The ALURE of undergraduate research: developing leadership through sharing successful models

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Objectives of the session

– To explain ALUREs (**A**uthentic **L**arge-scale **U**ndergraduate **R**esearch **E**xperiences).

– To discuss some of the issues we have uncovered while assisting people develop or refine their ALUREs.

– To help you develop successful models for supporting teaching innovation and institutional change.

An OLT Leadership for Excellence Project:
Developing and resourcing academics to help students conduct and communicate undergraduate research on a large scale

Team ALURE

From left Dr Susan Rowland - Primary Project Leader (s.rowland1@uq.edu.au), Co-leaders Dr Gwen Lawrie and Dr Kirsten Zimbardi, Team members Dr Jack Wang and Dr Paula Myatt, and Project manager Mr Peter Worthy
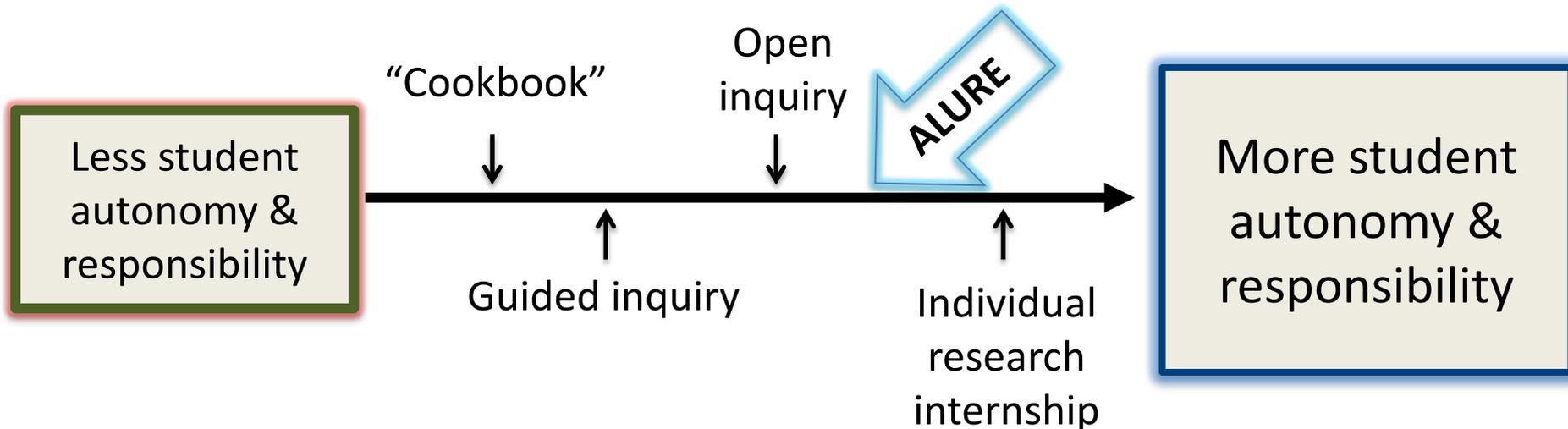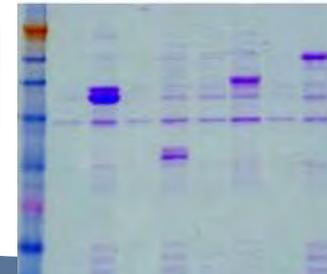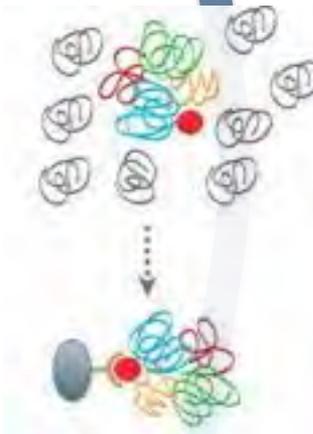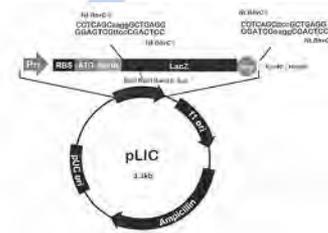
Australian Government

Office for **Learning & Teaching**

What is an ALURE?

- **A**uthentic **L**arge-scale **U**ndergraduate **R**esearch **E**xperience in science

- Hands-on research in the **undergraduate-course** laboratory

- Projects are part of **authentic** research initiatives and results are communicated to "someone who cares"

- Allows **many students** to participate in research

Less student autonomy & responsibility

"Cookbook"

Guided inquiry

Open inquiry

Individual research internship

ALURE

More student autonomy & responsibility

ALURE Example: Examining the insecticidal activity of an uncharacterised toxin

Why the ALURE OLT project?

- Developing and resourcing academics to help students conduct and communicate undergraduate research on a large scale.

- We aim for sustainable development and support of new leaders.

Existing ALURE leaders → mentor → New ALURE leaders → who drive local change for → Colleagues and institution

ALURE Project activities

Existing Leaders

Assist them to:
- Evaluate
- Refine
- Document their practice
- Reflect

New Leaders

Assist them to:
- Understand their context
- Design their ALURE
- Obtain ethics approval
- Evaluate
- Reflect

Resources

For teacher use:
- ALURE protocols
- Ethics exemplars
- FAQs and tips
- Online CoP

For student use:
- Workbooks
- Assessment

For evaluation:
- Reflections
- Surveys

Scope and Scale

- 14 ALURES
- 6 sites
- 34 academics
- >20 professional staff
- >1300 UG students
- 2 Hons students

What's your experience?

Existing Leaders

You have already implemented large-scale undergraduate research

→ **Think about ALURE**
Propose two factors that assist with successful ALURE uptake and sustainability.

New Leaders

You are considering implementing large-scale undergraduate research

→ **Think about ALURE leadership**
Identify two things that you, as a leader, can do to build a successful ALURE for your students.

Hidden issues impacting success

Existing Leaders

Assist them to:
- Evaluate
- Refine
- Document their practice
- Reflect

New Leaders

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- Evaluate
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For evaluation:
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- Surveys

We had thought these resources would be "enough" to drive uptake of the ALURE program at multiple universities.

Hidden issues impacting success

Existing Leaders
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- Refine
- Document their practice
- Reflect

New Leaders
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*But …
what we found is that there are hidden issues impacting success.*

Hidden issues impacting success

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New Leaders

Assist them to:
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Context

Evaluating learning

Fear of failure

Hidden issues impacting success

Existing Leaders

Assist them to:
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New Leaders

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Risk...

Take-home message – reduce risk

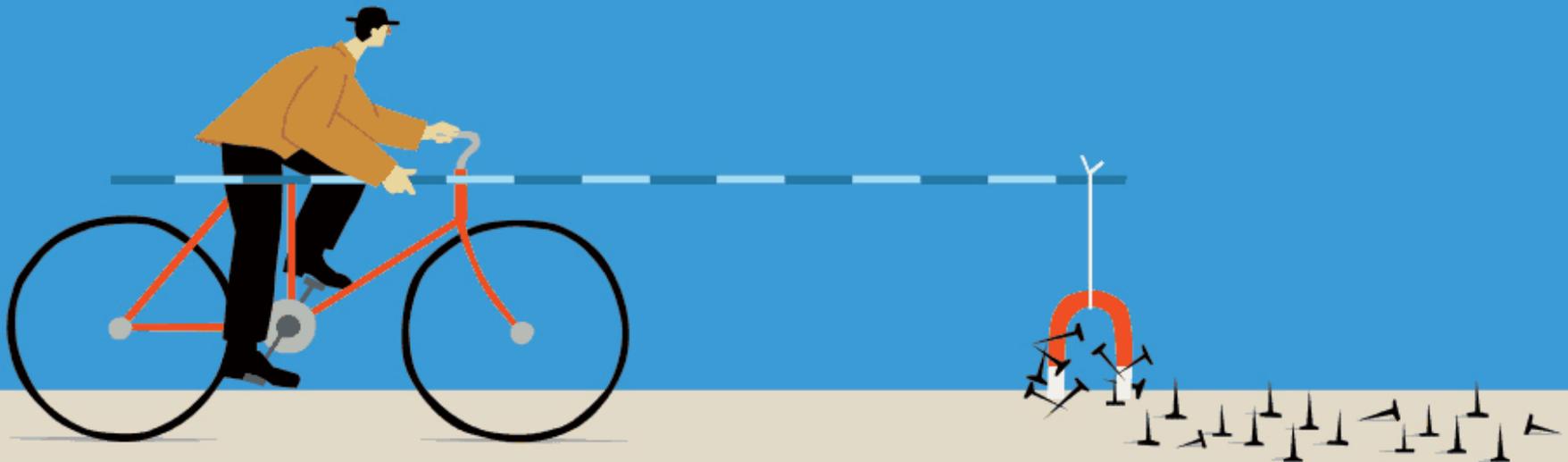**Through readiness for change**
- Institutional structure that encourages and allows innovation
- Central change agent that offers support and influences

Through evaluation and evidence
- Gather targeted evidence to support your planned objectives

Through mentoring
- Resources and a website are not enough
- Immediate, personal access to experienced mentors is key

Acknowledgements

Our mentors and our new implementers:

- *Australian National University (Dr P Newitt, Dr C Fulton, Assoc. Prof. S Howitt, Mr S Jones)*
- *Curtin University (Dr D Southam, Assoc. Prof. M Mocerino)*
- *Deakin University (Dr J West, Dr S Cheung, Dr L O'Sullivan, Dr A Veenstra-Quah)*
- *Newcastle University (Prof. L Milward, Dr J Weidenhofer, Ms B Goldie, Prof. J Scott, Dr K Mate) and Sydney University (Dr D Johnstone)*
- *University of New South Wales (Dr L Lutze-Mann, Dr R LeBard, Dr A Galea, Mr J Wilson)*
- *University of Queensland (Dr A Bugarcic, Dr K Colthorpe, Dr J Fraser, Mr M Green, Assoc. Prof. L Grondahl, Prof. R Hall, Prof P Hugenholtz, Dr K Jack, Dr U Kappler, Dr G Lawrie, Dr P Myatt, Ms R Pedwell, Dr S Rowland, Prof. M Schembri, Dr G Tyson, Dr J Wang, Prof. P Young, Dr K Zimbardi)*

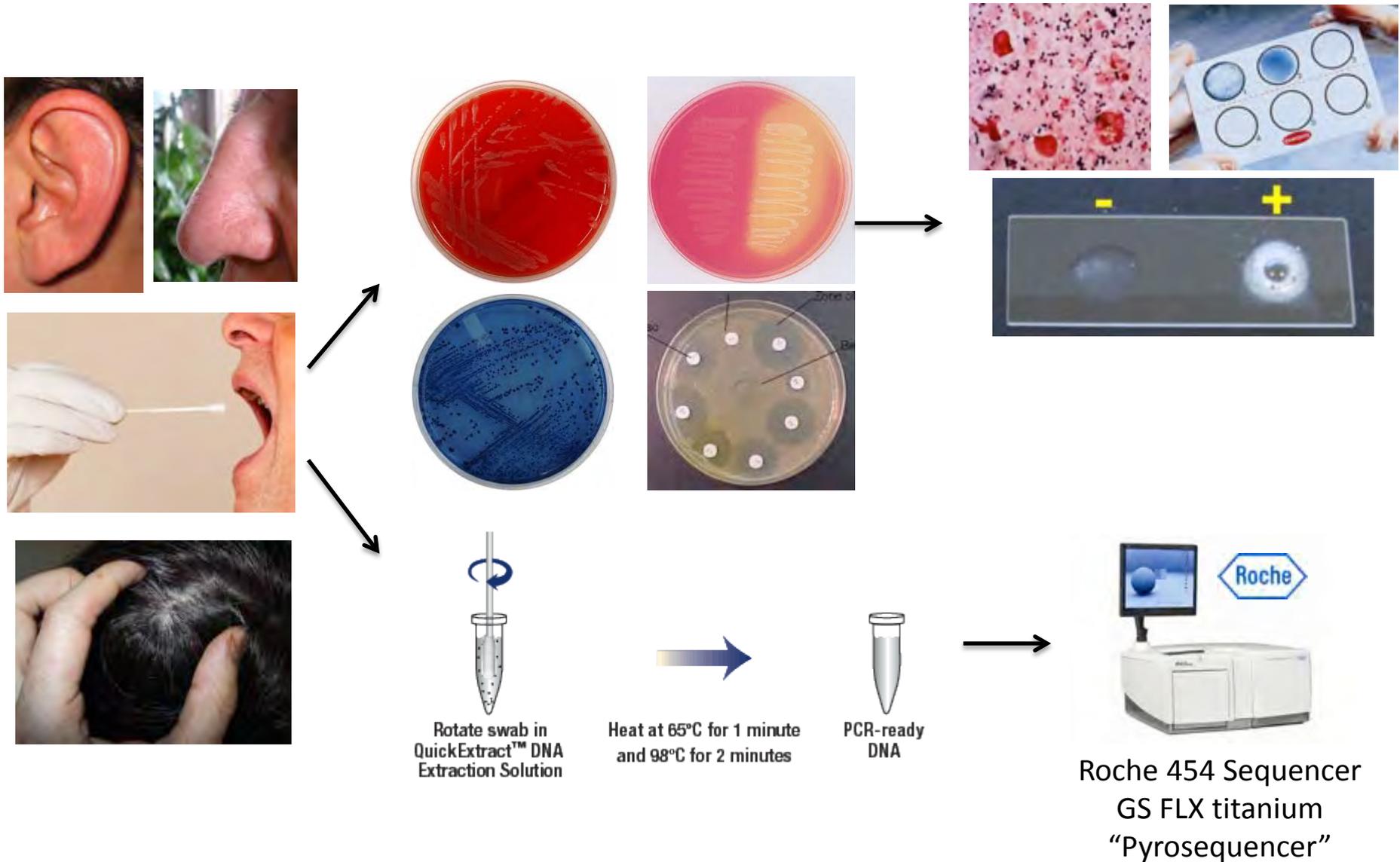**Our funding partners:**

Quote from one of our new implementers

"We're building capacity within our own little team; knowing that we could email you and ask "What can we do here?" was…. [*makes happy, expansive hand gestures*].

It's just knowing that it's not all left to you!

You've got an outside with people who have more experience in that space than you. You develop it [*the research experience*] as your own, but within the wider ALURE family."

Quote from new implementer, Deakin University

MICR2000 URE - The Human Microbiome

Rotate swab in QuickExtract™ DNA Extraction Solution

Heat at 65°C for 1 minute and 98°C for 2 minutes

PCR-ready DNA

Roche 454 Sequencer GS FLX titanium "Pyrosequencer"

ALURE Project activities

Evaluation

Implementation teams
- Personal visits, phone calls, and Skype sessions (when needed)
- Record Interviews during scoping and development
- Record reflective "exit" interviews

Student experience
- Pre-post surveys (CASPiE, Skills Self-Evaluation, and URSSA)
- Mid-term and post reflections (Roses, Buds, and Thorns)
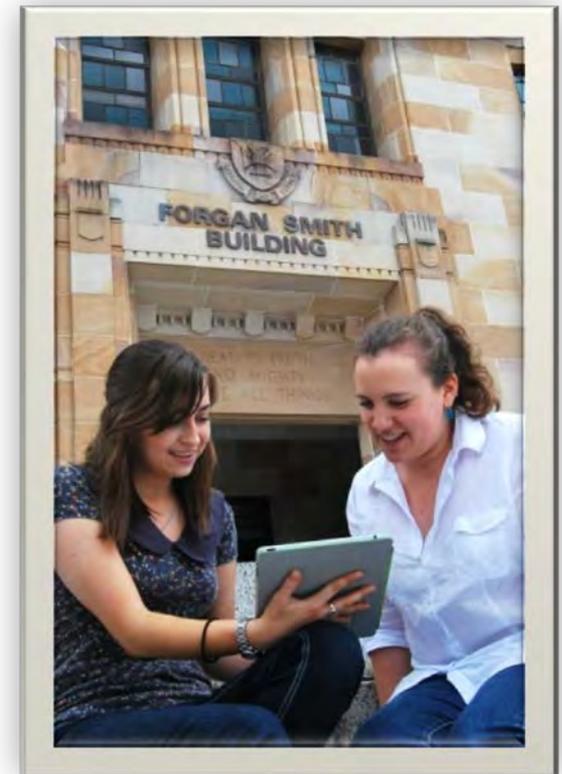
1. The UQ context

- Australia has 39 universities
- UQ is a research intensive university, offering a comprehensive education
- Total students = 48,000
  - 36,000 undergraduate
  - 12,000 postgraduate
  - Includes 11,000 international students
- UQ research ranking:
  - #3 in Australia
  - #63 Times Higher Education World University rankings
  - #85 in Shanghai Jiao Tong ranking
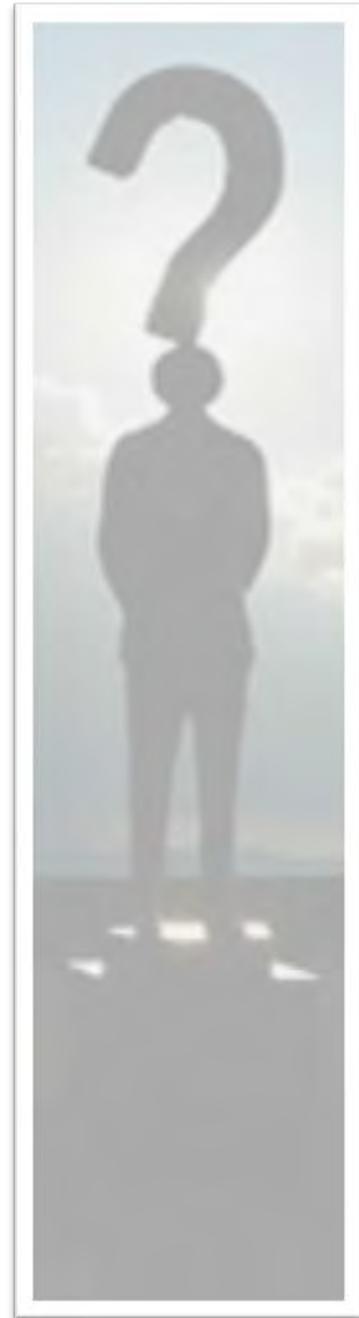
1. The UQ context

- 6 Faculties
- Total staff = 6,900
- Academic staff = 2,800

- Academic staff

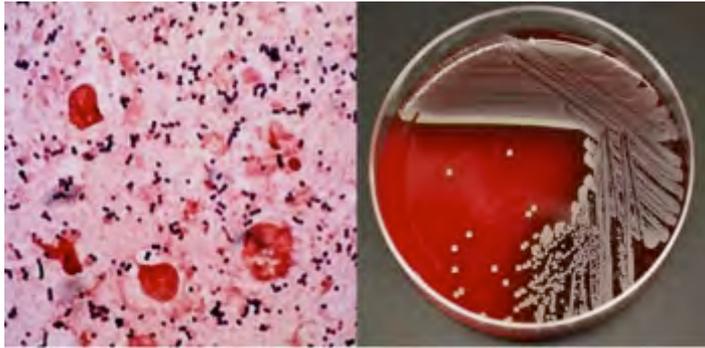| Academic category	No. academic staff
RO	1,438 (50%)
T&R	1,265 (42%)
TF	156 (6%)

FAQ 2: What is an appropriate research question for an ALURE?

- Needs to impart key scientific skills (laboratory, critical reasoning, communication)
- May also be discipline specific
- Build a question and project where students will have to assess their progress and make decisions
- Carefully consider whether the course coordinator has the capacity to troubleshoot problems that will occur
- **Audience:** Write down an appropriate research question for your ALURE
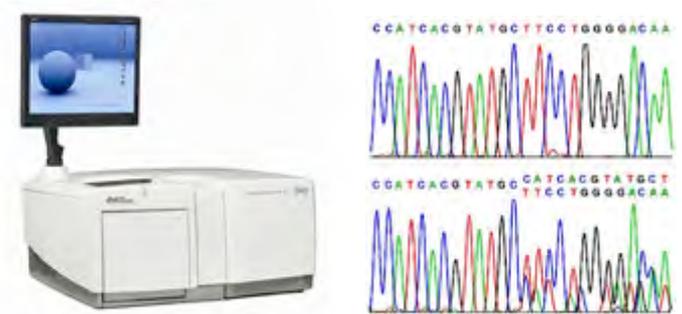
MICR2000: Traditional or Molecular Methods?

VS

16S rRNA sequencing

MALDI-TOF

Gram-Staining
Microscopy
Selective/differential culturing
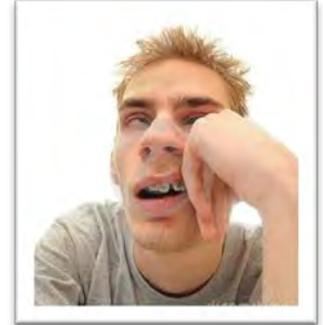Metabolic tests
Antibiotic Sensitivity testing

Audience: Think about the experimental approach your ALURE students could take

Why run an ALURE?

Providing varying levels of challenge for students

Giving students experience of research before they arrive in the research labs

Tailoring a course or courses to develop desired skills in graduates