



Bioengineering Innovation Outreach Challenge 2019

15th April 2019



THE UNIVERSITY OF
SYDNEY



ARC Training Centre for

**Innovative
BioEngineering**

Bioengineering Innovation Outreach Challenge 2019

The Bioengineering Innovation Outreach Challenge is a mentoring program pairing high school students with world-leading researchers to tackle some of the biggest medical challenges today. High school students will work with their research mentors to develop research questions and present their findings at an event hosted by the University of Sydney and the Australian Research Council Training Centre for Innovative Bioengineering on **April 15th 2019**.

The Program

- Will expose students to research in the field of bioengineering
- Inspire students to tackle research challenges and issues with current medical technologies
- Provides the opportunity to work with world-leading researchers at the University of Sydney
- Present ideas to an esteemed panel of academics, clinicians and industry

The Challenge

In teams of four to five, students from grades 10, 11 or 12 must **identify a short-coming of current medical technology** and apply the principles of bioengineering and scientific research to investigate solutions to that problem.

After development of their solution, teams will work with their researcher mentor to develop a model or prototype and presentation for **Presentation Day** at the University of Sydney. Presentation Day will be held on **15th April 2019** and will be broken into three stages.

- Stage I will re-examine and reinforce the principles of bioengineering
- Stage II will expose students to current research being conducted in bioengineering at the University
- Stage III will conclude the day, allowing teams the opportunity to present their work in front of a world leading panel and compete for one of three prizes

Registration

To register for this exciting opportunity, **teams of four to five students from grade 10 - 12** at any Australian high school are invited to submit an expression of interest to the program. Registration is now open and will close April 1st 2019 through: <https://goo.gl/forms/ZOtE6GLRjcVjqU5A2>

Registration is free, but individuals must make their own travel arrangements to/from the University of Sydney for Presentation Day.

Following registration and the review of your application, successful groups will be paired with their research mentor

Development

We strongly urge teams to focus on developing innovations which are intended to solve current issues in **regenerative medicine, nanotechnology, tissue engineering, medical imaging, biosensors or 3D printing**. Examples of current devices in the field include artificial organs, medical implants and smart drug delivery systems.

Teams are expected to prepare a model or prototype before making a **presentation of 3 minutes** in duration with the assistance of a single poster or presentation slide on Monday 15th April 2019.

Several interactive webinars will be available throughout the preparation period to adequately equip teams with the skills to develop their invention. **Dates and further announcements will be made on the website – arctcibe.org/bio2019 .**

Prizes

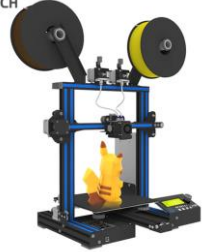
Best Innovation Overall Award (Peer Vote)

- One-week immersive research experience at the University of Sydney during the 2019 winter school holiday period.



The Australian Research Council – Training Centre for Innovative Bioengineering Team Award for Best Presentation

- Geeetech A10M Mix-color 3D Printer



The Bioengineering Team Scholarship for Most Innovative Device

- Mentorship from The Centre and its researchers at the University of Sydney as well as access to labs to further develop the innovation. This scholarship is intended to provide adequate resources for students to publish their work in the annual Google Science Fair.

Presentation Day

On Presentation Day, students will engage with researchers at the University and the Centre to hear more about the impact that medical technologies have on the quality of life for many people across the globe. This will include a talk from Dr **Mary Beth Brinson** of Cochlear, the Australian biotechnology company and innovator of the Cochlear Implant which has empowered over 350 thousand people with the ability hear.

Before lunch, **Dr Karl Kruszelnicki** will present on the need for greater innovation in the medical context and the role of high school students in driving the future of medical technologies.

After lunch, teams will present their work to an esteemed panel of academics and industry who will award the aforementioned prizes.

At the end of the day, extra-mural laboratory rotations provide the opportunity for students to learn about higher research facilities at the university.

The schedule is provided on the next page.

Start Time	Activity
8.30am	Registration open
9.00am	Welcome Address <i>Vice-chancellor and Principal Dr Michael Spence AC</i>
9:10am	Introduction to the Bioengineering Innovation Outreach challenge <i>Professor Hala Zreiqat & Yohaann Ghosh</i>
9.30am	Cochlear: The Journey of a Successful Australian Invention <i>Dr Mary-Beth Brinson</i>
10.00am	Morning tea - Meet the Mentors
10.30am	Research Expo
11.30am	Science and Creativity in the Medical Context with Q&A <i>Dr Karl Kruszelnicki</i>
12.45pm	Lunch
1.15pm	Presentation Preparation
1.30pm	Team Presentations
3.00pm	Nanoscience and the Future of Medicine <i>Professor Benjamin Eggleton</i>
3.30pm	Awards Ceremony and Conclusion
3.45pm	Extra-mural Lab tours (optional)

Struggling to Find A Relevant Problem With Current Medical Technology?

1. Artificial pancreas to help diabetics.
2. A pacemaker to treat obstructive sleep apnea
3. Gene therapy for inherited retinal diseases
4. Reduction of LDL cholesterol
5. Removing geographical barriers to care
6. New generation vaccine platforms
7. Targeted breast cancer therapies
8. Enhanced recovery after surgery
9. Centralizing monitoring of hospitalized patients.
10. Scalp cooling for reducing chemotherapy hair loss

https://www.ted.com/playlists/23/the_future_of_medicine

[\(2018\)](https://newsroom.clevelandclinic.org/2017/10/25/cleveland-clinic-unveils-top-10-medical-innovations-for-2018/_)

[\(2019\)](https://newsroom.clevelandclinic.org/2018/10/24/cleveland-clinic-unveils-top-10-medical-innovations-for-2019/_)



Prof. Hala Zreiqat

Professor of Biomedical Engineering

2018 NSW Premier's Award for Woman of the Year

NH&MRC Senior Research Fellow

Director: Australian Research Council Training Centre for Innovative Bioengineering

2016-2017 Radcliffe Fellow, Harvard University

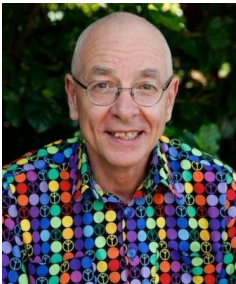
Head: Tissue Engineering & Biomaterials Research Unit



Dr Mary-Beth Brinson

Head of Clinical Affairs

Cochlear



Dr Karl S. Kruszelnicki

Julius Sumner Miller Fellow,

School of Physics,

The University of Sydney



Prof. Benjamin Eggleton

Director of the University of Sydney Nano Institute

(Sydney Nano)



Yohaann A. Ghosh

Chair: Bioengineering Innovation Outreach Challenge
ARC Training Centre for Innovative Bioengineering



Dr Peter Newman

Centre Research Coordinator
ARC Training Centre for Innovative Bioengineering



Dr Gurvinder Singh

Post-doctoral Researcher
ARC Training Centre for Innovative Bioengineering



Patrick Wachnik

Executive Assistant: Bioengineering Innovation Outreach
Challenge
ARC Training Centre for Innovative Bioengineering



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SYDNEY

For more information

Faculty of Engineering and IT | ARC Training Centre for Innovative Bioengineering

<http://arctcibe.org/bio2019/> | E p.newman@sydney.edu.au