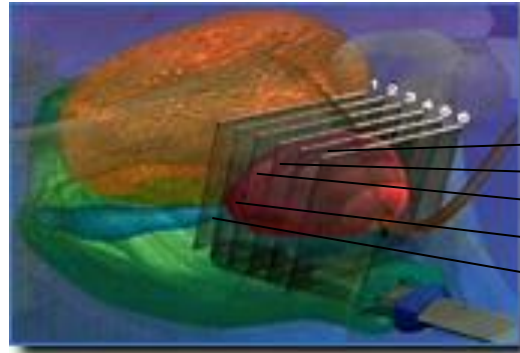
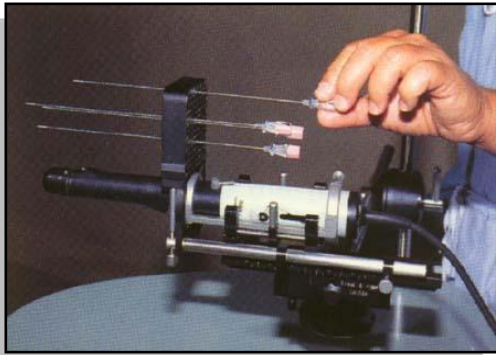
□ Rectal and bowel toxicity

- ▣ Bleeding
- ▣ Frequency, urgency

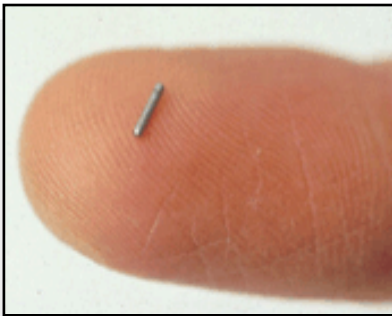
- Studies have shown that source placement is one of the biggest contributing factors to these complications
- Urethral and rectal toxicity: 40% of cases
- No real-time planning



Current Technology – TRUS

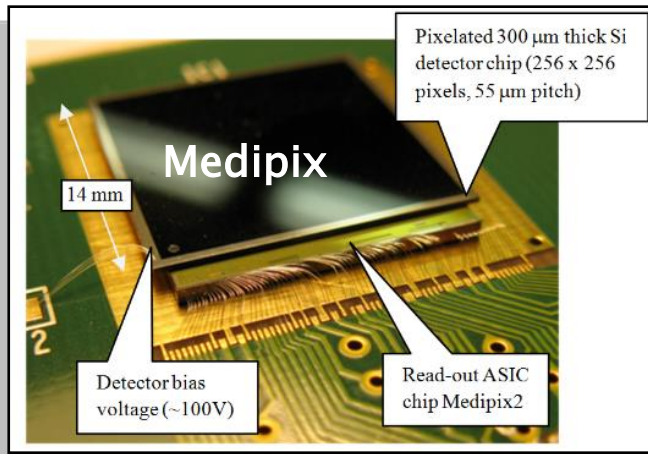


Ultrasound-guided insertion
of brachy sources



- Ultrasound is precise for soft-tissue anatomy, but not the seeds themselves.
- Furthermore, the pre-planned treatment plan does not necessarily match the implanted volume
- **Is there a way to do intraoperative dynamic dose optimisation?**

My PhD work: BrachyView



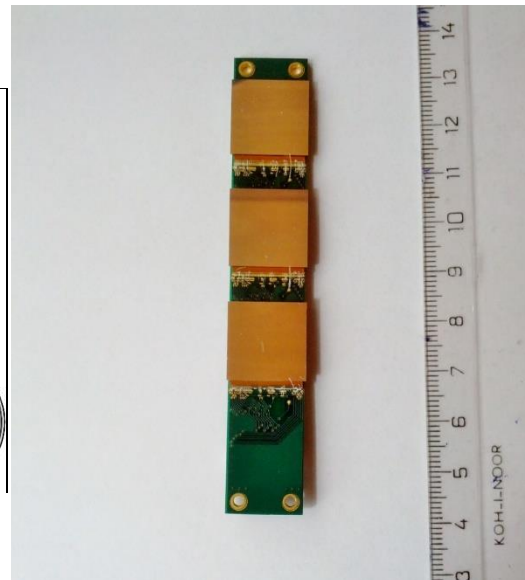
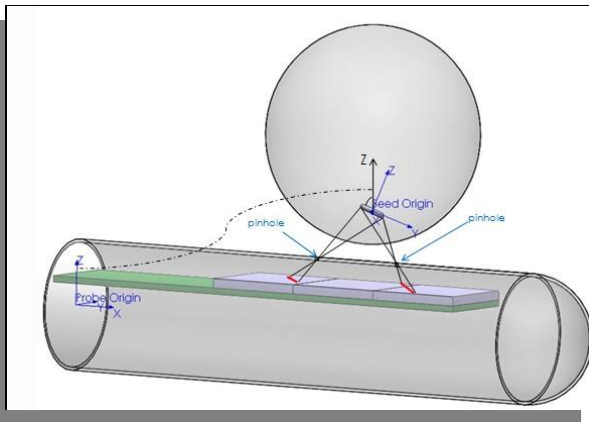
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IV



Gamma Camera
> US\$ 700,000



- Ultra-functional in-body imaging device
- Novel multiple chip assembly
- Cover a wide variety of modalities: pinhole imaging, CT reconstruction, soft tissue imaging

Training Activities

- Joint International Workshop on Off-Site Gamma Dose Rate and Ground Contamination Measurements
 - ▣ 13-15 May, 2013
- Czech Language Training Centre
 - ▣ Ongoing
- Working and training masters students



Czech for Foreigners
with Czech Language Training

Groups of 4-6, monthly payment only, immediate enrolment

Presentations and Publications

1. **BrachyView: Proof-of-principle of a novel in-body gamma camera for low dose-rate prostate brachytherapy**, *Medical Physics*: 40(4)
 - ▣ April
2. Invited talk at CMRP, UOW
 - ▣ August 17
3. Poster presentation at Solid State Dosimetry (SSD17) conference in Recife, Brazil
 - ▣ 'BrachyView: Feasibility Study of TimePix for Soft Tissue Thickness 'Colour X-Ray' Imaging in Prostate Brachytherapy Treatment'
 - ▣ September 22-27
4. Oral presentation at Solid State Dosimetry (SSD17) conference in Recife, Brazil, September
 - ▣ September 22-27
5. Paper accepted for oral presentation at IEEE NSS-MIC in Seoul, South Korea
 - ▣ October 27- November 2
 - ▣ 'BrachyView: Tomographic Reconstruction Using Timepix Detectors in Post-Implant Dosimetry Checks for Permanent Prostate Brachytherapy Implants'



Outreach

- ❑ Illawarra Christian School, Wollongong, Australia
- ❑ Rotary Foundation, Parramatta, Australia
- ❑ Kirrawee High School, Sydney, Australia
- ❑ 'Speed Date a Physicist', Wollongong, Australia





Questions!

Thank you!

