

**The University of Western Ontario
Graduate Program in Biomedical Engineering**

**Advanced Research Translation for Biomedical Engineers
(BME 9650B)**

Winter 2019

Prepared by:

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The University Of Western Ontario

Winter 2019 Detailed Syllabus

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

Month	Day	Time	Topic	Faculty
Jan	Fri 11	12:30	<ul style="list-style-type: none"> • Overview of course & policies • Class introductions • Creating a 5-year research plan • Assignment 1 	Rajaai
	Fri 18	12:30	<ul style="list-style-type: none"> • How to generate and prioritize research ideas 	Rajaai
	Fri 25	12:30	<ul style="list-style-type: none"> • Communicating your work: lay audiences, media, philanthropists • Assignment 1 Due (written) 	Rajaai
Feb	Fri 1	12:30	<ul style="list-style-type: none"> • Grant proposal writing & reviewing • Assignment 2 	Rajaai and Lacefield
	Fri 8	12:30	<ul style="list-style-type: none"> • NSERC mock peer review panel 	Rajaai and Lacefield
	Fri 15	12:30	<ul style="list-style-type: none"> • Study 	Rajaai
	Fri 22	12:30	<ul style="list-style-type: none"> • Judging presentations • Presenting research plans • Assignment 1(oral) Due 	Rajaai
Mar	Fri 1	12:30	<ul style="list-style-type: none"> • Medical device regulation • Assignment 2 Due 	Rajaai
	Fri 8	12:30	<ul style="list-style-type: none"> • The innovation process • Assignment 3 	Rajaai
	Fri 15	12:30	<ul style="list-style-type: none"> • Intellectual property • Commercializing your IP • Assignment 4 	Rajaai
	Fri 22	12:30	<ul style="list-style-type: none"> • Building and leading a research team • Assignment 3 Due 	Rajaai
	Fri 29	12:30	<ul style="list-style-type: none"> • Translational research (from discovery to public benefit) 	Rajaai
Apr	Fri 5	12:30	<ul style="list-style-type: none"> • 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/careers/2002/07/writing-research-plan>

<https://www-sciencemag-org.ezproxy.lib.ryerson.ca/careers/2014/04/writing-research-plan>

Lessons for success.....

<https://www.asha.org/uploadedFiles/ASHA/Research/L4S/Lessons-for-Success-Research-Career-Plan-Guidelines.pdf>

Elements of Style: William Strunk Jr. Ithaca, N.Y.: Priv. print. [Geneva, N.Y.: Press of W.P. Humphrey], 1918.

ON-LINE ED.: [Columbia University, Academic Information Systems](#) (AcIS), [Project Bartleby \(publications@columbia.edu\)](mailto:publications@columbia.edu).

Transcribed, proofread, and marked-up in HTML,

May 1995. Markup, graphics, and added files

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University in the City of New York.

The MIT Guide to Science and Engineering Communication: James Paradis, Muriel L. Zimmerman. The MIT Press Cambridge 1998 ISBN 0-262-16142-7

How to Write and Publish a Scientific Paper Robert A. Day 5th Edition Oryx Press 1998 ISBN 1-57356-164-9

Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering: Richard M. Reis, IEEE Press New York 1997.

The Academic Job Search Handbook 3rd Edition Mary Morris Heiberger and Julia Miller Vick Penn Press, Philadelphia 2001

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

The Craft of Scientific Writing 3rd Edition Michael Alley Springer Verlag New York Inc. 1996 ISBN 0-387-94766-3

Successful Scientific Writing 2nd Edition Janice R Matthews, John M. Bowen and Robert W. Matthews Cambridge University Press 2000 ISBN 0-521-78962

Scientific Papers and Presentations Martha Davis, Academic Press 2002 ISBN 0-12-206370-8

Science in Public: Communication, Culture and Credibility Jane Gregory and Steve Miller
Perseus Publishing 1998 ISBN 0-7382-0357-2

Faculty and Guest Speakers

Seyed M Rajaai, PhD, PEng
James Lacefield, PhD, PEng

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Course Coordinator
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.