

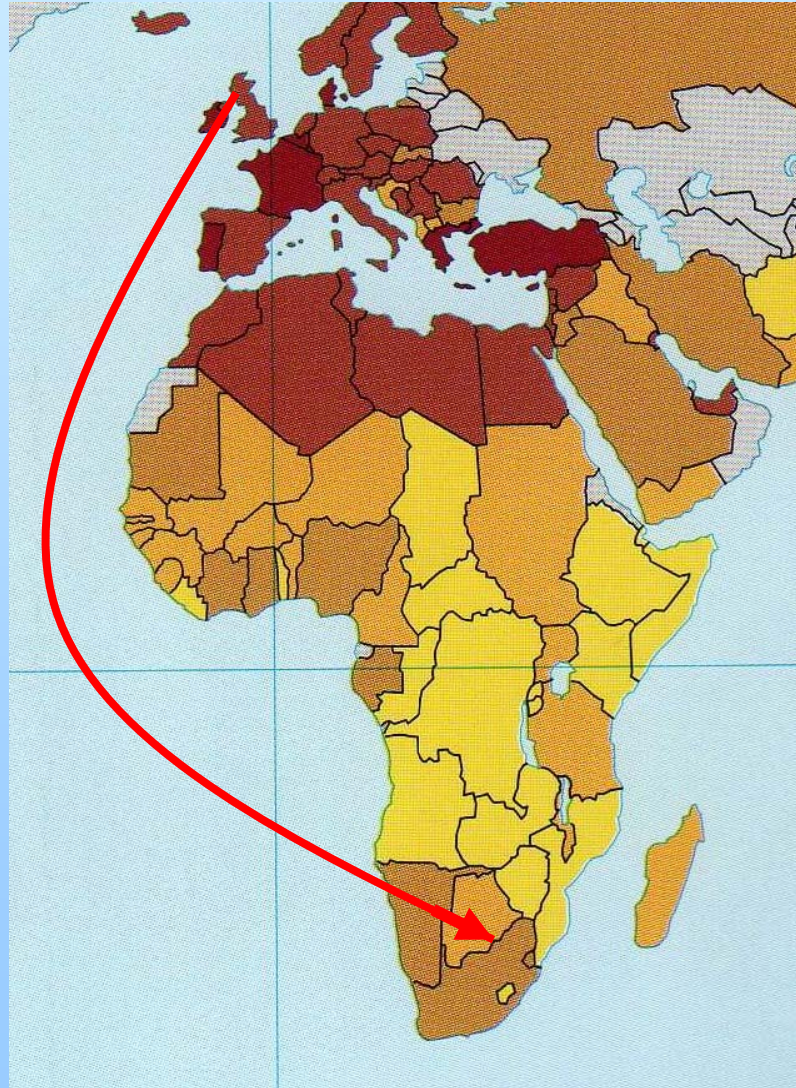


Dr Margaret O'Hara

Research Medical Physicist

- BSc (Hons) Strathclyde University 1986 - 1990
- PGCE St Andrew's College, Bearsden 1991- 1992
 - Physics Teacher Abronhill High School, Cumbernauld 1992 – 1994

1994. Moved to Botswana, Southern Africa to take up a post teaching physics in a high school in the capital city, Gaborone.



St Joseph's College, Gaborone 1995. Form 4F, 4th year top set physics class



St Joseph's College, Gaborone. St Joseph's day celebrations. Scottish country dance club doing a Gay Gordon's



Rainbow High School 1998. 1st years in school marimba band



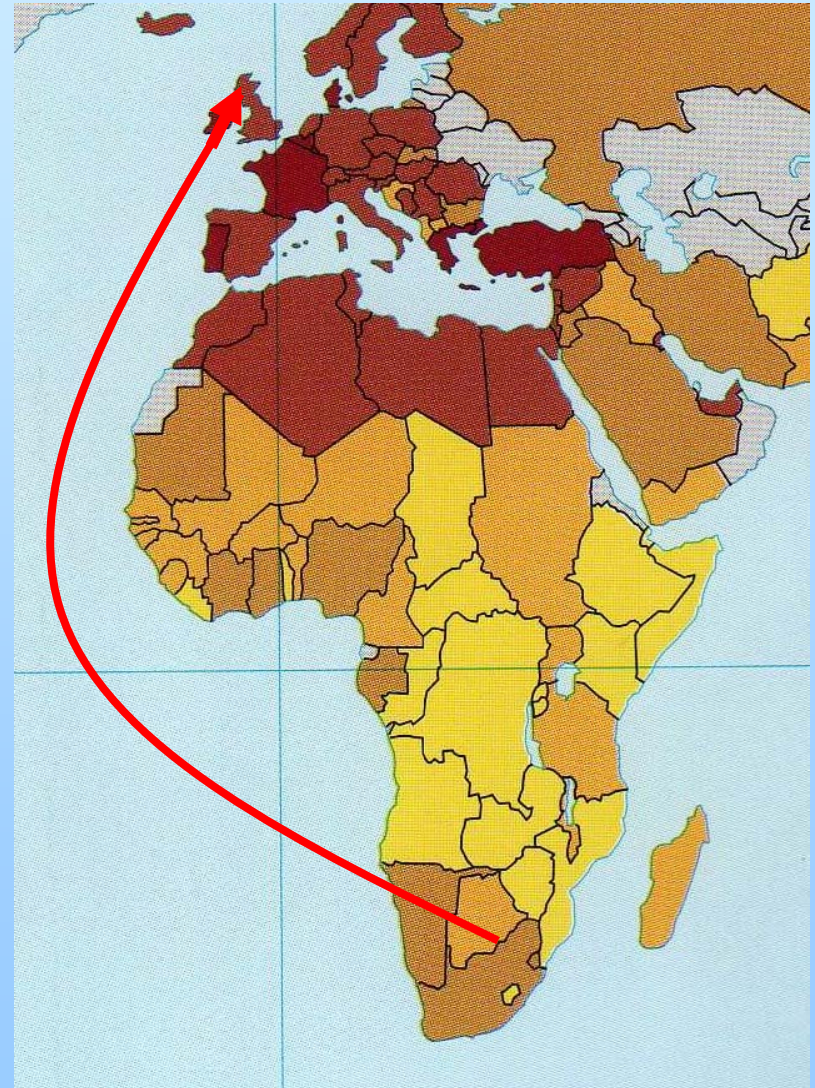
Form 2J, my 2nd year registration class, Maru a Pula High School, 2000







- 2001/2002 MSc
Medical and
Radiation Physics,
University of
Birmingham
 - MSc project-
electron, photon and
neutron simulation in
a medical linear
accelerator to
determine neutron
dose in a
radiotherapy
treatment room

Returned to UK end of 2000



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- 2002 – 2004 Part 1 training as clinical scientist, University Hospital Birmingham NHS Trust, Queen Elizabeth Hospital
 - Radiotherapy
 - Nuclear Medicine
 - Medical Imaging

Diploma of the Institute of Physics and
Engineering in Medicine

- 
- 2004 - 2009 PhD Medical/Molecular Physics, University of Birmingham
 - Using Proton Transfer Reaction Mass Spectrometer
 - Very sensitive instrument for detecting aroma molecules called Volatile Organic Compounds (VOCs)
 - Applied to analysis of compounds on human breath

Breath Analysis for disease diagnosis

PTR-MS



skin cancer

bladder cancer

prostate cancer



Breath analysis has been used to investigate many diseases and conditions....

Heart

Transplant rejection

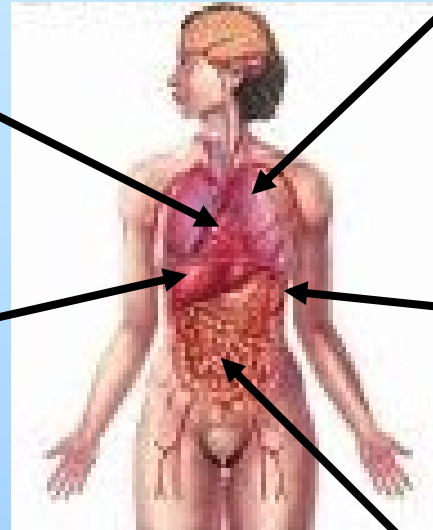
Angina

Lungs

Cancer

COPD

Asthma



Liver

Cirrhosis

Fatty liver

Kidney

Haemodialysis

Failure

GI Tract

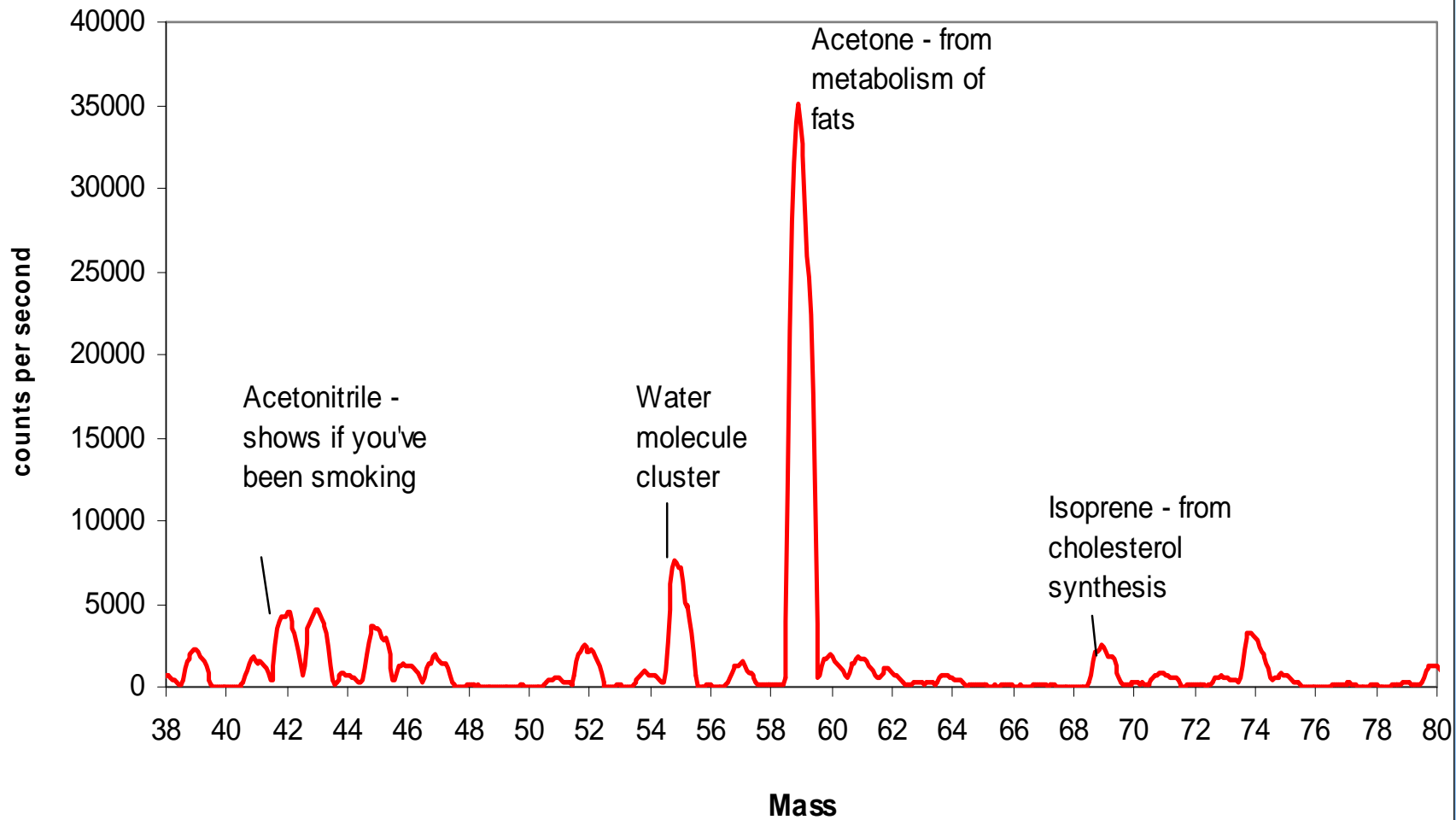
Irritable bowel

Colon cancer

Intestinal infections

and many more...

— Typical Human Breath Sample Spectrum





Current Position

- **Research Physicist**, Queen Elizabeth Hospital, UHB, radiotherapy department
 - Medical physics departments in hospitals are at the forefront of the process of continuous improvement of treatments – research plays a crucial role

What is Radiotherapy?

- Radiotherapy is the treatment of cancer tumours using **high energy X-Rays**.
(The X-rays used to make an image are low energy)

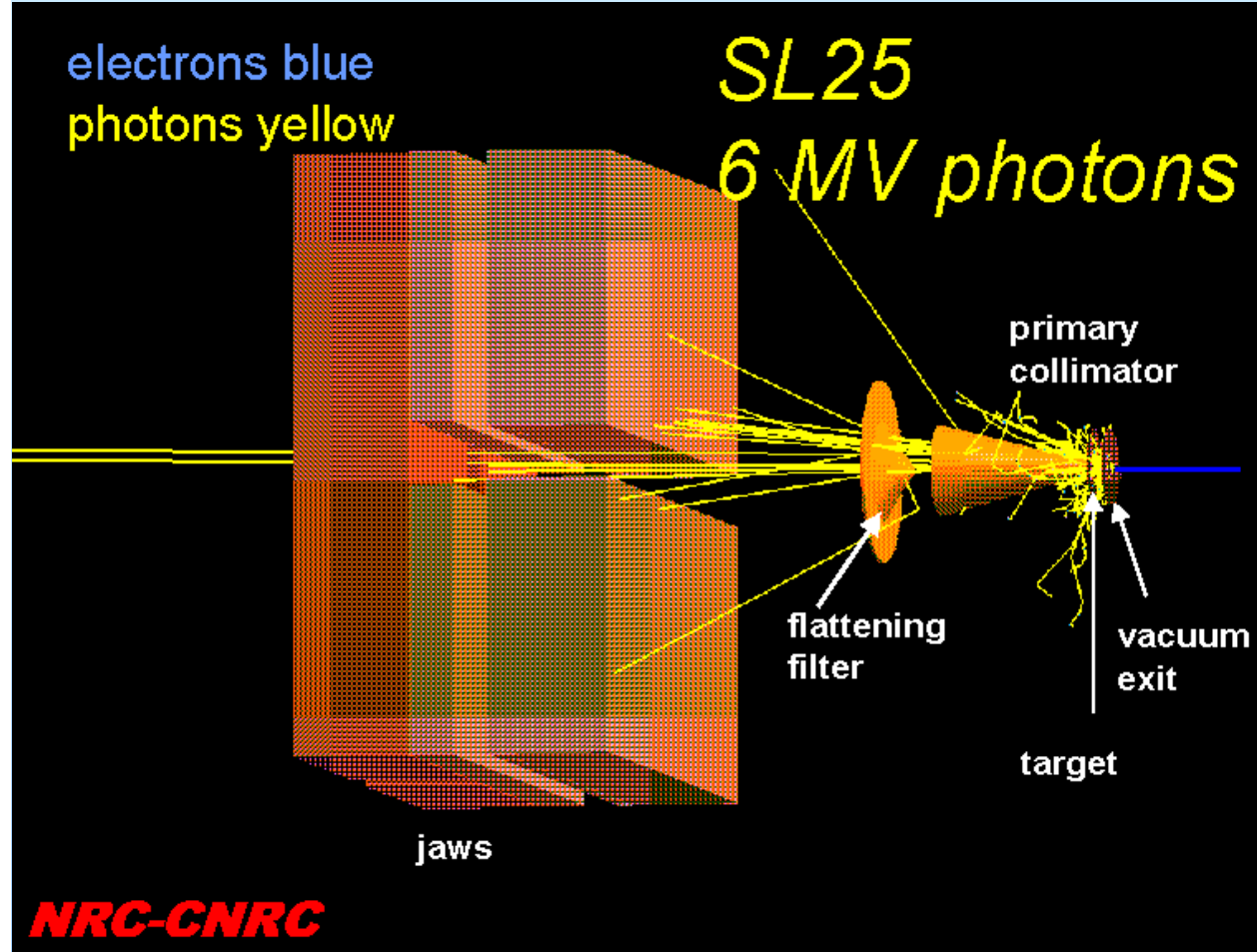


A Linear Accelerator (linac)

- Produces high energy X-rays by accelerating a beam of electrons across millions of volts into a tungsten target.



- I use special software to simulate the motion and reactions of **electrons** and **photons** in the linac
- aim is to make changes which will lead to **faster treatments** without affecting the dose given to the tumour.



The Future...

- Applying to research funding councils for grants to continue PhD research
 - Project planned to use breath analysis to find new ways of diagnosing liver disease



Thank you for your attention.....

