Evolution of an Industry Advisory Board

School of Mathematics and Physics

Danny Atkins

SEPnet Employer Engagement Fellow

A Little Background

- Portsmouth had Physics degree and masters courses until its demise in 2001
- Industry formed a very close link with the masters course
- Physics reformed in 2010 with input from industry partners
- Joined SEPnet in 2010
- Started Industry Advisory Board 2012

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Reviews

- Wakeham Review, 2016 (STEM Degree provision and Graduate Employability)
- Shadbolt Review, 2016 (Computer Science Degree Accreditation and Graduate Employability)

Alongside more detailed recommendations, both reviews identified that:

•*students would benefit from universities and employers working together* to expand and improve the array of work experience opportunities and embedding the learning from work experience more consistently in degrees

•professional bodies need to strengthen their accreditation systems so they support universities to deliver high-level STEM skills that are most relevant to industry

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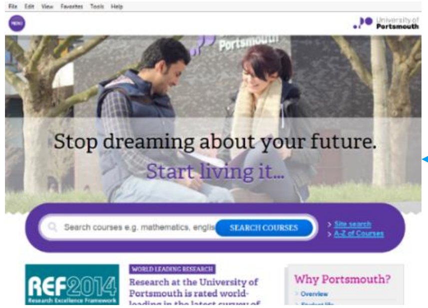
Learning Links

Academia



Academic Learning
Skills Learning

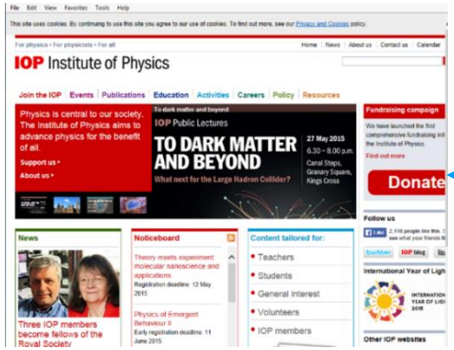
SEPnet

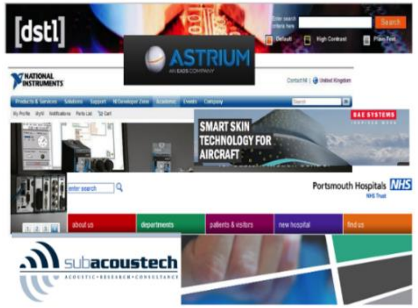
Professional learning

Student

Placements
Mentoring
Transferrable Skills

Professional Bodies





Industry

Continual Professional Development

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Forming an Industrial Advisory Board (IAB)

- Start with contacts you know, build up a small group
- Local employers and appoint Chair from industry
- One productive working meeting per year with clear activities and outcomes.
- Ensure benefits exist for employers:
  - Provide resources, academic specialists, student workers
  - Promote your company
  - Provide a recruitment opportunity
  - Improve Corporate Responsibility on both sides

IAB Aims

- What do you want to achieve?
  - Clear benefits for all parties
  - Leadership/vision/critical friends
  - Industry needs for CPD
  - Identification of funding streams
  - Joint projects
  - Keeping things on track
  - Helping to devise and implement strategy

Current IAB Invitees

Name

- Selex Galileo
- Dstl Acoustics
- BAE Systems
- Airbus Defence and Space
- SEPnet
- Defence Academy
- National Instruments
- NPL
- Dstl Alverstoke underwater
- Dstl
- Ports Hospitals NHS Trust
- QTEC
- IBM
- Fry IT
- STFC
- Astrium
- IRed Ltd
- Nabla ventures
- DSTL Environment Science
- STS Defence

Kurt J Lesker
Grass Valley
IOP – Business Engagement

Head of School
Student Placement and Employability Centre
Institute of Cosmology and Gravitation academics
Physics academics

Student reps

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The IAB

- Needs to understand:
  - The current demands of employment (as encountered by physics graduates)
  - The value of physics knowledge in adding value in employment
  - The nature and value of employability skills in adding value in employment
  - The value of “employability” from employers’ perspective
  - Embrace the need to provide suitable learning opportunities *within the physics curriculum*

Student skills

- 2011 The IOP publication The physics degree – graduate skills base and the core of Physics
https://www.iop.org/education/higher_education/accreditation/file_43311.pdf

- 2017 Physics today - Preparing physics students for 21st century careers
https://physicstoday.scitation.org/doi/10.1063/PT.3.3763

- 2019 Graduate prospects – What can I do with my physics degree?
https://www.prospects.ac.uk/careers-advice/what-can-i-do-with-my-degree/physics

Make sure all attendees requirements are registered in the meeting minutes

Engaging Employers with Curriculum Design and Delivery – What we do

Involvement in curriculum delivery in credit-rated units at each level;

Applications and Impacts of Physics (20 credits L4)
Industry-lead Problem Based Learning in the labs at L5 Group and Individual Industry Projects at L6 (40 credits BSc)
80 credit projects at MPhys (L7)

RF and Microwave Systems (L6)– industry specialists
Health Physics (L6) – medical physicists

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Example: Applications and Impacts of Physics L4 (20 credits)

- Introduction to the application of physics in industry and employment
- Industry and Health Professionals deliver lectures/Students engage in site visits
- Begin to develop independent research skills and communication skills
- Assessment: case study, presentation and popular article.

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Industry Placements

- Year-in-Industry
  Most problematic element – range of reasons.
  Competitive nature of large company Year-in-Industry schemes.
  Relatively low budget operations of most SME's – timing issues.
  2017 – 1 students placed
  2018 – 2 student placed
  2019 – 2 students placed

- SEPnet placements
  8 weeks summer placements can form basis for final year project.
  2017 – 2 students placed
  2018 - 1 student placed
  2019 - 8 students placed

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Industry Placements (Continued)

- Other Options

  4 on (non-SEPnet) summer placements

  1 on Teacher training summer scheme

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Industry Projects

Final year (40 credit BSc, 80 credit MPhys) joint university-industry projects integrating experimental, theoretical and computational skills and knowledge to design, plan, implement and evaluate a project that addresses specific problems that arise in the industrial, research and field context.

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QinetiQ

Defence Academy of the United Kingdom

AIRBUS DEFENCE & SPACE

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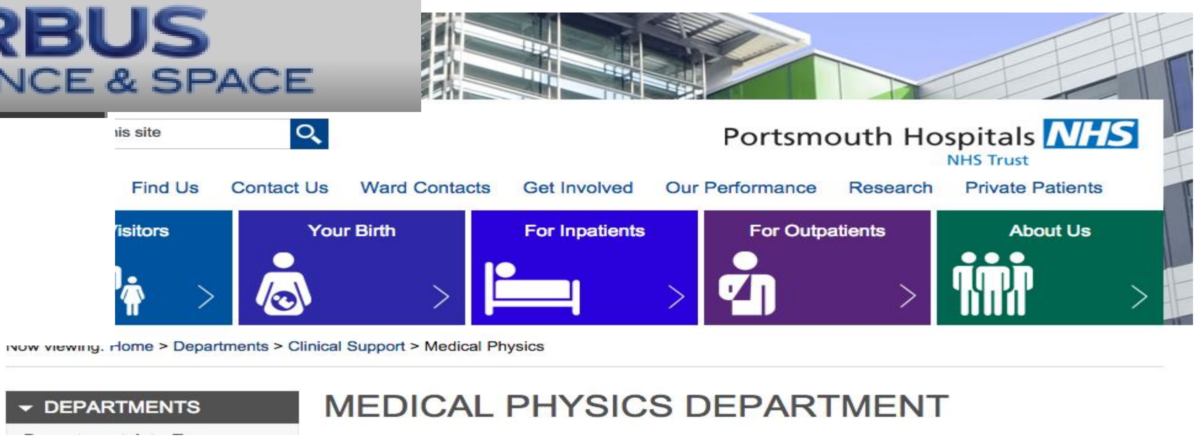


Positive Outcomes

DMFR A Journal of Head & Neck Imaging
DentoMaxilloFacial Radiology

Dentomaxillofac Radiol. 2015 Feb; 44(2): 20140223. PMCID: PMC4614175
Published online 2014 Nov 20. doi: 10.1259/dmfr.20140223

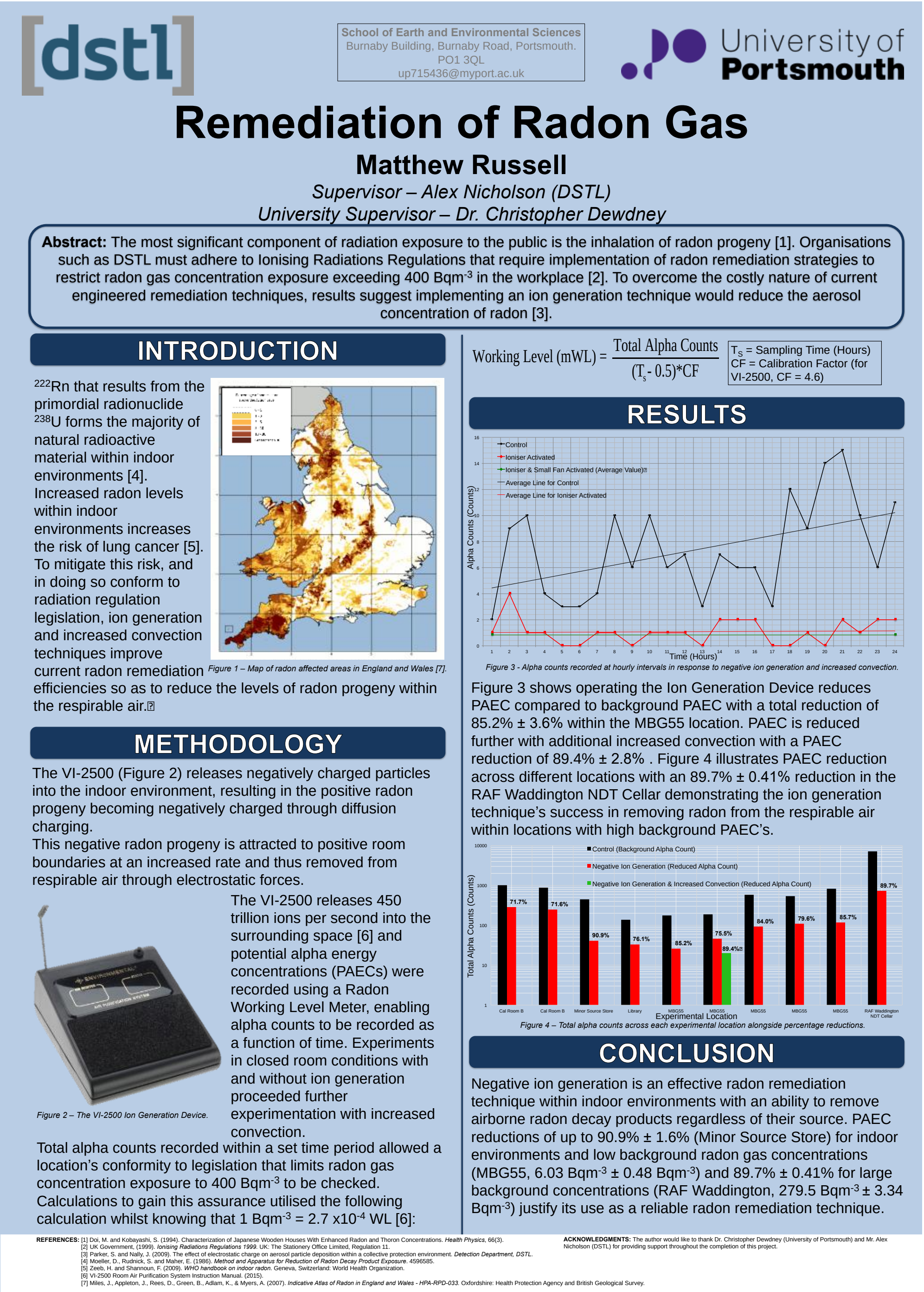
The reduction of dose in paediatric panoramic radiography: the impact of collimator height and programme selection

A T Davis, H Safi, and S M Maddison

Author information ▶ Article notes ▶ Copyright and License information ▶

Poster Output

- Poster is the standard output
- Displayed in the School
- Good Publicity for the company



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Remediation of Radon Gas

Matthew Russell

Supervisor – Alex Nicholson (DSTL)

University Supervisor – Dr. Christopher Dewdney

Abstract: The most significant component of radiation exposure to the public is the inhalation of radon progeny [1]. Organisations such as DSTL must adhere to Ionising Radiations Regulations that require implementation of radon remediation strategies to restrict radon gas concentration exposure exceeding 400 Bqm^{-3} in the workplace [2]. To overcome the costly nature of current engineered remediation techniques, results suggest implementing an ion generation technique would reduce the aerosol concentration of radon [3].

INTRODUCTION

^{222}Rn that results from the primordial radionuclide ^{238}U forms the majority of natural radioactive material within indoor environments [4]. Increased radon levels within indoor environments increases the risk of lung cancer [5]. To mitigate this risk, and in doing so conform to radiation regulation legislation, ion generation and increased convection techniques improve current radon remediation efficiencies so as to reduce the levels of radon progeny within the respirable air.

Figure 1 – Map of radon affected areas in England and Wales [7].

METHODOLOGY

The VI-2500 (Figure 2) releases negatively charged particles into the indoor environment, resulting in the positive radon progeny becoming negatively charged through diffusion charging.
This negative radon progeny is attracted to positive room boundaries at an increased rate and thus removed from respirable air through electrostatic forces.

The VI-2500 releases 450 trillion ions per second into the surrounding space [6] and potential alpha energy concentrations (PAECs) were recorded using a Radon Working Level Meter, enabling alpha counts to be recorded as a function of time. Experiments in closed room conditions with and without ion generation proceeded further experimentation with increased convection.

Figure 2 – The VI-2500 Ion Generation Device.

Total alpha counts recorded within a set time period allowed a location's conformity to legislation that limits radon gas concentration exposure to 400 Bqm^{-3} to be checked. Calculations to gain this assurance utilised the following calculation whilst knowing that 1 Bqm^{-3} = 2.7 $\times 10^{-4}$ WL [6]:

$$\text{Working Level (mWL)} = \frac{\text{Total Alpha Counts}}{(T_s - 0.5)*CF}$$

T_S = Sampling Time (Hours)
CF = Calibration Factor (for VI-2500, CF = 4.6)

RESULTS

Figure 3 - Alpha counts recorded at hourly intervals in response to negative ion generation and increased convection.

Figure 3 shows operating the Ion Generation Device reduces PAEC compared to background PAEC with a total reduction of 85.2% ± 3.6% within the MBG55 location. PAEC is reduced further with additional increased convection with a PAEC reduction of 89.4% ± 2.8% . Figure 4 illustrates PAEC reduction across different locations with an 89.7% ± 0.41% reduction in the RAF Waddington NDT Cellar demonstrating the ion generation technique's success in removing radon from the respirable air within locations with high background PAEC's.

Figure 4 – Total alpha counts across each experimental location alongside percentage reductions.

CONCLUSION

Negative ion generation is an effective radon remediation technique within indoor environments with an ability to remove airborne radon decay products regardless of their source. PAEC reductions of up to 90.9% ± 1.6% (Minor Source Store) for indoor environments and low background radon gas concentrations (MBG55, 6.03 Bqm^{-3} ± 0.48 Bqm^{-3}) and 89.7% ± 0.41% for large background concentrations (RAF Waddington, 279.5 Bqm^{-3} ± 3.34 Bqm^{-3}) justify its use as a reliable radon remediation technique.

REFERENCES: [1] Doi, M. and Kobayashi, S. (1994). Characterization of Japanese Wooden Houses With Enhanced Radon and Thoron Concentrations. *Health Physics*, 66(3).
[2] UK Government, (1999). *Ionising Radiations Regulations 1999.* UK: The Stationery Office Limited, Regulation 11.
[3] Parker, S. and Nally, J. (2009). The effect of electrostatic charge on aerosol particle deposition within a collective protection environment. *Detection Department, DSTL.*
[4] Moeller, D., Rudnick, S. and Maher, E. (1986). *Method and Apparatus for Reduction of Radon Decay Product Exposure.* 4596585.
[5] Zeeb, H. and Shannoun, F. (2009). *WHO handbook on indoor radon.* Geneva, Switzerland: World Health Organization.
[6] VI-2500 Room Air Purification System Instruction Manual. (2015).
[7] Miles, J., Appleton, J., Rees, D., Green, B., Adlam, K., & Myers, A. (2007). *Indicative Atlas of Radon in England and Wales - HPA-RPD-033.* Oxfordshire: Health Protection Agency and British Geological Survey.

ACKNOWLEDGMENTS: The author would like to thank Dr. Christopher Dewdney (University of Portsmouth) and Mr. Alex Nicholson (DSTL) for providing support throughout the completion of this project.

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Summary

key issues in starting, using and maintaining an IAB

- What do universities want to get out of it?
- What are you expecting from members?
- What will the industrial members get out of it?
- Who are your key industries?
- What other networking opportunities do you have (for staff and students)?
- How will you maintain impetus, monitor and measure success?

Act on the information you get, otherwise it is a tick box exercise of little value

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Thank you for listening