Biomedical Engineering 9650B – *Advanced Research Translation for Biomedical Engineers*

Instructor: Dr. S. M. Rajaai, PhD, PEng
Email: srajaai@uwo.ca

**Description**
This half course (12 2-3 hour lectures, 4 assignments) applies advanced concepts in research translation from the development of an intellectual property and regulatory strategy for a novel invention (biological, new chemical entity or device), generating a roadmap including team building requirements and introduction to professional skills required for a postgraduate academic or industry position, to the development of strategies to simplify written and oral knowledge translation for generating and reviewing research grants, philanthropic and media presentations. Special emphasis is placed on internationally accepted formats, case-based learning and breakout group discussion with team consensus building. Assignments make extensive use of the trainees’ research data to enable rapid translation of methods identified and evaluated in class into practical use for establishing a successful independent research career and team.

**Prerequisites**
PhD graduate trainees of the Graduate Program in Biomedical Engineering currently undertaking a research thesis are required to complete this course and are provided high priority for enrollment over other trainees who may enroll at the discretion of the instructor. All enrolled students must have completed an undergraduate degree in a related research area with research experience and BME 9550B or permission of the instructor and program. Enrollment is limited to between 7 and 14 students.

**Learning Objectives**
1. Students will learn how to: 1) build a successful interdisciplinary biomedical engineering research team for the future, and 2) focus on scientific methods, appropriate scientific conduct, translational skills to build a collaborative interdisciplinary research program in academia or industry.
2. Students will learn how to summarize their current research and results into a 5 year plan and including a short 3 minute overview for different general scientific audiences and for the media or philanthropic presentations and in accordance with international standards.
3. Students will be able to create a knowledge translation roadmap for research projects including intellectual property disclosure and protection as well as regulatory pathways, commercialization and marketing approval.
4. Students will be able to create written and oral proposals for research project funding from granting agencies, philanthropists and for dissemination to the media.
5. Students will be able to generate a Research and Development roadmap for a drug or device identifying the critical milestones and skills/expertise required for successful translation to industry or other end users.
**Version 2019**
Lecture Times: Fridays 12:30-2:30 pm  
Lecture Location: TBD  
Textbook: No required textbook. Recommended references will be distributed electronically. 
Instructor E-mail: srajaai@uwo.ca

**Evaluation**
All assignments are due on the dates specified. Where appropriate, assignments must be delivered in hardcopy to class on the due date specified or by email at 3 pm on the same date clearly identified as a Word or PowerPoint attachment with **student name embedded in the title of the file and the date**. If you don’t label your attachments with your name they will get lost! Late or incomplete assignments will not be graded. Assignments will be graded in class or during the weeks following the due date. The course will be graded on the basis of four criteria:

Assignment 1: Professional roadmap/research plan: 20% written + 5% oral

Assignment 2: NSERC grant panel review: 20% written +10% oral

Assignment 3: Development of a strategy for a novel device: 20%

Assignment 4: Venture capital presentation: 25%
## Course Schedule

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<th>Month</th>
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<th>Topic</th>
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| Jan   | Fri 11 | 12:30 | • Overview of course & policies  
• Class introductions  
• Creating a 5-year research plan  
• **Assignment 1** | Rajaai |
|       | Fri 18 | 12:30 | • How to generate and prioritize research ideas | Rajaai |
|       | Fri 25 | 12:30 | • Communicating your work: lay audiences, media, philanthropists  
• **Assignment 1 Due (written)** | Rajaai |
| Feb   | Fri 1  | 12:30 | • Grant proposal writing & reviewing  
• **Assignment 2** | Rajaai and Lacefield |
|       | Fri 8  | 12:30 | • NSERC mock peer review panel | Rajaai and Lacefield |
|       | Fri 15 | 12:30 | • Study | Rajaai |
|       | Fri 22 | 12:30 | • Judging presentations  
• Presenting research plans  
• **Assignment 1(oral) Due** | Rajaai |
| Mar   | Fri 1  | 12:30 | • Medical device regulation  
• **Assignment 2 Due** | Rajaai |
|       | Fri 8  | 12:30 | • The innovation process  
• **Assignment 3** | Rajaai |
|       | Fri 15 | 12:30 | • Intellectual property  
• Commercializing your IP  
• **Assignment 4** | Rajaai |
|       | Fri 22 | 12:30 | • Building and leading a research team  
• **Assignment 3 Due** | Rajaai |
|       | Fri 29 | 12:30 | • Translational research (from discovery to public benefit) | Rajaai |
| Apr   | Fri 5  | 12:30 | • Venture capital presentations  
• **Assignment 4 Due** | Rajaai |

**Texts /Course Materials:**
All students will be provided with copies of lecture materials and other published papers relevant to this course. In addition to this material, there are a number of texts relevant to the course:

- **Writing a research plan, Jim Austin**
  - [https://www-sciencemag-org.ezproxy.lib.ryerson.ca/careers/2014/04/writing-research-plan](https://www-sciencemag-org.ezproxy.lib.ryerson.ca/careers/2014/04/writing-research-plan)

- **Lessons for success…..**


- **ON-LINE ED.: Columbia University, Academic Information Systems** (AcIS), Project Bartleby (publications@columbia.edu).
  - Transcribed, proofread, and marked-up in HTML, May 1995. Markup, graphics, and added files
  - © copyright 1995 by the Trustees of Columbia University in the City of New York.


- **Ms. Mentor’s Impeccable Advice for Women in Academia**: Emily Toth Penn Press Philadelphia 1997


**Faculty and Guest Speakers**

Seyed M Rajaai, PhD, PEng  
Srajaai@uwo.ca  
Course Coordinator

James Lacefield, PhD, PEng  
Jlacefie@uwo.ca  
Guest Speaker

**Plagiarism and Scholastic Offences**

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offense at The University of Western Ontario. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website:  
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

**Mental Health**

Students who are in emotional/mental distress should refer to Mental Health@Western  
http://www.uwo.ca/uwocom/mentalhealth/  
for a complete list of options about how to obtain help.

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see:  
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf  
and the downloadable Student Medical Certificate (SMC):  
https://studentservices.uwo.ca/  
(under the Medical Documentation heading).

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counseling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.