Careers in Addressing Global Challenges Day

Wednesday 4th November at 11:15-11:40am

Dr Liz Rylott

Researcher and Lecturer

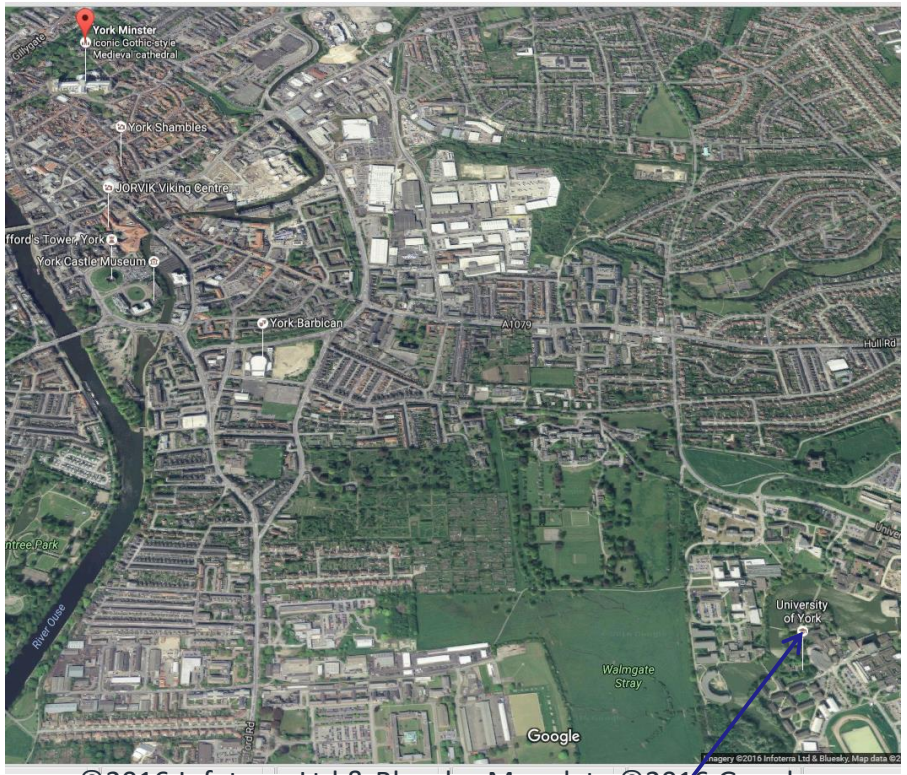
Plant Biotechnology

Where I work

Royal Society of Biology

TEF Gold Teaching Excellence Framework

Centre for Novel Agricultural Products



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University of York

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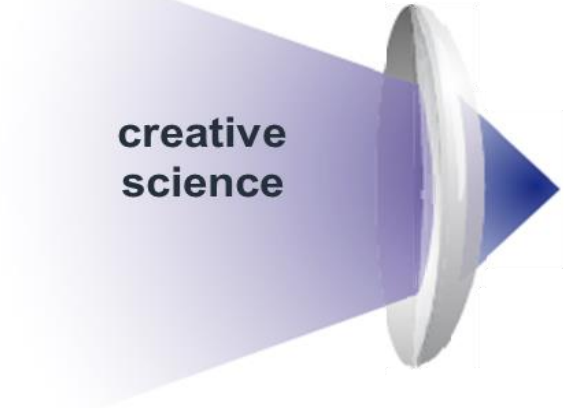
CNAP strategy:
Finding solutions in the natural world



problem solving

Bioenergy/biorenewables

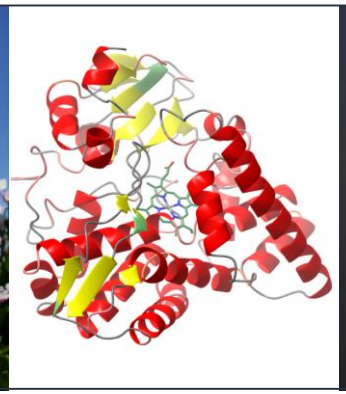
Health

Clean technologies/

Phytoremediation

Food



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Research and innovation focus areas

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What do I DO..?

Full-time researcher (80%) and lecturer (20%)

In a nutshell:

- Write
- Talk
- Smile
- Wave arms about
- Travel
- Run up and down stairs
- Eat cake

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A wonderfully varied job

- Supervision of undergraduate and post-graduate students (meetings, reports, lab demonstration)
- Writing research grant applications
- Writing research manuscripts for publication in scientific journals
- Tutorials and lectures (+ associated support)
- Committee meetings
- Writing reports for funding bodies
- Preparing and giving presentations at conferences
- Senior handling editor for IJP
- Vice president for IPS (conference organising, chairing sessions, judging, fund raising)
- Troubleshooting, fixing, canvassing, lobbying…

My research - Bioremediation

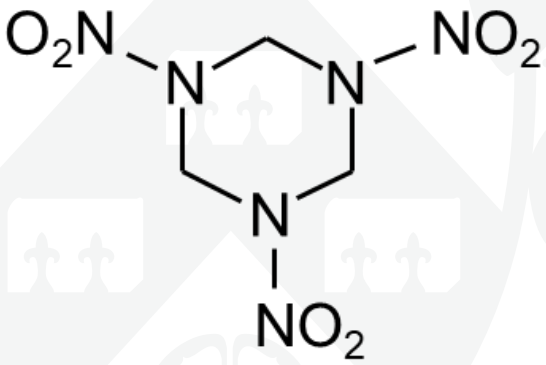
- Using plants to remediate explosive residues from military training ranges

- Using plants to take up and concentrate specific metals from polluted environments

Explosive pollutant 'partners in crime'

RDX

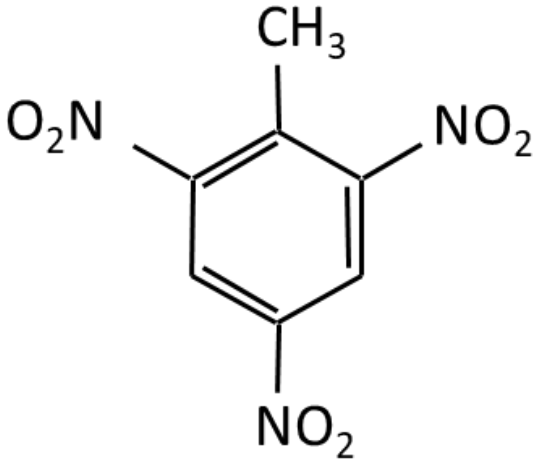
Hexahydro-1,3,5-trinitro-1,3,5-triazine



- Co-contaminants
- Not found in nature
- Little degradation in environment in last c. 60 years
- TOXIC

TNT

2,4,6-Trinitrotoluene



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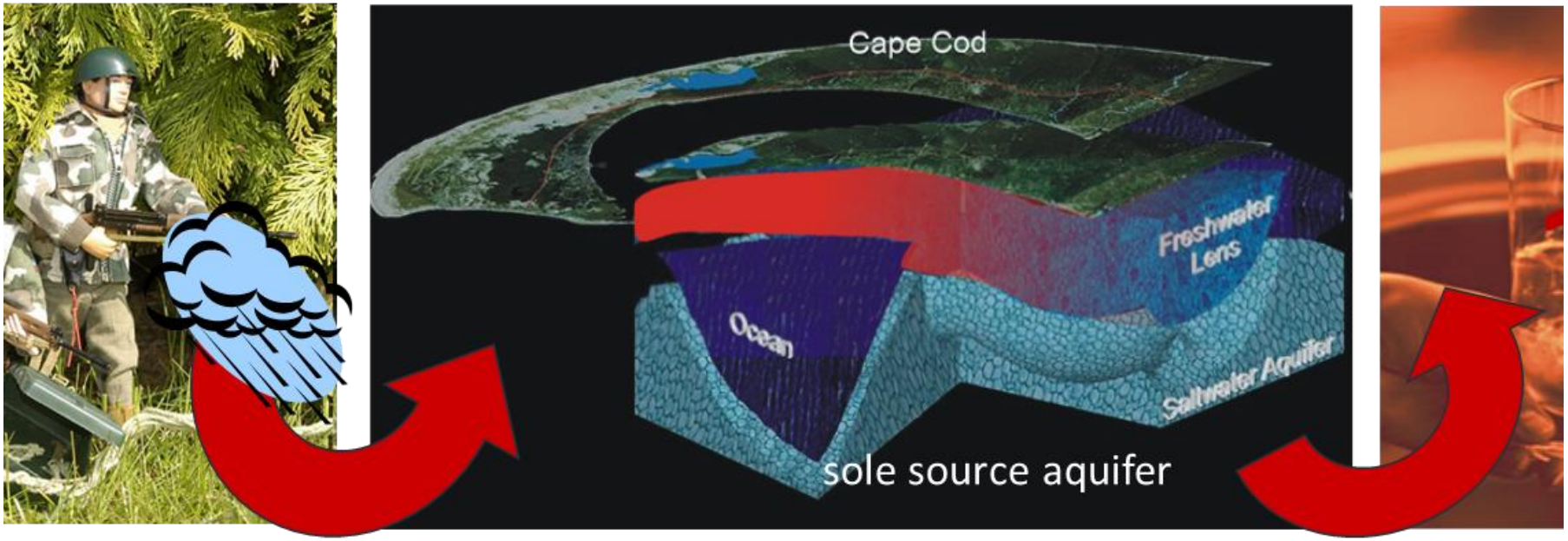
A specific problem with RDX…

Contamination of ground water is a significant problem around military training ranges



- Towns in the Cape Cod region have 15-55% higher incidence of breast cancer than US state average (Massachusetts Department of Public Health Survey 1982-1994)

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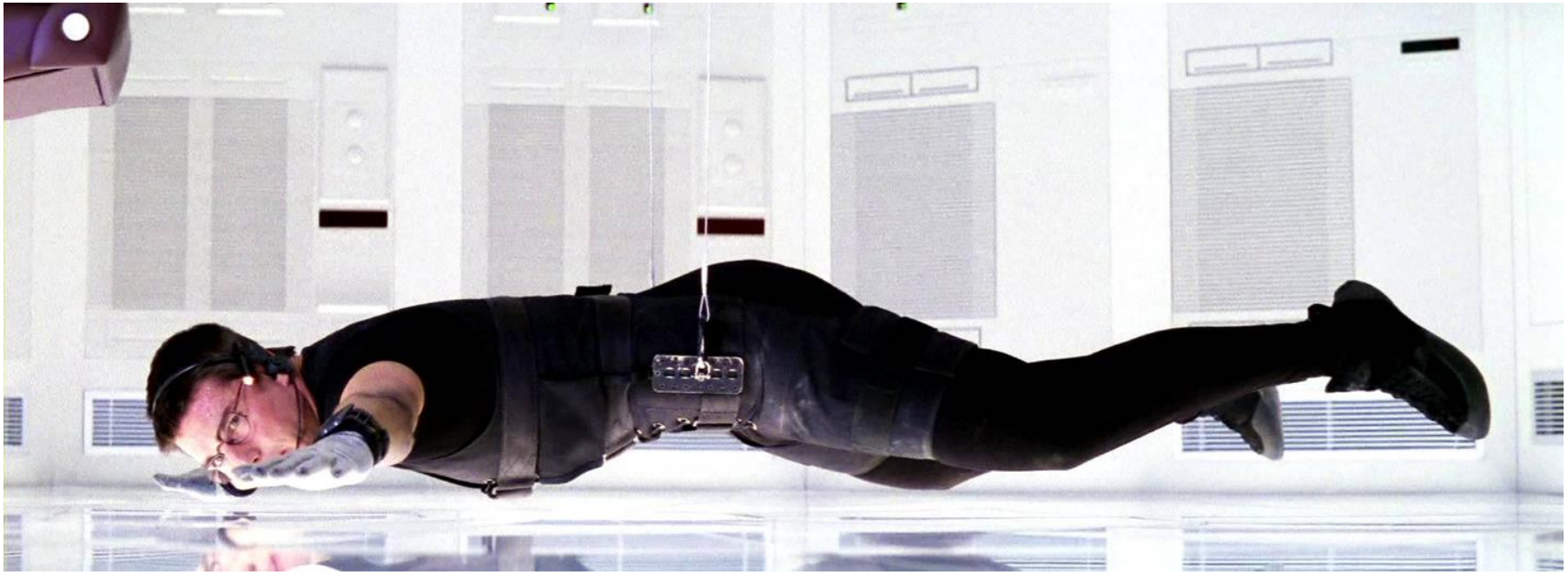
The Plant Biotechnologist's Mission:

To remediate and contain explosive contamination on military training ranges in the US



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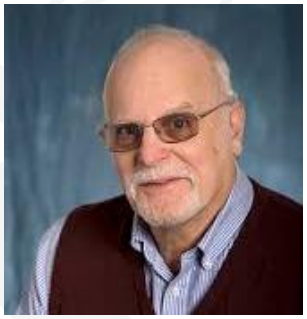
The Team

Mr Timothy Cary

U.S. Army Engineer Research and Development Center



Dr Stuart Strand

UNIVERSITY of WASHINGTON

Dr Neil Bruce

Dr Liz Rylott

UNIVERSITY of York

DoD EPA DOE SERDP
Strategic Environmental Research and Development Program

ESTCP

[dstl]

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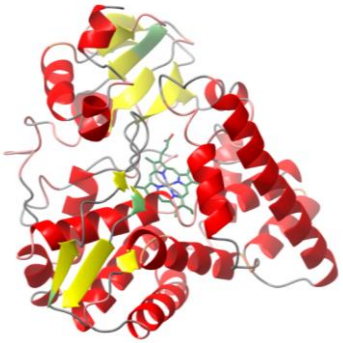
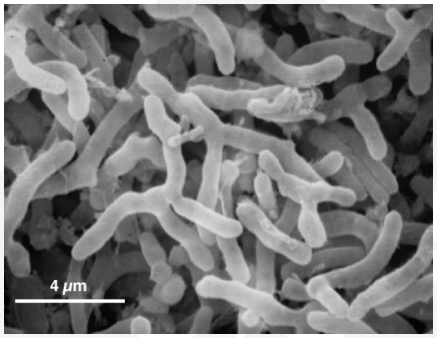
Study natural detoxification processes and harness for remediation

Microbes from the source environment



Study novel biochemistry



Isolate explosives-degrading microbes

Transfer to suitable plant species

Test the technology, laboratory, glasshouse, field scale, roll-out

Phytomining metals

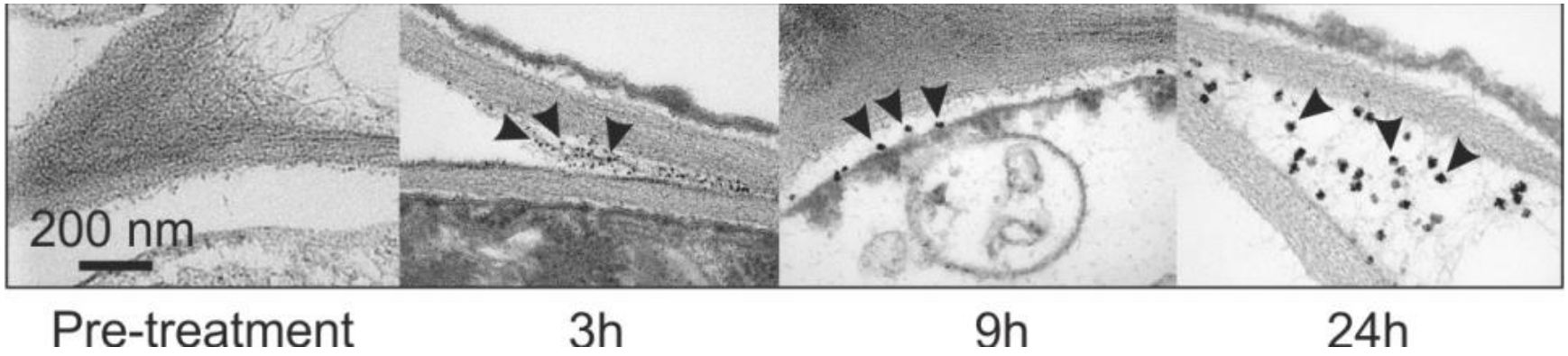
Consumption, Dispersal and Dilution

Waste sources

- Waste mine tailings
- Vehicle catalytic converters
- Roadside verges
- Electronics, industrial, municipal, and pharmaceutical waste

Using Plants to take up Gold and Palladium - Phytoextraction

Metals IN BIOLOGY



- Plants take up gold and palladium and form nanoparticles
- Pyrolysed Pd-biomass can be used as a chemical catalyst
- Pd-on Carbon catalysts worth > 5 x times price of pure Pd
- Using nanoparticles in planta adds value
- Reduced energy inputs and processing costs

Johnson Matthey Inspiring science, enhancing life

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BBSRC bioscience for the future

Yorwaste

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The scope of job opportunities in the sector and possible career pathways

- Researcher in academia
- Researcher in industry (medicine, biochemistry, microbiology, biomedical engineering)
  - UK companies (see Biorenewable Development Centre)
  - Funding bodies (UKRI)
- Policy makers
- Consultancy (Environmental management)
- Patent attorney
- Scientific journalism
- Any job you like…

Qualifications and experience required (including relevance of further qualifications such as MSc or PhD)

- Four-year BSc + integrated MSc are becoming increasingly popular
- PhD highly likely to contribute positively to a career in biotechnology

Relevance of the MSc and PhD topics?

A former undergraduate asked me this recently on LinkedIn:

"It's not just the subject, but the supervisor, location, lab environment (post-doc support?). Find somewhere you feel you'll enjoy and flourish in. The actual title of your final PhD isn't what gets you your dream job."

University of York, Centre for Novel Agricultural Products is an EXCELLENT place to study Biotechnology!

Qualifications and experience required (including relevance of further qualifications such as MSc or PhD)

Start now to make yourself stand out from the crowd:

- Build up (and check!) an online presence
  - LinkedIn
  - Twitter – follow pivotal researchers, institutes, companies, policy makers (see @LizRylott for an adequate example)
- Join a relevant society (Royal Society of Biology (obvs!), Society for Experimental Biology, Biochemistry Society etc. They all have great student rates
- Get a job as a summer intern, Gatsby Plant Sci Summer School
- Network – approach researchers (we're lovely people)
- Blog, webpage See Liz Rylott's webpage for a 'rough guide'

What to expect from choosing this career path

- Disaster!
  - Manuscripts rejected
  - Funding proposals rejected
  - Research scooped
- Exhalation!
  - Manuscripts accepted
  - Funding proposals accepted
  - Research first
- Conference travel around the world (post-covid…)
- Meet lots of wonderful people
- Work all over the world
- Make a small +ve difference…

A career in academia is not for the faint hearted!

Working practices and conditions that you might encounter

- Universities are hot houses for new ways of thinking e.g. cultural and societal values. What a great place to work!
- Flexible working practices, job sharing, part-time, good ma/paternity
- Access to wide range of (free!) professional development
- This is not a 9 – 5 job (what *good* jobs are?)
- The workload can be high and variable (exam marking, proposal deadlines)
- An expectation to win funding, get good student feedback, deliver high impact papers
- Vegan cakes

Career development opportunities

As current undergraduates take advantage of:

- University careers centre, and industrial links
- Ask about summer internships/PhD opportunities – approach academics
- If not too late…consider a year in industry
- Follow usual job ad sites (jobs.uk)
- Search online for more esoteric opportunities e.g. Laidlaw Scholarship at University of York
- **NEVER ASSUME SOMETHING IS NOT POSSIBLE – There is no rule book, e.g. if you have a job, but want to try a job in a different area alongside this, discuss with your line manager**

Skills required for a successful career

- Great time management skills
- Excellent people/communication skills
- Engaging presentation…
- Good writing skills
- Critical thinking
- Ability to ‘say no’!

Thank you for listening!

Happy to answer questions…

- liz.rylott@york.ac.uk
- Liz Rylott's homepage
- @LizRylott