From Curriculum Refresh to scholarly outputs

Michael Loughlin & Jody Winter

Biosciences

Curriculum refresh, modules/courses ready for 18/19

- In SST currently reviewing all roadmaps to ensure all changes stated will be in place by October.

- An enormous amount of change, refinement and/or enhancement.

- examples : one a whole module with multiple impacts of students, may be hard to define/measure.

- a specific change in one module with an impact that may be defined specifically.

- multiple changes across departments.

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"Professional Skills" in Microbiology - drivers

…what jobs do Microbiologists do?

…what skills do Microbiologists need?

| Success for all | Curriculum Refresh & RSoB accreditation |

Highly engaging module content

Work-like experience

Communication

Problem solving

Technical skills

Creativity

"Professional Skills" in Microbiology

Term 1/CWK 1:

- Practical lab skills

- Health & safety

- **Record keeping**

- *Practical* research

Term 2/CWK 2:

- *Online/library* research

- **Communication** skills

- Computing skills

- Current topics

"Professional Skills" in Microbiology

Term 1/CWK 1:

- Practical lab skills

- Health & safety

- **Record keeping**

- *Practical* research

Assessed by Benchling online lab notebook covering 7 labs + 1 bioinformatics workshop (50% module mark)

Term 2/CWK 2:

- *Online/library* research

- **Communication** skills

- Computing skills

- Current topics

Assessed by communicating science piece & associated tutorial activities (50% module mark)

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Expectations for this module

Laboratory assessment GBA grid includes marks for *professional standards of behaviour*

- – Arrive on time
- – Adhere to good laboratory practice, health & safety requirements etc
- – Keep detailed and accurate records of everything you do in the lab
- – Conduct yourself as you would in the workplace

Communicating Science:

Evaluate both peer reviewed journals and media piece dealing with science to find " happy medium" where science is accurately but engagingly delivered to the general public

Molecular relatedness of ESBL/AmpC–producing *Escherichia coli* from humans, animals, food and the environment analysis ⛺

Antibiotic-resistant bacteria are sweeping the US: CDC found hundreds of 'nightmare' bacteria last year - and a quarter can turn other germs into superbugs

Small World Initiative
crowdsourcing antibiotic discovery

"a unique crowdsourcing approach for the 21st century to tackle pressing global health challenges while inspiring the next generation of scientists."

Started at Yale University, 2012

Aims:
- antibiotic discovery
- inspire young scientists
- raise awareness of AMR

Now over 150 institutions across 12 countries

Small World Initiative
crowdsourcing antibiotic discovery

"the solutions to our current health challenges are just waiting to be found in the world around us and could even be discovered in the soil in your own backyard."

In the UK, Microbiology Society piloted SWI programmes in 2015/16 and are now running the UK scheme as "Antibiotics Unearthed".

MICROBIOLOGY SOCIETY

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Homepage › Education & Outreach › Antibiotics Unearthed

Antibiotics Unearthed

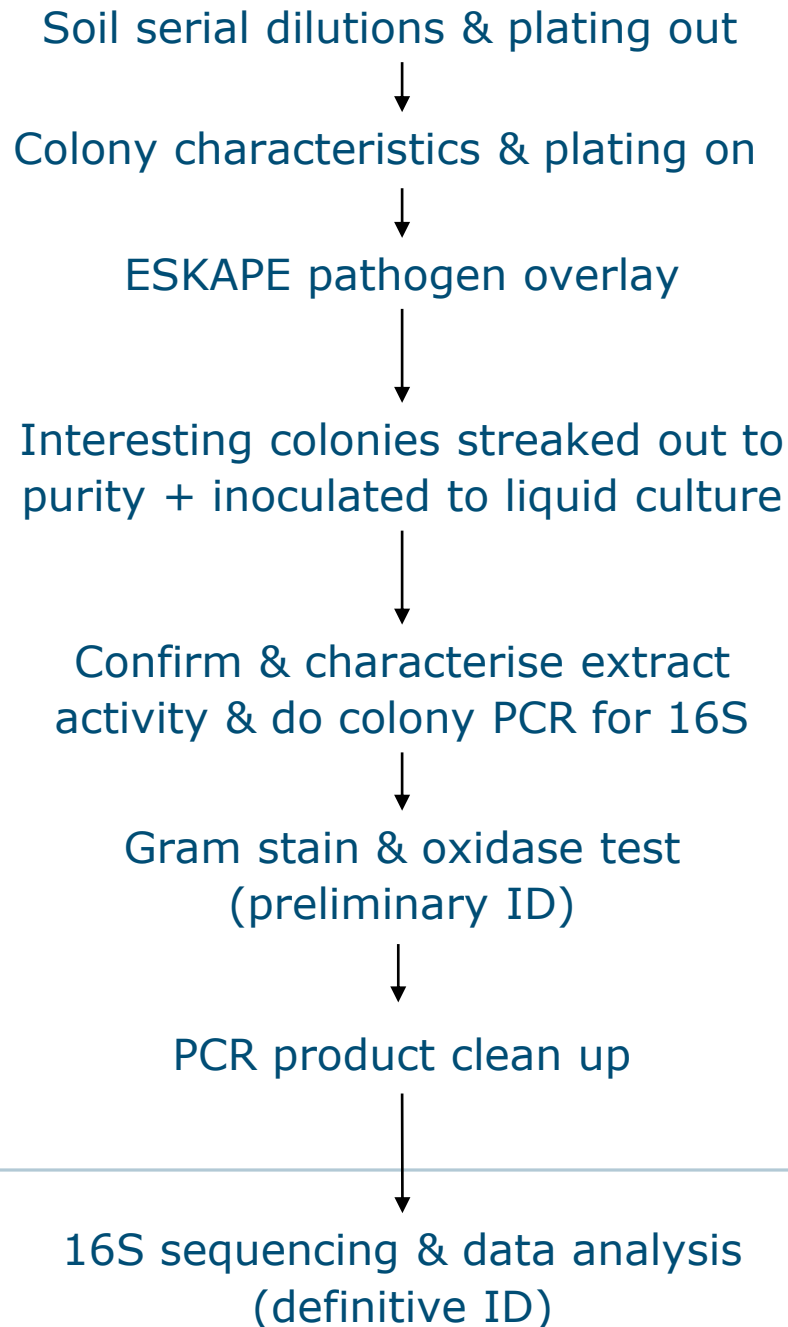Antibiotics and antibiotic resistance

Citizen Science Project

School Partnership

ANTIBIOTICS UNEARTHED

Antibiotics Unearthed is continuing in 2017, following on from two successful years of our project crowdsourcing for new antibiotics, inspired by the Small World Initiative™, the Microbiology Society is very pleased to announce it will continue this public engagement venture as 'Antibiotics Unearthed' in 2017.

28 June 2018

Soil serial dilutions & plating out

↓

Colony characteristics & plating on

↓

ESKAPE pathogen overlay

↓

Interesting colonies streaked out to purity + inoculated to liquid culture

↓

Confirm & characterise extract activity & do colony PCR for 16S

↓

Gram stain & oxidase test (preliminary ID)

↓

PCR product clean up

↓

16S sequencing & data analysis (definitive ID)

Benchling lab file (50% module mark)

Don't worry if:

- You don't complete all the steps
- Some steps don't work

But DO write up <u>as complete a record as possible</u> of <u>what you actually did</u> & what your <u>results</u> were

Outputs

High EVASYS scores (2016-17: 5.0; 2017-18: 4.4)

I thoroughly enjoyed the small world project & thought it gave a very good insight into drug development.

- Current research
- Being involved with antibiotic research
- Extensive lab work
- Interesting topics

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Outputs

4 students/year presented posters at Microbiology Society annual conference

& all students on the module were listed as authors

Outputs

Of the 8 students who presented conference posters so far:

- 2 secured paid sandwich placements (& discussed SWI at interview)

- 2 secured graduate positions (& discussed SWI at interview)

- 2 secured summer research placements

- But can it be said to have a direct link?

Outputs

Summer 2017:

2 students completed summer research placements & blogs following up antibiotic producer "hits" generated by the class

- Each awarded Certificate of Professional Practice

- One secured an MRes place

- One secured a funded PhD position (& discussed SWI at interview)

Penicillin 2.0

WORKING AS PART OF THE SMALL WORLD INITIATIVE TO DISCOVER THE NEXT GENERATION OF ANTIBIOTICS.

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"Antimicrobial resistance is not a future threat looming on the horizon. It is here, right now, and the consequences are devastating."

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Other initiatives

- Work with Andy Grayson to allow students to receive feedback on quality of all exams. Now carried forward to other modules

- (broad data set but could be linked to exam grades)

- Introduction of a reflective aspect to a mid term exam , looking at how successful approaches to revision were and to apply to final exams

- (narrower data set again linked to grades)

- Range of **Success for all** activities

- (how do you know what succeeded, repeating students)

Outputs?

Students benefit

Practice shared within and outside School

No "study" completed

No papers published

Knowledge needed: self

Where to publish? What can be published?

What data can be used?

Ethical approval when designing "study" associated with enhancement

Knowledge needed: university/school/dept

What is the priority?

What support is available?

Next steps?

- TILT innovative pedagogy group

- School working group on pedagogy after appraisals determine how many Teaching and Scholarship staff may be focussing on this and what areas of study. Investigations across multiple disciplines stronger than a single.

- Department working group focussed around success for all WILL be producing outputs from the work, laying the ground work for a developed submission to Ref.

- But not this one.

- If you have ideas Michael.Loughlin@ntu.ac.uk

**TILT Innovative Pedagogy
Practice and Scholarship Group**

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**Publishing Pedagogic Research Workshop
25th September 2018**