Year 3 research project student-led inquiry labs with productive failure

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Year 3 Biochemistry BSc / MSci degree

120 credits

- Literature Review Project in Molecular Biosciences (BIOC0021)
- Specialist Research Project in Molecular Biosciences
  - Course-based undergraduate research experience
  - Scalability and standardization
  - Metagenomics (BIOC0023)
  - Protein Structure and Function (BIOC0029)
    - 80-100 students
    - 20-30 students
Design

Term 1 (Oct-Dec, 10 weeks)

Orientation
- Learning lab techniques and data analysis
- Writing own protocols from provided selected papers and manufacturer’s manuals through guided groupwork in tutorials
- Testing protocols and getting acquainted with lab set-up and safety

Term 2 (Jan-Mar, 10 weeks)

Inquiry: reproduce, modify, or build on existing, self-chosen, peer-reviewed research (individual)
- Gaining hands-on insights into real-life aspects of design, planning, testing, failure and troubleshooting, and reproducibility (= the process of science)
- Helping and learning from others through sharing experiences, setbacks, and successes

Term 3 (Apr-Jun, 7 weeks)

Report and presentation marking: focussed on process, not results

Three assessment components:
- Inquiry labs proposal (individual)
- Risk Assessment (individual)
- Test (individual)
- Report (individual)
- Presentation (individual)
Goals, and challenges

Student-led inquiry labs after orientation labs
• Catering for different levels of prior knowledge
• Acquiring research-based skills
• Giving autonomy and building a sense of ownership

Encountering failure and troubleshooting
• Encouraging creativity, exploration, and iteration
• Focussing on a growth mindset by providing an environment where failure is seen as a learning experience

Groupwork and sharing experiences with peers and staff
• Fostering a community and creating a sense of belonging
• Appreciating the role of peer support on emotional well-being and performance

Challenges
Physical space, time, and equipment needed; budgeting and delivery delays for chemicals; staff workload; students finding Python difficult to learn
More information