Integrated Research Team (IRT) Experience

Description

The IRT experience provides a mentored project in which the CREATE student is trained to play a key role in a multidisciplinary team alongside basic and clinical scientists. The approach is based on the team model currently used at HMRC and includes elements that guide the student through the stages of a typical research project. The experience is intended to prepare the student for undertaking major projects and is adapted in scope to accommodate master's, doctoral, and post-doctoral trainees.

Instructional Goal

To develop specific skills and attitudes critical to efficient operation of multidisciplinary research teams.

Learning Objectives

By the end of this module, trainees will be able to:

- Describe the structure of an IRT and one's role within an IRT
- Manage fiscal and human resources, and identify an effective communication plan for one's team.
- Develop research questions focused on clinical problems associated with patient treatment.
- Demonstrate an understanding of other scientific cultures through successful completion of a multidisciplinary research project.
- Undertake laboratory evaluation of medical products such as implants and assistive devices.
- Write research objectives and a detailed experimental protocol.
- Identify a reasonable project scope and develop a detailed work plan.
- Identify relevant methods for experimentation, including initial design of testing apparatus or other technology and perform pilot testing or numerical simulation (if appropriate).
- Manage the technical aspects of a study, data management and analysis.
- Engage in knowledge dissemination of research results through presentations and publication(s).

Instructional Methods

Mentoring session(s): Interns and trainees will be mentored by scientists and clinical researchers. IRT Orientation session, Clinical visits and Field travel where applicable.

Facilitators

Dr. Tim Bryant
Various mentors

Delivery

Regular research team meetings
Delivery: Lab-based

Phase 1 and 2

Objectives	Activities
1. **Clinical Needs Identification** • Clinical problem identified in terms of patient need. • Best practice described. • Relevant literature is reviewed. • Expected clinical outcome defined.	**HMRC-CREATE Trainee:** • Understands relevant anatomy and physiology. • Masters terminology in this area • Understands related treatment methods and clinical problems • Increases ability to self-learn in these areas **Clinical Trainee:** • Reviews relevant clinical literature. • Understands key clinical issues and potential methods for measuri research outcomes
2. Research Questions • Research questions identified in terms of clinical need. • Potential outcome measures identified. • Critical assessment of potential impact.	**HMRC-CREATE Trainee:** • Performs initial review of scientific and technical literature. • Develops research questions based on suitable models. • Develops plan for literature and technical review. **Clinical Trainee:** • Critically assesses relevancy of research questions.

Phase 1 and 2 completion: Formal presentation to IRT. Oral questioning and formative feedback.

Phase 3 and 4

Objectives	Activities
3. Research Objectives • Thorough review of literature. • Research objectives posed in terms of knowledge or technology needs. • Feasible scope described.	**HMRC-CREATE Trainee** • Understands clinical, scientific, and technical issues. • Understands requirements of the project. **Clinical Trainee** • Understands clinical, scientific, and technical issues. • Understands requirements of the project.
4. Work Plan • Experimental design described in terms of objectives. • Measured variables defined and justified. • Experimental protocol detailed.	**HMRC-CREATE Trainee** • Identifies relevant methods for experimentation, including testing apparatus or other technology. • Performs pilot testing or numerical simulation completed if appropriate. **Clinical Trainee** • Understands limitations in technology and appreciates time line required for development.

Phase 3 and 4 completion: Draft research proposal. Oral formative feedback.

Phase 5

Objectives	Activities
5. Feasibility Assessment • Revised work plan detailed. • Proof of principle study demonstrates feasibility of work plan or technology.	**HMRC-CREATE Trainee** • Responsible for scientific technical accuracy of fabrication, data acquisition, data management, and analysis of results. **Clinical Trainee** • Responsible for clinical best practice as appropriate in work plan. • Participates in data acquisition as appropriate. • Critically assesses results.

Phase 5 completion: Presentation to IRT. Oral questioning and formative feedback.

Phase 6

Objectives	Activities
6.1 Project Completion - Paper Option. Completed research study described in formal structure suitable for conference presentation	**HMRC-CREATE Trainee:** • Responsible for technical aspects of study, data management, and analysis. • Critical evaluation and discussion of results. **Clinical Trainee:** • Responsible for clinical aspects of study and critical assessment of results.
6.2 Project Completion – Proposal Option. Completed key aspects of project proposal in formal structure suitable for submission for funding.	**HMRC-CREATE Trainee:** • Coordinates document preparation. • Prepares technical aspects of proposal. • Determines budget requirements and timeline. **Clinical Trainee:** • Prepares clinical aspects of proposal. • Critically assesses proposal.

Phase 6 completion: (Option 1) Formal presentation with questioning. Summative review by faculty external to IRT. (Option 2) Submission of project proposal suitable for review by faculty external to IRT.