20.07.2020

Statement of Commitment

Mentors (PI's, Post-docs, PhDc's and/or nominee of corresponding mentor)

Mentors are the backbone of the BIOTech Futures program and in the past teams have mentioned that working with their mentors has been the greatest take-away from the challenge. Mentors need to be approachable and actively responsive to the queries of their teams. They **communicate solely through email using their official, registered email address, online conference calls (zoom/skype), or over the phone.**

Please note: Should students choose to call their mentors an adult supervisor (parent/guardian or teacher) must be present.

USYD Zoom video conference is available here: https://uni-sydney.zoom.us/

High school students can participate in the program in teams or as individuals. Mentors can guide students through two ways:

1. By suggesting particular project(s) in the area of expertise of the mentor, which students can choose.

2. By mentoring students on projects that the students have devised themselves.

Examples of past project titles include 'a novel non-thrombogenic film for mechanic heart valves', 'therapeutic clothes for ezcema', '3D printed uterus transplant for endometriosis', 'drug elucidating hydrogel dressing for enhanced wound healing', and 'a smart greenhouse approach for maximising root oxygen levels in food crop'.

Mentors contributing a particular project should also contribute some relevant literature links. By and large, the provided literature should be open-access. If a particular pay-wall protected paper is necessary to the project, then the mentors should provide an executive summary on the key points of that paper.

Aside from serving as a source of scientific and engineering knowledge, mentors also provide insights into their own areas of research. This serves to help provide students with a better understanding as to what tertiary pursuit of

STEM can entail and lead to.

Therefore, mentors will need to provide appropriate time to guide their teams and help them in the formation and development of their idea (maximum ten hours per team). Mentors are required to review their team's aim, hypothesis, literature review and methods before approving any experiments to be done by the team (not all teams will need to conduct experiments). Mentors are also required to be present at the start of day 1 (8th Feb 2021) to help resolve any questions in person.

Mentors will also be required to attend three short meetings with BIOTech Futures committee members over the course of the challenge.

Please note: **Should students choose to call their mentors an adult supervisor (parents or teacher) must be present. This call should be made using the teacher or parent's phone.**

Schools

Although schools are not required to directly participate in the BIOTech Futures Challenge, their assistance is encouraged in ensuring their respective representative teams are progressing with their projects according to a self-developed timeline, project log or plan.

Any additional guidance provided to their teams would be valued however it should be considered that students are to be the driving force behind the projects.

Students

Students are expected to invest sufficient time and effort into the completion of their project, keeping in mind that the aim of the BIOTech Futures Challenge is to, as the name suggests, 'challenge'. The competition aims to encourage the ideation of original ideas and, subsequently, students are expected to conduct their own work and their own research (with the guidance of their mentors).

Innovations are to be conceptual, with a sound scientific background. No experimental results are required. However, any results in the literature that

support the theory of the innovation is looked upon favourably.

Both guided teams and self-guided students will complete (i) a poster on their project, (ii) a 3 minute pitch and, (iii) an accompanying powerpoint slide for the symposium. It is optional that students/teams also write a scientific report detailing their research, analysis and justification of their design and design process. A separate prize will be awarded for the best report. Please note students can conduct their own experiments, but where appropriate may also discuss experimental data from previous studies that supports their design.

A guide for the report, poster and powerpoint slide are provided on our website. In the 3 minute pitch, students must at least: 1. demonstrate a need for their innovation; 2. identify a target market; 3. explain how their innovation works; 4. outline how their innovation is superior to the available solutions already on the market.

In addition, students are encouraged to make a model (virtual or physical) that enables visualisation of their innovation.

The report (if applicable), poster and powerpoint slide are to be submitted by January 17th . The pitch must be prepared for the symposium.

3Min Pitch Presentation

All self-guided students and guided teams will have an opportunity to present their projects at the science fair during the symposium. This is also a good opportunity for students to see what other teams have worked on. 50 semi-finalists will be chosen based on their poster and report to pitch their project (3 min presentation) onstage in front of a judging panel. From this, 10 teams/students will be selected to pitch their project again and defend their design in an open Q and A session, after which prize winners will be announced. All teams will have the opportunity to present their project at a ‘science fair’ at the symposium.

More on the requirements:

Requirements of a prototype. We only suggest that teams build a prototype for assistance in their presentation. It may not be necessary depending on the

chosen innovation. The expectation is not for students to engineer a functional prototype. A simple 'pipe-cleaner' or 'paddle-pop stick' model will suffice. The benefit of a prototype is for scale, concept and visual aid. In fact, the reasoning behind encouraging teams to build a prototype is for them to identify where they can improve on their innovation and use the model as a self- assessment tool. For example, say students were to suggest using biocompatible materials for knee replacement. Sculpting a model ball/socket joint from Styrofoam would allow them to visualise whether their idea looks reasonable enough. Does their innovation belong in the human body? How could they re-design the joint to allow for a greater range of movement? Would a different shape be better? These are the questions we want students asking themselves throughout the process.

Requirements for the pitch presentation. Semifinalist teams will use a single .pptx slide to act as an aide to their presentation of three minutes in duration. The slide must conform to the template provided online. Any deviations to size or orientation will not be accepted. Furthermore, in order to establish the innovative nature of their idea, teams are required to analyse what ideas have previously been done within their chosen topic area and how their own idea accounts for the shortcomings of the solution to be superseded. This .pptx slide must be submitted with the poster and report (if applicable).

Time Indication

In preparation for this, students may spend the following indicative time:

Time (mins) Guideline for each activity:

1. (30) Deciding which project to pursue (pre-application)
2. (60) Online research on the core issues of the project (after application is approved)
3. (120) Initial contact with mentor and/or nominee
4. (120) Reading relevant literature and summarising their findings (to become intro of the report)
5. (120) Team discussion regarding approaches to the core

Issues, brainstorm of different designs

6. (60) Consult mentor regarding chosen approach and design pros/cons

7. (180) Articulating the solution, how it will work, how it is innovative and better than anything else currently available
8. (60) Seek feedback from mentor and/or nominee as team
9. (180) Writing of final report based all research and discussions previously mentioned
10. (90) Complete poster using template
11. (30) Complete the single.pptx slide using template
12. (60) Seek feedback from mentor and/or nominee as team
13. (60) Refine presentation
14. (30) Complete team rehearsal

Therefore, students should not spend more than 20 - 25 hours on this project in total.

If they have any other scientific questions for their mentors, they are available via email, video conference or phone.

Should students choose to call their mentors a parent, teacher or guardian must be present.

As a reminder, the convention is 8th and 9th February 2021. This is a day we hope that you can share with your family, peers and teachers so feel free to invite them to come and see your presentation!

If you have any further questions please feel free to get in touch with the team through biotech.futures@sydney.edu.au

Kind regards,

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