Chem 797T: Frontiers of Biotechnology, Spring 2016

Course Coordinators:
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Class Meetings: Tuesdays and Thursdays 6:00 – 7:15 pm
Integrative Science Building ISB 321

	Unit	Instructor	Guest Lecturer & Affiliation
Tues Jan 19	Introduction	J. Hardy & B. Osborne	
Thurs Jan 21 Tues Jan 26 Thurs Jan 28	Inducing and Using Immune responses Antibodies for Cancer Therapy Conventional and Engineered T cells for Cancer Therapy	Richard Goldsby rgoldsby@vasci.umass.edu	
Tues Feb 2	Sanofi Presentation		Patrick Guirnalda Sanofi Pharma.
Thurs Feb 4	Discussion of Assigned Topics by Appointment		
Tues Feb 9	Regeneron Presentation		Jim Fandl Regeneron
Thurs Feb 11 Tues Feb 18 Thurs Feb 23	Metabolic Engineering	Mike Henson mhenson@engin.umass.edu	Nate Tedford Gingko Bioworks
Thurs Feb 25 Tues Mar 1 Thurs Mar 3	Technologies for RNA Therapeutics	Wei-Lih Lee wlee@bio.umass.edu	Craig Martin; UMass Jesse Chen Moderna Therapeutics
Tues Mar 8 Thurs Mar 10 Tues Mar 22	Design and Evolution of Protein Therapeutics	Scott C Garman garman@biochem.umass.edu	Tim Edmunds Genzyme
Thurs Mar 24 Tues Mar 29 Thurs Mar 31	Assistive Reproduction Technologies	Rafael Fissore rfissore@vasci.umass.edu	The revolution of ART
Tues Apr 5 Thurs Apr 7 Tues Apr 12	Future of Gene Editing and Gene Therapy	Tom Maresca tmaresca@bio.umass.edu	Bill Lundberg CSO CRISPR Therapeutics
Thurs Apr 14	Course Analysis & Future Planning		
Tues Apr 19 Thurs Apr 21 Tues Apr 26	Technologies for targeted protein/ RNA/drug delivery	S Thai Thayumanavan thai@chem.umass.edu	Mark Tracy Tracy Bioconsulting

Prerequisites: This course is open to graduate students in all life-science programs as well as to students in programs with applications relevant to Biotechnology.

Outline of Course: The goal of *Frontiers in Biotechnology* is to educate students about the scientific advances and resulting tools that have allowed the biotech revolution, to chronicle the implementation of recent advances in biotechnology, and to identify those areas of great unmet need in which biotechnology can play a major role in the future. Frontiers in Biotechnology comprises eight individual units focusing on what we view to be eight of the most cutting edge advances in biotechnology. We have designed the course around the concepts that '*Biotechnology'* is a vast enterprise with a huge number of applications and that the ultimate goal of any biotechnology is application to a pressing human need. Thus in each unit we engage industrial experts to provide real-world, real-time snapshots of biotechnology applications.

Each 3-meeting unit consists of one lecture by the indicated UMass BTP Faculty Instructor, one lecture by an outside, industrial expert and concludes with one discussion section on the topic. The involvement of multiple faculty allows students to interact with faculty from multiple disciplines. The interaction with UMass faculty from various departments and with industrial visitors provides a rich source of potential mentors for students in the course.

Grading: Grades will be based on scores from eight assignments, one assignment corresponding to each unit in the course. The assignment for each unit will be designed and graded by the instructor for that unit. Each assignment will be worth 100 points, for a total of 800 points possible in the course.

Background Reading – Particularly Important for Chemists & Engineers:

The BioTech Primer by BioTech Primer Inc.

Biotechnology Demystified by Sharon Walker

Biotechnology for Beginners by Reinhard Renneberg and Arnold L. Demain

Historical Context - For fascinating historical background into many of the groundbreaking discoveries and techniques that have made biotechnology possible:

The Eighth Day of Creation: Makers of the Revolution in Biology by Horace Freeland Judson

Genentech: The Beginnings of Biotech by Sally Smith Hughes