**Economics of Innovation and Intellectual Property Rights**

 **Peking University, Spring 2017**

**Syllabus**

Information, Research and Innovation are key drivers of growth and prosperity in the modern economy. Policy makers and entrepreneurs need to understand the economics of research and the roles of various policies in fostering sustained innovation in a world of proliferating intellectual property rights. This course addresses these issues.

 We start with the history of research and innovation and the institutions that have supported it since ancient times.  We then consider the standard modern economics of invention, introduced by Arrow, Nelson and others; the major types of research management systems; the nature and economic effects of the various modern intellectual property rights; major innovation achievements including examples from agriculture, pharmaceuticals, alternative energy sources, software, and electronics.  We discuss the determinants of the direction of innovation, the roles of the public and private sectors, open source innovation, the interaction between innovation and market structure, the role of antitrust, the access of the poor to needed technology, and the challenges of ongoing global intellectual property negotiations.

Students on this class will read and become familiar with some historical examples of the innovation process, and study topics including:

* Economics of innovation processes including research, invention, innovation, development, adoption and diffusion
* different forms of intellectual property rights and other means of protecting, encouraging or contracting for innovation
* a simple static model of the economics of optimal patent life
* the effects of patents in simple static and dynamic models
* simple models of patent licensing
* the evaluation of innovations, directed innovation and economic growth
* issues such as open source innovation, indigenous rights, international intellectual property protection, the problems of neglected diseases, access to pharmaceuticals, and encouragement of clean technology

**Prerequisite:** intermediate microeconomics and introductory calculus.

The **main text** is Suzanne Scotchmer, [*Innovation and Incentives*](http://books.google.com/books?id=wCVzojA6YJoC&dq=&pg=PP1&ots=iNpDu1KqD5&sig=y5sxguTX2yxpAwXG-N0ejwl4HDk&prev=http://www.google.com/search?q=Scotchmer+Innovation+and+Incentives&ie=utf-8&oe=utf-8&aq=t&rls=org.mozilla:en-US:official). Cambridge, MA: MIT Press, 2004.

**Office Hours: After class 9:30-10:30 pm.**

**Examinations:**

Midterm: April 12 or 19, in class

Final: June 7

**Grading:**

There will be a total of five problem sets throughout the semester, one midterm and one final exam.

Each student is expected to submit at least one news item (please, no corporate press releases) analysis related to innovation or intellectual property before the last class. This will be graded with a maximum score of 5%. Good sources include *Science, Nature, Technology Review, New York Times,* [*The Economist* Science and Technology news](http://www.economist.com/science/)*,* [National Science Foundation: Science and Engineering Indicators](http://www.nsf.gov/statistics/), China Daily, etc

In each class, all students will be expected to take an active role in class discussions, and in critically examining the contributions of others. Class participation is crucial for all students. Do not be shy; I have never heard a stupid question from a student yet!

Homework 20%

Midterm Exam 25%

Final Exam 45%

News Article 5%

Class Participation 5%

Reading List

The main text is Suzanne Scotchmer, [Innovation and Incentives](http://books.google.com/books?id=wCVzojA6YJoC&dq=&pg=PP1&ots=iNpDu1KqD5&sig=y5sxguTX2yxpAwXG-N0ejwl4HDk&prev=http://www.google.com/search?q=Scotchmer+Innovation+and+Incentives&ie=utf-8&oe=utf-8&aq=t&rls=org.mozilla:en-US:official), Cambridge, MA: MIT Press,

You are responsible for reading the following references as background for the lectures.

Mokyr, J. 1990*.* [The Lever of Riches.](http://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;;idno=heb03329) New York. Oxford University Press

Chapter 1 “Introduction”

 Chapter 4 “The Renaissance and Beyond: Technology 1500-1750”

 Chapter 9 “China and Europe”
Fagerberg, J. 2005. ["Innovation: A Guide to the Literature."](http://emlab.berkeley.edu/users/bhhall/e124/01-Fagerberg-chap01.pdf) *Oxford Handbook of Innovation*. Oxford University Press, Oxford, UK. (Available Online)

**1. Introduction: Innovation and Its Importance to the World**

*Review of Syllabus, course requirements, reading list.*

Easterly W. and R. Levine. 2001. It’s Not Factor Accumulation: Stylized Facts and Growth Models. *World Bank Economic Review* 15(2):177-219.

Fogel R.W. 2004. [“Health, Nutrition and Economic Growth.”](http://www.jstor.org/stable/10.1086/383450) *Economic Development and Cultural Change* 52(3): 643-658.

Pardey, P.G. and N.M. Beintema. 2001. *Slow Magic: Agricultural R&D a Century After Mendel*. IFPRI, Washington, D.C.

Schumpeter, J.A. 1942. *Capitalism, Socialism and Democracy*. London, U.K.: Allen and Unwin. Chapter VII. “The process of Creative Destruction,” pp. 81-86.

**2. Investing in Knowledge**

**\***Scotchmer, S. *Innovation and Incentives*, Chapter 2. "Investing in Knowledge," especially up to pp. 47 plus Section 2.8.1.

**3. History of institutions for creating or encouraging innovation**.

\*Scotchmer, S. *Innovation and Incentives*, Chapter 1. "Institutions: A Brief Excursion through History (with S. Maurer)."

Mokyr, J. [The Lever of Riches](http://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;;idno=heb03329), Chapters 1, 4 and 9.

Boldrin, M. and D. Levine, *Against Intellectual Monopoly*.” Chapters 1 and 2, pp.1-41 (free on the web).

Busch, V. *Science: The Endless Frontier*

**4. Intellectual Property Protection**

*Patents, Copyrights, Secrecy, Others (Technical Protection, Plant Parents, Plant Variety Protection)*

*Intellectual Property Protection: US and China (plus notes on EU, Japan, Korea)*

\*Scotchmer, S. *Innovation and Incentives*, Chapter 3. "A Primer for Nonlawyers on Intellectual Property."

**5. How Patent Incentives Work**

\*Scotchmer, S. *Innovation and Incentives*, Chapter 4. “On the Optimal Design of Intellectual Property.”

Nelson, R. 1959. ["The Simple Economics of Basic Scientific Research."](http://www.jstor.org/stable/pdfplus/1827448.pdf)  *Journal of Political Economy* 67:304

Gordon, H. S. 1959 "[The Economic Theory of a Common-Property Resource: The Fishery](http://ideas.repec.org/a/ucp/jpolec/v62y1954p124.html)." *Journal of Political Economy*

Wright, Brian D. 1983. “The Economics of Invention Incentives: Patents, Prizes, and Research Contracts.” *American Economic Review* 73(4): 691–707.

**6. Cumulative Innovation**

\*Scotchmer, S. *Innovation and Incentives*, Chapter 5. “Standing on the Shoulders of Giants.”

-Basic/Applied; quality ladders; research tools

Jaffe, A. B. and J. Lerner.(2004) *Innovation and its Discontents* Chapter 2: "The Dark Side of Patents."

[“Spitting Image.”](http://socrates.berkeley.edu/~scotch/innovation/inventing_injet.htm) 2002 *Economist* September 19

[The Invention of Email”](http://socrates.berkeley.edu/~scotch/innovation/inventing_email.pdf) 1998.  *Pretext Magazine* 1998

**7. Licensing of Technology**

*-fixed fee vs. per unit royalty; competitive effects; compulsory licensing; ex ante vs. ex post*

 *-university patenting and licensing and Bayh-Dole Act*

\*Scotchmer, S. *Innovation and Incentives*, Chapter 6. “Licensing, Joint Ventures and Competition Policy.”

Drivas, K., Lei, Z., Merrill, S.A. and Wright, B.D. (2014) “Industry-Funded Academic Inventions Boost Innovation.” *Nature* 507, 297–299 (20 March) doi:10.1038/507297a

**8. Litigation and Enforcement of IPRs: US and China**

*Contracts; Litigation of infringement; Trolls; Technical Means; Antitrust and innovation markets*

\*Scotchmer, S. *Innovation and Incentives*, Chapter 7. “Litigation and Enforcement.”

**9. Diffusion and Adoption**

*Electric power; tractors v. horses; hybrid corn; computers; transgenic crops; cell phones*

R.E. Evenson, et al. 2003: ["Assessing the Impact of the Green Revolution, 1960-2000"](http://www.sciencemag.org/cgi/reprint/300/5620/758.pdf) *Science* 300, 758

Griliches, Z. 1960. ["Hybrid Corn and the Economics of Innovation."](http://www.jstor.org/sici?sici=0036-8075(19600729)3%3A132%3A3422%3c275%3AHCATEO%3e2.0.CO%3B2-B) *Science*, New Series, 132, 3422 (July 29): 275-280

Hall, Bronwyn.2005 ["Innovation and Diffusion."](http://ideas.repec.org/p/nbr/nberwo/10212.html) In J. Fagerberg, Ed. *Oxford Handbook of Innovation*. Oxford University Press, Oxford, UK.

David, Paul. [“The Dynamo and the computer: Historical Perspective on the Productivity Paradox.”](http://www.jstor.org/sici?sici=0002-8282(199005)80:2%3c355:TDATCA%3e2.0.CO;2-X&origin=repec) 1990.

Farmer JD and Trancik J.E., Dynamics of technological development in the energy sector, *London Accord Final Publication*, J-P Onstwedder and M Mainelli eds. (2007); and Santa Fe Institute Working Paper #07-12-046

**10. Networks, Compatibility, Standards and Pools**

\*Scotchmer, S. *Innovation and Incentives*, Chapter 10. “Networks and Network Effects.”

-JPEG; HD DVD vs. Blue Ray; PIPRA

**11. International IP Protection**

\*Scotchmer, S. *Innovation and Incentives*, Chapter 9

*-Paris Convention, Berne Convention*

*-TRIPS and bilateral negotiations, Compliance*

*-Who patents where? Who gains?*

**12. Induced Innovation, Endogenous Growth and Directed Innovation**

Romer, P. 1994. “The Origins of Endogenous Growth.” *Journal of Economic Perspectives.* Vol. 8, No. 1 (Winter), pp. 3-22

**13. Open Source**

* Linux and copyleft

Von Hippel, E. *Democratizing Innovation* (See Reader)

Benkler, J. 2004 ["Commons-Based Strategies and the Problems of Patents"](http://www.sciencemag.org/cgi/reprint/305/5687/1110.pdf) *Science* 305 20 August: 1110-1111

Jefferson, R. 2006. ["Science as a Social Enterprise: The CAMBIA BiOS Initiative."](http://ses.library.usyd.edu.au/bitstream/2123/2686/1/LegalFramework_Ch18.pdf) *Innovations. Fall.*

* [BiOS](http://www.nature.com/nature/journal/v438/n7067/pdf/nature04342.pdf)

**14. Conference on Biodiversity and Indigenous People's Rights**

* Can bioprospecting rights save the Amazon?

Koo, Bonwoo and Brian D. Wright. 1999. ["The Role of Biodiversity Products as Incentives for Conserving Biological Diversity: Some Instructive Examples."](http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6V78-3XK0PBH-1N-1&_cdi=5836&_user=4420&_pii=S0048969799003095&_orig=search&_coverDate=10%2F18%2F1999&_sk=997599998&view=c&wchp=dGLzVzz-zSkWb&md5=bfaf1b78e9250239acdd8562d9a06767&ie=/sdarticle.pdf) *The Science of the Total* *Environment* 240(1999): 21-30.

Greene, S. ["Indigenous People Incorporated."](http://www.geog.umontreal.ca/donnees/geo6815/Lecture_cours%2012_Greene_Bioprospecting_indigenous_peoples.pdf)*Current Anthropology* 45, 2, April 2004.

[Hayden, Cory. "Bioprospecting: Can pharmaceutical research give back?" *Revista: Harvard Review of Latin America.* Fall 2004/Winter 2005: 40-41](http://drclas.fas.harvard.edu/revista/files/455b5f2ae59df/flora_and_fauna.pdforated.pdf)

**15. Drugs for Neglected Diseases**

Maurer, S.,A.Rai. and A. Sali  2004. ["Finding Cures for Tropical Diseases: Is Open Source the Answer?"](http://medicine.plosjournals.org/archive/1549-1676/1/3/pdf/10.1371_journal.pmed.0010056-L.pdf) *Public Library of Science: Medicine* 1 56-58

[Kremer, M. and Glennerster, R. 2004. *Strong Medicine:Creating Incentives for*](http://medicine.plosjournals.org/archive/1549-1676/1/3/pdf/10.1371_journal.pmed.0010056-L.pdf)

*Pharmaceutical Research on Neglected Diseases*. Princeton, N.J.: Princeton

[University Press, chapter to be assigned.](http://medicine.plosjournals.org/archive/1549-1676/1/3/pdf/10.1371_journal.pmed.0010056-L.pdf)

**16. Patent Thickets and Related Problems**

*-Golden Rice; Transgenic corn; Stem cells; Others?*

Binenbaum, Eran, C. Nottenburg, P.G. Pardey, B.D. Wright and P.Zambrano. 2003. “South- North Trade, Intellectual Property Jurisdictions, and Freedom to Operate in Agricultural Research on Staple Crops.” *Economic Development and Cultural Change*, 51(2): 309- 355.