TECHNOLOGICAL INNOVATION:
TI:GER®
GENERATING ECONOMIC RESULTS

Technological Innovation: Generating Economic Results (TI:GER®)
Fundamentals of Innovation I, MGT 6830
Fall 2009 Syllabus

Faculty:

Dr. Marie C. Thursby
Executive Director, TI:GER
Tech Square Management Building-Room 400
404.894.6249
marie.thursby@mgt.gatech.edu

Dr. Frank Rothaermel
Associate Professor, Strategy
frank.rothaermel@mgt.gatech.edu

Dr. Marco Ceccagnoli
Assistant Professor, Strategy
marco.ceccagnoli@mgt.gatech.edu

Dr. Stuart Graham, J.D.
Assistant Professor, Strategy
stuart.graham@mgt.gatech.edu

Dr. Tina W. McKeon, J.D., Ph.D
Principal, Fish & Richardson, PC
tmckeon@fr.com

Professor Anne Rector, J.D.
Director, LWRA and TI:GER Programs
Emory University School of Law-Gambrell Hall, Room 544
404.727.6748
arector@emory.edu

Professor Margi Berbari
Program Director TI:GER
Tech Square Management Building-Room 421B
404.385.1072
margi.berbari@mgt.gatech.edu

Jennifer Smith
TI:GER Program Coordinator
Tech Square Management Building-Room 421A
404.385.3275
jennifer.smith@mgt.gatech.edu

Edna Patterson
TI:GER Program Coordinator
Emory University School of Law-Gambrell Hall, Room 563
404.727.6506
edna.patterson@emory.edu

Class Logistics: Meeting Time: Tuesday, 4:35 - 6:55 pm
Locations:
Georgia Tech, **College of Management**, **Room 224**
Emory Law School, Gambrell Hall, Room 5E

Assignment & Lecture Postings on Lexis/Nexis Webcourse; Lexis/Nexis IDs and passwords will be provided to Tech students on Tuesday, August 25.

Class Discussions and Social Networking – LinkedIn

Required Textbook/Readings:

***Advances in the Study of Entrepreneurship, Innovation and Economic Growth, Volume 18, Technological Innovation: Generating Economic Results*; Libecap, Gary D. and Thursby, Marie C., Elsevier, 2008**
The text will be distributed at no charge in class on August 25.

Additional readings, resumes, cases and other course material will be reproduced in a course pack and sold in class on Tuesday, August 25.

Additional readings may be distributed in class.

Course Overview
Technological innovation is not simply invention, but a process that includes all the steps from decision to conduct research and to identify opportunities and paths for that research to contribute to society, through commercial application and diffusion, and finally to its ultimate impact and consequences. This is the first of a two-course sequence on various techniques and approaches needed to understand the innovation process. Issues explored will include patterns of technological change, the identification of market and technological opportunities, competitive market analysis, the process of technology commercialization, intellectual property protection, and methods of valuing new technology.

This is not a course in entrepreneurship or managing product or process development per se. The primary focus is on acquiring a set of tools that are critical for capturing value from new technology, be it in a university setting or a large or small company. These tools can provide a framework for the types of problems that will be addressed in your TI:GER® teams.

The Fall Semester, Fundamentals of Innovation I, will focus on:

1. Identifying and evaluating business opportunities for technological innovation;
2. Learning forms of intellectual property protection and writing patent claims;
3. Identifying the capabilities and resources necessary to succeed in a particular industry; and
4. Learning to work in a multidisciplinary team.

Students are also encouraged to "keep current" on general topics of innovation and technology commercialization. Excellent business-oriented web sites that provide free content (sometimes just excerpts of articles are free) that are helpful in individual development, class preparation, and team activities include Forbes at www.forbes.com and Fortune at www.fortune.com, the Kauffman Foundation at www.kauffman.org, Business Week at www.businessweek.com, the Wall Street Journal at http://online.wsj.com/home/us and www.researchoninnovation.org.

A library of relevant books on business startup and technological innovation and commercialization is housed in the TI:GER lab and available for check-out.

In the spring, Fundamentals of Innovation II will focus on identifying the value proposition of a potential product based on the technology, identifying potential markets, valuing the technology at various stages of research, evaluating legal structures for feasible business opportunities, understanding the business impact of legal decisions, and developing a commercialization plan.

These two courses will provide the academic core to the student's first year in the Technological Innovation: Generating Economic Results (TI:GER®) program. Students will take each course as a "community of participants" and will participate in innovation teams, which will be formed during the first month of fall semester. These teams will participate in in-class activities and team problem-solving exercises to obtain an understanding of the technology commercialization process. The research that will drive the innovation teams will be provided by the PhD candidates and their advisors.

Innovation Team Structure and Performance Expectations

Each innovation team will be composed of a PhD candidate, two MBA candidates, and two JD candidates. The teams will remain intact for the entire two-year TI:GER experience. Teams are expected to set their own priorities and "commercialization agendas" within the context and schedules determined by the Fundamentals of Innovation course.

Each team should develop shared patterns of understanding. Teams are expected to work through and develop their own set of positive team dynamics and work rules. Just as in an actual commercialization setting, each team is expected to leverage its mix of disciplinary skills and team members should learn from each other. Students will visit each of the seven Ph.D. student labs (8/28 – 9/18) and attend several socials during the first four weeks of fall semester. Students will give their preferences for team members, and the **teams will be formed with these preferences in mind. Teams will be announced prior to September 26, the day of the Ropes Course outing.**

Each TI:GER team will meet on a fixed schedule with the TI:GER Program Professors, Margi Berbari and Anne Rector, to provide updates on team activities and to receive any needed direction on specific team activities. These meetings can be conducted on either the Tech or Emory campus. All team members must be present. Teams that do not meet as scheduled will be penalized in terms of the overall course evaluation. **Team meetings will be scheduled during the weeks of October 6 and November 9.**

Mentors

Each of the TI:GER® teams will be assigned mentors during fall semester, ideally both a legal mentor and a business mentor(s). Teams are expected to help locate appropriate mentors and provide them with in person progress reports at least twice/semester. All team members are encouraged to participate, although it may not be feasible or necessary to have all team members present at each meeting. Grading of this portion is based on feedback from the mentor(s) and your mentor report and comprises 5% of the final grade. A mentor report is due from the team by Monday, December 7. All communication and interactions with mentors should be guided by the TI:GER® Mentorship Program Guidelines.

Academic Honesty and Student Rights

This course will follow the guidelines established by Georgia Tech's honor code and student handbook and the Professional Conduct Code for Emory Law. All sources of information utilized in any of the course assignments are to be appropriately acknowledged. Please keep in mind that academic dishonesty includes (a) cheating, (b) fabrication and falsifications, (c) multiple submissions, (d) plagiarism, and (e) complicity in academy dishonesty. For any

questions involving these or any other Academic Honor Code issues, please consult the TI:GER® faculty or www.honor.gatech.edu and http://www.law.emory.edu/cms/site/fileadmin/current_students/conduct-code.pdf.

Class Attendance and Participation

In-class discussions and participation are an integral part of the TI:GER curriculum and account for 15% of the final grade. The participation grade will be based on overall class attendance (including timeliness), quality of participation in class discussions, team meetings preparedness, and attendance at other required meetings or events. **To enhance participation, students are asked to refrain from using their laptops during class time, unless specifically requested to do so.**

Class attendance will be taken weekly and is an important part of the participation grade. This three-credit class meets only once per week, and therefore missing a class means missing an entire week of information. We understand that job interview conflicts or illness can impact attendance. Any student needing to miss a class must notify Professors Berbari and Rector in advance. After one class absence, students will be expected to ask in advance for an excused absence, without which they will receive a reduction to their course grade appropriate to the number of unexcused absences.

Written Answers to Class Discussion Questions
Due 9/1; 9/15; 9/29; 10/20; 10/27; 11/10; 11/17; 12/1

Please provide a 2-3 page **written document** at the beginning of class that responds to the discussion questions. These questions are listed in the attached class schedule under "assignments." Note that some classes do not require a written response to the class discussion questions and written answers are at times not required for all questions – please look at the instructions carefully. A student who will be absent can email the write-up **in advance of the class time** with no penalty. Write-ups turned in after the class meeting time will be subject to the late assignment penalty.

IP Search and Analysis Project – Due 11/3 in class

This will be assigned by Emory Law faculty. Elements of the project requirements and grading criteria will be provided during the first and second IP-oriented class sessions.

Industry Analysis – Due 12/4 by 5:00 PM

This assignment involves an analysis of an industry that is relevant to the each TI:GER team's technology. The industry will be assessed in terms of resources and capabilities offered or lacking, and the opportunities and threats of its competitive environment. More details regarding this assignment will be available in class.

Team Evaluations – Due 12/7 by 5:00 PM

Each student will evaluate fellow team members, whose final grades will be based in part on the point allocations assigned in those evaluations.

Mentor Report – Due 12/7 by 5:00 PM

A mentor report form with instructions is posted on Lexis/Nexis.

Lecture Series write-ups - Due 12/7 by 5:00 PM

Plan to attend **two outside lectures** on relevant commercialization topics and write a one-page summary of what you learned and how it might impact your team and its commercialization process. These lectures could be part of the Georgia Tech Impact Series, Georgia Tech Public Policy Series, Emory Law's TechLaw® Series, or relevant community organizations such as IEI

or TAG. A list of organizations and seminars is posted on Lexis/Nexis. These write-ups must be emailed to the professors by December 7.

Late assignments

A penalty of 10% of the total points available for each assignment will be imposed for every day the assignment is late (i.e., 10% deducted if one day late, 20% deducted if two days late, etc.)

Grade Calculation:

A total of 400 points will be available for each student. The percentage of points for each assignment is reflected below.

Assignments will be evaluated as follows:

Basis	**% of Grade**
Class Participation	15%
Mentor Evaluation	5%
Write Up Questions	20%
IP Search and Analysis	20%
Industry Analysis	30%
Team Evaluation	5%
Lecture Series Write-ups	5%

Assignment/Activity	**Due Date**	**Submission Method**
TI:GER Social Reception	Sunday, 8/30	
Research Lab Visits	8/28– 9/18	
TI:GER Lab Open House	After class 9/1	
BOLD- Ropes Course	Saturday, 9/26	
Team Meetings	10/6 – 10/12	Sign up in class 9/29
Written Discussion Questions	9/1; 9/15; 9/29; 10/20; 10/27; 11/10; 11/17; 12/1	Submit hard copy in class to Berbari
IP assignment	11/3	Submit hard copy in class to Rector
Team Meetings	11/9 – 11/13	Sign up in class 11/3
Industry Analysis	Friday, 12/4 by 5:00 pm	email to Rector, Berbari
Lecture Write-Ups	Monday, 12/7 by 5:00 pm	email to Rector, Berbari
Mentor Report	Monday, 12/7 by 5:00 pm	email to Rector, Berbari
Team Evaluation	Monday, 12/7by 5:00 pm	email to Rector, Berbari

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
8/25	4:20 - 4:35 4:35 - 5:30 5:30 - 6:00 6:00 - 6:45 6:45 - 7:00	Students purchase course book **Overview of University Industry Technology Transfer** Welcome, introduction of students and faculty, assessment **Introduction to TI:GER** Marie Thursby **Confidentiality Agreements** Patrick Hatfield, Locke Lord Bissell & Liddell LLP **Initial Evaluation Jill Aeurbach**	Georgia Tech **Room 224**	 Students receive research summaries; Lexis/Nexis and WestLaw IDs and passwords Students sign non disclosure forms Students complete initial evaluation	
8/28 – 9/18	Variable times	**Research Lab Visits**		**All students are expected to visit each of the seven PhDs' labs to get an overview of the research & technology, to assist in team selection**	
Sunday 8/30	5:00 - 8:00 PM	**Reception** – hors d'oeuvres & drinks for 1st & 2nd year students	Thursby Home		
9/01	4:35 - 6:30 6:30 – 6:45 6:45 - ??	**Profiting from Innovation (Ceccagnoli)** Brief introductions by PhD students TI:GER Lab Open House with get-acquainted activity Pizza and soft drinks provided	Ga Tech 4th floor TI:GER Lab	**Class Discussion Questions – Written Answers (#1,2)** **Case A Discussion Question -Written Answer (#2)** **Due in Class** **Reading:** Ceccagnoli, M & Rothaermel, FT 2007, "Appropriating the returns from innovation," Chapter 1 in *Advances in the Study of Entrepreneurship, Innovation, and Economic Growth*, Vol. 18 (textbook) **Case**: EMI and the CT Scanner (A) 9-383-194 and (B) 9-383-195	**Class Discussion Questions** 1) Why do we frequently see innovators lose to imitators? 2) What can innovators do about it? Or more generally, what does it take to profit from innovation? How important are technological vs. non-technological assets? 3) How complete is the Teece model described in the assigned chapter? Should any other factors be considered? If so, which factor(s)? Explain. **Case Discussion Questions** **<u>Case A:</u>** 1) What kind of technological change is involved in EMI's basic invention? (e.g., incremental or

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
					radical change? new to the world technology or new combinations of old technologies? product/process innovation?) Does this matter? 2) Should EMI license its invention? What are the pros and cons of such a decision? What do you think of EMI's argument that it would be a bad idea to license to X-ray firms, because the X-ray firms would be reluctant to cannibalize their own business? **Case B:** 1) What is EMI's competitive position in 1976? 2) What conclusion do you draw about EMI's strategy in the CT scanner market between 1972 and 1976? What should they have done instead? Explain
9/8	4:35 - 6:55 7:00 - 8:00	**Identifying Market Opportunities (Berbari)** Informal after class social – Dutch treat (optional)	Ga Tech Ray's Pizza 5th Street	**Reading:** Shane, 2000. Prior Knowledge and the Discovery of Entrepreneurial Opportunities, Organizational Science 11(4) PP. 448-469 Case: Three Dimensional Printing UVA-ENT-0006 - Darden	**Class Discussion Questions** 1) How do Austrian theories of economics differ from neoclassic economic theories when offering explanations about who becomes an entrepreneur? 2) Why is prior knowledge important to a potential entrepreneur? 3) What other qualities do you think are important in the discovery of entrepreneurial opportunities? Explain why. 4) How will your prior knowledge help your TI:GER® team? **Case Discussion Questions** • How did eight entrepreneurs discover opportunities to commercialize the 3DR process? • What business opportunities were discovered and how were they discovered?
9/15	4:35 - 5:35	**Technological Innovation: Generating Economic Results and Overview of University Tech Transfer**	Ga Tech	**Reading:** Case: InfoVision (A):Technology Transfer at Georgia Tech and Supplement to InfoVision (A) Perry-Smith, J & Vincent, L	**Class/case Discussion Questions** 1) Why do you think the TI:GER participants in the case had a difficult time getting along? 2) Think about the most

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
		(Thursby)		2007, "The Benefits and Liabilities of Multidisciplinary Commercialization Team," Chapter 2 in textbook	salient characteristics of someone in your profession. What skills/abilities/characteristics does your profession reward? Why did you choose your profession? How has your education changed you? 3) What have been your positive/negative experiences in working across professional boundaries in your past job experience? 4) Describe the types of conflict that can occur in an interdisciplinary team and how conflict can actually benefit the team. **Case Discussion Questions** 1) Why is it difficult for professionals in different disciplines to get along? 2) Why did you choose the degree program you are in? What are the measures of success in your chosen career? What motives you? What abilities are needed in your profession? 3) What went wrong with the team in Spring 2005? What lessons can be drawn from this case?
	5:45 - 6:45	**Personality Style Inventory – Overview and Inventory (Kurre)** Informal after class social – Dutch treat (optional)	TBD	**Each student will complete and turn in a personality inventory during class** **Class Discussion Questions - Written Answers (#1,2,4)** **Case Discussion Question -Written Answer (#3)** **Due in Class.**	
9/22	4:35 - 5:25 5:35 - 6:45	**Team Management and Team Processes Personality Styles: Understanding Projects and Teams (Kurre)** **TI:GER Experiment** **(Kelli Lanier)**	Ga Tech	**Reading:** • Team Handbook – included in Course pack Turn in Teammate recommendation form	
9/26	10 am – 5:00 pm	**Retreat** **Ropes Course at Berry College**	10 am departure from Ga Tech	Meet at front entrance of GA Tech Hotel (Across from Management Graham Entrance, next to Parking lot E81)	
9/29	4:35 - 6:55	**Introduction to IP & Patents** **(McKeon)**	Emory Room 5E	**Reading:** Hallenborg, L, Ceccagnoli, M, Clendenin, M 2007, "Intellectual Property Protection in the Global Economy," Chapter 3 in textbook **Class Discussion Questions**	**Class Discussion Questions** 1) Identify three types of patents issued by the United States Patent Office. Which type is the most common? How do the three types differ? 2) What are the rights

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
				- Written Answers (#1,4,6) **Due in Class**	conveyed by a patent? 3) What are the benefits and limitations associated with filing a patent application under the Patent Cooperation Treaty? 4) What are the requirements for patentability? 5) Does a patent give you the right to practice an invention in the United States? Why or why not? 6) How do provisional and non-provisional patent applications differ? What would you consider in deciding whether to file a provisional or non-provisional application? 7) What is the date of an invention and why is it important? 8) How can an academic researcher benefit from the CREATE Act? 9) How is infringement of a patent claim analyzed?
10/6 – 10/12	Variable	**Team Meetings with faculty**	Ga Tech & Emory	**Meeting Preparation:** **1. Prepare team project elevator pitch** **2. Complete exercises in Team Handbook**	
10/6	4:35-5:40 5:40 - 6:55	**Patent Searching Training** **(Lexis/Nexis Representative)** **Patent Searching** **(McKeon)**	Emory	**Bring laptop to class for patent search training** **Reading:** David Pressman 2008, Patent It Yourself, 12th Edition, Chapter 6 (Coursepack) **Patent Search Activity:** • Perform a patentability search at the U.S. Patent and Trademark Office website for a list of issued patents that include “napkin ring” in the title and print those results. Indicate which patents on the list are utility patents and which are design patents. Indicate which patent(s) list the attorney or agent as the author of the reading assignment. • Perform a worldwide patentability search at the European Patent Office website for a list of issued patents that include “napkin ring” in the title and print those	**Class Discussion Questions** 1) What are the advantages and disadvantages of computer searches related to patentability? 2) Identify several types of searches relevant to patent strategy. 3) What does all this information on the face of a patent mean? 4) How do you calculate patent term?

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
				results. Indicate which patent(s) on the list have an inventor named Lloyd Clark.	
10/13	4:35 - 5:10 5:10 - 6:00 6:00 - 6:55	**University IP & Technology Transfer and Licensing** **Case Review (Berbari)** **Guest Lecturers:** Jilda Garton, Associate Vice Provost for GTRC Kevin Wozniak, Director, Technology Licensing	Ga Tech	**Reading:** SpudSpy – Harvard Business School Case 9-605-059	**Case Discussion Questions** • What went wrong? How did this situation spin out of control? • Why are Anderson and Huang so upset? • Can the project be salvaged? • What can you do in your teams to avoid these problems?
10/20	4:35 - 6:55	**Trade Secrets, Trademarks, Copyright** **(Graham)**	Emory	**Readings:** • Hallenborg, L, Ceccagnoli, M, Clendenin, M 2007, "Intellectual Property Protection in the Global Economy," Chapter 3 in textbook • Graham, S. "Beyond Patents: The Role of Copyrights, Trademarks, and Trade Secrets in Technology Commercialization," Chapter 5 in textbook **Class Discussion Questions - Written Answers (#1,2,5)** **Due in Class**	**Class Discussion Questions** 1) In the US, how are copyrights and trademarks different? 2) In the US, what factors do you consider when deciding whether to rely on patents, copyrights, or trademarks to protect your intellectual property? 3) In the US, what are the differences between trade secret and patent? 4) How do you analyze the strength of a trade mark? 5) What use is copyright to the entrepreneur? What are the relative advantages of copyright in different technology settings?
10/27	4:35 - 6:55	**CVD vs. Markham (Thursby/Graham)**	Emory	**Readings:** • Case: CVD Inc. vs. A.S.Markham Corporation A (HBS 9-388-041) • A Note on Antitrust and Competitive Tactics (HBS 9-703-493) • Cohen, et al, "Protecting Their Intellectual Assets: Appropriability Conditions and Why US Manufacturing Firms Patent (or Not)," NBER Working Paper 7552 **Class Discussion Questions -Written Answers (#1,2,3)** **Due in Class**	**Class Discussion Questions** 1) What are the critical legal and ethical issues in this case? 2) As a juror, what decision would you reach on each of the issues? On what facts do your decisions hinge? 3) With the benefit of hindsight, what would each of the parties have done to: prevent this case from occurring; and strengthen their legal position in the eventuality of a suit? **Case Discussion Questions** • Why didn't Markham patent its process originally? • Was the CVD process a trade secret?

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
					• From the standpoint of antitrust law, was the license valid?
11/3				**IP Assignment Due at 5pm**	
11/3	4:35 - 6:55	**Industry analysis (Ceccagnoli)**	Ga Tech	**Readings:** • Case: Matching Dell (HBS case n. 9-799-158) Readings: • The Five Competitive Forces That Shape Strategy, Porter M. (HBR article) • Graph "PC Shipments 1990-2008"	**Class Discussion Questions** 1) Why the explosion in PC shipments from 1990-2000? Why the sudden end to growth in 2000? What are the prospects for 2010? 2) What is the industry value chain in the PC assembly business? 3) Why does this industry have such low average profitability? 4) What are the sources of Dell's success in the PC assembly business?
11/10	4:35 - 6:55	**Gaining and Sustaining Competitive Advantage (Rothaermel)**	Ga Tech	**Readings:** • Rothaermel, FT 2007, "Competitive advantage in technology intensive industries," Chapter 7 in textbook **Class Discussion Questions -Written Answers (# 2, 3, 5) Due in Class**	**Class Discussion Questions** 1) What is strategy? 2) What is competitive advantage? 3) How do you know that a company has a competitive advantage? 4) How do you formulate/make strategy? 5) How do you do internal analysis?
11/9– 11/13	variable	**Team meetings with faculty**	Emory or Ga Tech		
11/17	4:35 - 5:30 5:40 - **7:30***	**Patent Drafting I** **(Patent Drafting II McKeon)** **Claims Drafting workshop with team of patent attorneys**	Emory	Advance reading - any issued US patent **Class Discussion Questions - Written Answers (# 2, 3, 5)** **Due in Class** Work with your team in class to prepare a set of patent claims *Note the extended class time due to no class on 11/24	**Class Discussion Questions** 1) What are the parts of a patent application? 2) For the application that you reviewed, print the claims and indicate which you think is one of the broadest claims and explain why. 3) In regular English, explain what you think that claim means. Indicate which, if any, are composition claims and which, if any, are method claims. 4) What are the parts of a patent claim? 5) How do you decide how many patent claims to include in an application?

Date	Time	Event/Topic/Lecturer	Location	Assignments	Class Discussion Questions
11/24		**No Class** **Happy Thanksgiving**		.	
12/1		**Patent Policy: Is the patent system broken and how effective is it at supporting innovation? (Graham)**	Emory	**Readings:** • Bagley, Margo A 2007, "Patents and Technology Commercialization: Issues and Opportunities," Chapter 4 in textbook. • Jaffe, A and Lerner, J *Innovation and Its Discontents: How Our Broken Patent System is Endangering Innovation and Progress, and What to do about it*. Read the Introduction, pp. 1-24. • *A Patent System for the 21st Century, Science, Technology and Economic Policy*, 2004. Read the Executive Summary **Class Discussion Questions--Written Answers (#2,4,5)** **Due in Class**	**Class Discussion Questions** 1) After the readings, how has your perception of the usefulness of patents changed, if at all? 2) How do the readings suggest we should evaluate the patent system? 3) What are the costs to society of a malfunctioning patent system? 4) How would the proposed changes in the patent system affect the commercialization of your team's technology? 5) Do you foresee problems in launching your product given the workings of the patent system?
12/4				**Industry Analysis Due by 5:00 PM**	
12/7				**Lecture Write-ups Due by 5:00 PM** **Team Evaluations Due by 5:00 PM** **Mentor Report Due by 5:00 PM**	