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News Clips: New and Notable

"The societal benefit of developing a new type of credit default swap has always been dubious. In an era when thousands of amateur stock analysts post their thoughts online, expert opinions from Wall Street analysts may also provide less value. On the other hand, we need our best and brightest engineers developing new types of medical devices, renewable energy sources, solutions for global warming, and ways for sustaining the environment and purifying water. And we need them to start companies that help America keep its innovative edge. So maybe the dark cloud over finance has a silver lining, and investment banking's loss will be engineering's gain."

-Vivek Wadhwa, "Engineering: Suddenly Sexy for College Grads," *Business Week* online, 11/14/08

Full article:

http://www.businessweek.com/print/technology/content/nov2008/tc20081113_488542.htm

"Dr. Block, from the University of California, Davis, and a graduate student there, Matthew Keller, make the case for what Dr. Block calls 'stim-novation' in 'Building on Success: Reforming the U.S. Innovation System,' a white paper (posted as a pdf on the Longview Institute Web site). They propose the creation of a cabinet-level Department of Innovation."

-Andrew C. Revkin, "Does Obama Need a Department of Innovation?," *New York Times* online, 12/10/08

Full article:

<http://dotearth.blogs.nytimes.com/2008/12/10/do-we-need-innovation-department/?pagemode=print>

Featured Academic Papers

For pdf copies of papers refer to:

<http://www.hbs.edu/units/tom/seminars/2008/science/>

[Private Equity and Long-Run Investment: The Case of Innovation](#), Josh Lerner (Harvard Business School)

Abstract: A long-standing controversy is whether LBOs relieve managers from short-term pressures from public shareholders, or whether LBO funds themselves are driven by short-term profit motives and sacrifice long-term growth to boost short-term performance. We investigate 495 transactions with a focus on one form of long-term activities, namely investments in innovation as measured by patenting activity. We find no evidence that LBOs are associated with a decrease these activities. Relying on standard measures of patent quality, we find that patents granted to firms involved in private equity transactions are more cited (a proxy for economic importance), show no significant shifts in the fundamental nature of the research, and are more concentrated in the most important and prominent areas of companies' innovative portfolios.

[Population modeling of the emergence and development of scientific fields](#), David Kaiser (MIT)

"Adventures in Scientometrics: Accounting for Scientific Practice Individually, Institutionally, and Internationally"

Abstract: We analyze the temporal evolution of emerging fields within several scientific disciplines in terms of numbers of authors and publications. From bibliographic searches we construct databases of authors, papers, and their dates of publication. We show that the temporal development of each field, while different in detail, is well described by population contagion models, suitably adapted from epidemiology to reflect the dynamics of scientific interaction. Dynamical parameters are estimated and discussed to reflect fundamental characteristics of the field, such as time of apprenticeship and recruitment rate. We also show that fields are characterized by simple scaling laws relating numbers of new publications to new authors, with exponents that reflect increasing or decreasing returns in scientific productivity.

[Of Mice and Academics: Examining the Effect of Openness on Innovation](#), Scott Stern (Kellogg)

Counterparts in industry, academics maintain discretion over their research agenda and allow others to build on their discoveries. This paper examines the relationship between openness and freedom, building on recent models emphasizing that, from an economic perspective, freedom is the granting of control rights to researchers. Within this framework, openness of upstream research does not simply encourage higher levels of downstream exploitation. It also raises the incentives for additional upstream research by encouraging the establishment of entirely new research directions. In other words, within academia, restrictions on scientific openness (such as those created by formal intellectual property [IP]) may limit the diversity and experimentation of basic research itself. We test this hypothesis by examining a "natural experiment" in openness within the academic community: NIH agreements during the late 1990s that circumscribed IP restrictions for academics regarding certain genetically engineered mice. Using a sample of engineered mice that are linked to specific scientific papers (some affected by the NIH agreements and some not), we implement a differences-in-differences estimator to evaluate how the level and type of follow-on research using these mice changes after the NIH-induced increase in openness. We find a significant increase in the level of follow-on research. Moreover, this increase is driven by a substantial increase in the rate of exploration of more diverse research paths. Overall, our findings highlight a neglected cost of IP: reductions in the diversity of experimentation that follows from a single idea.

Migration News

President-Elect Obama and S&E Workers

Philip Martin, *Migration News*

Immigration was not a major issue in the 2008 presidential campaign, in part because Senators John McCain (R-AZ) and Barack Obama (D-IL) agreed on the need for "comprehensive immigration reform." However, during the Republican primaries, immigration reform was a hot topic. During one debate, McCain disavowed the comprehensive immigration reform proposal he co-authored with Senator Edward Kennedy (D-MA) in 2006, saying he now realized that Americans wanted the borders secured before unauthorized foreigners were legalized.

Comprehensive immigration reform generally means coupling more enforcement with a path to legalization for unauthorized foreigners in the US. The differences between McCain and Obama were in emphasis. McCain called for border security before legalization, while Obama stressed the need to enforce labor and immigration laws in the workplace.

President Bush announced principles for immigration reform, including more enforcement, a path to legal status for unauthorized foreigners, and a new guest worker program, and then waited for Congress to act. Most commentators expect President Obama to take largely symbolic steps in 2009, such as suspending "disruptive" workplace raids and stepping up labor inspections until comprehensive immigration reform is enacted.

Obama's designated chief of staff, Representative Rahm Emanuel (D-IL), reportedly said that immigration reform would not be a first-term issue in an Obama administration. Juan Salgado, board chairman of the Illinois Coalition for Immigrant and Refugee Rights, said Emanuel told him in November 2008 that: "there is no way this [immigration reform] legislation is happening in the Democratic House, in the Democratic Senate, in the Democratic presidency, in the first term."

Obama has been cautious about expanding the number of H-1B visas available. He said that employers can "go a long way toward meeting industry's need for skilled workers with Americans. Until we have achieved that, I will support a temporary increase in the H-1B visa program as a stopgap measure until we can reform our immigration system comprehensively."

However, Obama's designated secretary of the Department of Homeland Security, Arizona Governor Janet Napolitano, has been an advocate of more H-1B visas. In September 2007, Napolitano was one of 13 governors who signed a letter to Congressional leaders asserting that "our nation face[s] a critical shortage of highly skilled professionals in math and science" and urging a temporary increase in the number of H-1B visas. Earlier in 2007, Napolitano urged a legislative change that would allow foreign graduates of US universities to obtain immigrant visas upon graduation.

H-1B. The H-1B program provides US employers with an easy attestation process to hire foreigners with at least Bachelor's degrees to fill US jobs that normally require Bachelor's degrees. These jobs "require theoretical and practical application of highly specialized knowledge to perform

fully.”

When the H-1B program was being developed for inclusion in the Immigration Act of 1990, the consensus was that the US had sufficient workers for its economy, but not enough to fill jobs in fast-growing occupations that required training, such as S&E and health care occupations. For this reason, employers were allowed to simply assert or attest that they wanted to hire foreign “specialty workers” and were paying at least the prevailing wage to the foreigner. The US Department of Labor was obliged to approve employer’s applications that satisfied these rules, and was not allowed to investigate whether the employer was abiding by the promises made in the application until after a complaint was received. However, to protect US workers, the number of H-1B visas was capped at 65,000 a year.

There were fewer than 65,000 requests for H-1B workers until FY98, when the US unemployment rate was 4.5 percent, employment was expanding by two million a year, and there was talk of a “new economy” no longer subject to economic cycles. The high-tech industry took the lead to persuade Congress to approve the American Competitiveness and Workforce Improvement Act of 1998, which raised the ceiling on H-1B visas to 115,000 in FY99 and FY00 and to 107,500 in FY01. An employer-paid training fee of \$500 was imposed on each H-1B application or renewal to train US workers to fill jobs for which employers were requesting H-1B workers.

The 1998 Act placed new restrictions on H-1B dependent employers, generally those with at least 15 percent H-1B visa holders among their US employees. Such employers were required to attest that they had not laid off a similar US worker 90 days before the request for an H-1B foreigner, and would not lay off a similar US worker 90 days after the H-1B worker was employed. H-1B-dependent employers were also required to make “good faith” efforts to recruit US workers before applying for H-1B workers.

In 2000, with employer requests once again exceeding the H-1B quota, the American Competitiveness in the 21st Century Act raised the annual ceiling to 195,000 for three years. This limit was never reached, in part because H-1B visas issued to US universities and research institutions were exempt and because the IT bubble burst in 2001. The employer-paid training fee was raised to \$1,000 per H-1B application or renewal.

The ceiling on H-1B visas reverted to 65,000 a year in 2002, but another 20,000 H-1B visas were made available to employers who wanted to hire foreigners with MS or PhD degrees from US universities. This means that US employers can hire 85,000 new H-1B visa holders a year, and an unlimited number are available to universities and non-profit research institutes.

Employers are requesting more than twice the 85,000 H-1B visas available under the ceiling each year; there were 163,000 employer requests for H-1B visas in FY09. DHS selects winning applications for H-1B visas by lottery, a procedure that is widely considered non-optimal.

Disagreement between supporters and opponents of the H-1B program has blocked efforts to raise the cap. Most employers want a “clean” increase in the cap, which means raising the number of H-1B visas available to 200,000 a year or more without adding protections for US workers. Critics want more protections for US workers, such as requiring all employers, rather than just H-1B-dependent employers, to try to recruit US workers before hiring H-1B visa holders and to include in

their attestations that they did not lay off US workers to open jobs for H-1B visa holders.

OPT. The Department of Homeland Security tried to ease the pressure on employers seeking foreigners with H-1B visas with an "emergency rule" in April 2008 that lengthens Optional Practical Training (OPT) for foreign graduates of US universities from 12 to 29 months if they work for US employers who participate in the E-Verify system, which allows employers to check the legal status of new hires.

Many employers hire foreign graduates of US universities under OPT in the summer after they graduate and apply for H-1B visas on their behalf in the spring of the following year, when H-1B visas become available. Lengthening OPT training to 29 months gives employers two years rather than one to obtain an H-1B visa for the foreigner in the lottery. A suit by the Programmer's Guild alleging that lengthened OPT was a backdoor effort to raise the H-1B ceiling was dismissed.

Fraud. DHS released a report in September 2008 concluding that 51 of 246 H-1B petitions, 21 percent, that were filed by employers in 2005-06 involved fraud or technical violations of H-1B regulations.

www.uscis.gov/portal/site/uscis/menuitem. eb1d4c2a3e5b9ac89243c6a7543f6d1a/?vgnextoid=2ef1b0f8a0150110VgnVCM1000000ecd190aRCRD&vgnnextchannel=2ef1b0f8a0150110VgnVCM1000000ecd190aRCRD. The review of sample applications aimed to verify that the employer existed, that the foreigner had the stated credentials and was or would be employed as specified in the application, and that the H-1B visa holder would be paid the prevailing wage.

The review found 28 cases of foreigners not working at the specified location, 14 cases of pay below the prevailing wage (sometimes because the employer deducted DOL and DHS application fees from the worker's wages), and 10 cases of foreigners not having claimed degrees. Seven employers had non-existent businesses and six other businesses were substantially different than described by the employer. Fraud was more often found among those claiming Bachelor's than graduate degrees, more common in business analyst and accounting than in computer-related occupations, and more common in newly established firms with fewer than 25 employees.

PERM. Many H-1B visa holders expect their employers to sponsor them for immigrant visas or green cards. Until they receive immigrant visas, H-1B visa holders are normally required to remain employed by the sponsoring employer.

There are five employment-related immigrant visa categories or preferences, with 42,426 visas a year available for the first three and 10,540 visas a year for preferences 4 and 5. First-priority visas are for foreigners with "extraordinary ability," outstanding professors and researchers, and multinational executives, and no US sponsor or test of the US labor market is generally required before issuing visas to these foreigners. Second-preference employment visas are for foreigners with "exceptional ability" in the sciences, arts, or business and professionals with advanced degrees. These foreigners need a US job offer, but there is no test of the US labor market to determine if a qualified US worker is available to fill the job for which the employer is seeking an immigrant visa on behalf of a foreigner.

Third-preference employment-related immigrant visas are for foreigners with at least a BA degree, skilled workers filling jobs that require at least two years training or experience, and unskilled

workers. Waiting times increase as skill levels fall for these visas, producing waits of over five years for unskilled third preference employment visas (http://travel.state.gov/visa/frvi/bulletin/bulletin_1360.html). Fourth-preference employment visas are for “special” immigrants, mostly religious workers, and fifth-preference visas are for investors, most of whom invest \$500,000 in areas with high unemployment that create or preserve at least 10 US jobs.

Employment-based immigration almost always means that foreigners already in the US adjust their status from student or guest worker to immigrant. Most US employers sponsor foreigners they already employ for immigrant visas, and foreigners receiving employment-based immigrant arrived 5-10 years earlier. For example, in 2007, only five percent of those receiving first, second, and third priority immigrant visas arrived in 2007—95 percent were already in the US.

Employment-based Immigration, 2007

	Total	Adjustments	New Arrivals	Share
First-preference Principals	10,967	9,958	1,009	9%
Extraordinary Ability	2,243	1,798	445	20%
Outstanding Professors	2,261	2,226	35	2%
Multinational Executives	6,463	5,934	529	8%
Second-preference Principals	22,303	21,843	460	2%
Third-preference Principals	32,808	30,680	2,128	6%
BA Degrees	12,365	11,860	505	4%
Skilled Workers	17,965	16,434	1,531	9%
Unskilled Workers	2,478	2,386	92	4%
First, Second, Third	66,078	62,481	3,597	5%

Source: US Immigration Statistics, www.dhs.gov/ximgt/statistics/data/index.shtm. There are also a few visas granted to foreigners in third-preference Schedule A shortage occupations such as nurses and physical therapists.

Third-priority employment-related immigrant visas are to be issued only after the US government supervises employer efforts to recruit qualified US workers. Since most foreigners being sponsored for immigrant visas are already filling the jobs for which the employer is now seeking US workers, it is not surprising that the recruitment required to check for US workers very rarely produces US applicants who are hired.

In an effort to speed up what is generally a fruitless search for US workers, DOL in 2005 switched from state agencies verifying employer job descriptions and ads, and checking the resumes of US workers who responded, to a “trust-the-employer” approach. This approach, known as the Program Electronic Review Management (PERM) system, allows employers to develop job descriptions, advertise jobs, and keep records of US applicants who are found not to be qualified. DOL assumes that employers are honest and certifies that an immigrant visa should be issued to the foreigner as requested by the employer.

Most employers use lawyers to sponsor foreigners for immigrant visas, and some allegedly help employers to ensure that the required ads do not produce qualified US applicants. DOL announced in July 2008 that it would screen all employer applications filed by the Pittsburgh-based Cohen & Grigsby law firm, which filmed a presentation to employers highlighting how to avoid finding

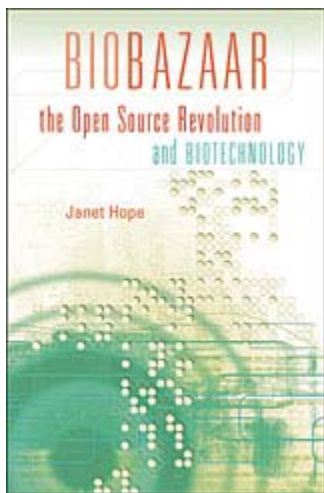
qualified US workers (www.youtube.com/programmersguild). DOL also debarred the San Francisco-based LawLogix Group from filing PERM applications on behalf of employers for three years because it filed false applications to test the prevailing wage parameters of the electronic system DOL uses to screen employer submissions.

The largest immigration law firm, Fragomen, Del Rey, Bernsen & Loewy, was accused by DOL of helping employers to avoid hiring qualified US workers because by suggesting that Fragomen lawyers be contacted if qualified US workers responded to ads. DOL said its rules require employers alone to decide whether the US job applicant is qualified—the implication was that Fragomen helped employers to find reasons that dis-qualified US applicants. However, DOL in September 2008 dropped the audits planned of Fragomen-assisted employers because its rules limiting the roles of attorneys in hiring were not clear until clarifying rules were issued August 29, 2008.

Outlook. Immigration reform remains a major concern of Hispanic legislators and particular groups of employers, including high-tech employers, construction and landscaping firms, and farmers. However, a majority of Americans in opinion polls want legal immigration reduced and more done to reduce unauthorized migration. With recession reducing job growth and increasing unemployment, immigration reform is unlikely to be a “first 100 days” issue for either a Democratic or Republican administration.

Featured Book

Janet Hope, *Biobazaar: The Open Source Revolution and Biotechnology* (Cambridge, MA: Harvard University Press, 2008), 428 pp., \$27.95, hardback.



Review by **John Trumbour**, Harvard Law School

Inspired by the anthropologist of hackerdom Eric S. Raymond in his essay and eventual book *The Cathedral and The Bazaar*, Janet Hope contrasts the “centralized, hierarchical development efforts” in building a cathedral with the “decentralized, quasi-anarchical” world of the bazaar. The bazaar became the model animating the open source movement for nonproprietary software. The intellectual property expert Hope seeks to bring the open source revolution to biotechnology, hence her declaration of the need for a “biobazaar.”

In the 1980s, Richard Stallman of MIT helped to unleash the open source movement through the “GNU Manifesto” and the subsequent establishment of the Free Software Foundation.

Stallman sought to develop a community of cooperating hackers, and open source principles remain a fountain of vitality for the internet. Jonathan Zittrain in *The Future of the Internet and How to Stop It* (2008) articulates mounting anxieties that open source principles could soon collapse. Corporate imperatives are promoting sterile, preprogrammed platforms that allow for no tinkering by technological enthusiasts. He regards the new iPhone as a repudiation of the “generative” principles that governed the Apple II computer.

After Stallman’s theoretical breakthroughs and movement building, others soon turned to open source principles in many other realms of human endeavor. Economist Richard B. Freeman and political scientist Joel Rogers proposed open source principles as a way of attracting new publics to a twenty-first century labor movement in the USA that had been in decline since the 1950s.

Janet Hope believes that the revolution in patenting biological innovations since the late 1970s has become a hindrance to biotechnology, and she calls for an open source renovation of this particular scientific landscape. She sketches the swelling of proprietary rights in the biological field: “In 1978, the USPTO granted fewer than 20 patents in the field of genetic engineering. By 1989, the total number of biotechnology patents being granted each year had risen to 2,160, increasing even further to 7,763 new patents in 2002.” (p. 35) According to the *OECD Science, Technology and Industry Scoreboard 2007*, the USA in 2004 held 38.7 percent of the world’s biotechnology patents under the PCT (Patent Co-operation Treaty), followed by Japan (17.7 percent) and Germany (10.0 percent).

While this lead in patents might excite some partisans of U.S. science, Hope regards this victory as a “tragedy of the anti-commons,” a phrasing introduced in a *Science* article by the academic legal thinkers Michael Heller and Rebecca Eisenberg. As Hope paraphrases their arguments, “if owners are unable to negotiate successfully for the bundling of rights so that someone has an effective privilege of use, the resource may be underused. The upshot is that granting too many patents or other intellectual property rights upstream can stifle socially valuable innovations further

downstream in the course of research and product development.” (pp. 39-40) Bargaining breakdowns and delays in research are a pronounced feature of the system.

Janet Hope makes the case that an open source system could enable scientists to bust out of these logjams. She cautions that biotechnology scientists should not expect the biobazaar to become as commercially successful as many software enterprises. She sees possibilities in some of the open source experiments underway such as the Tropical Diseases Initiative (TDI), which tries to find cures for diseases often among populations too poor to make research attractive for corporate pharma regimes.

Nevertheless, she argues that open source proponents could learn from the Fair Trade movement on how to make the biobazaar commercially viable. As she explains, “Just as supporters of open source in biotechnology (and software) must find ways to counter the perception that voluntarily giving up proprietary exclusivity is incompatible with commercial success, the Fair Trade movement has had to demonstrate that making the commitment to pay a fair minimum price for coffee, tea, bananas, and other commodities – thereby voluntarily giving up the right to exploit small farmers and producers further up the value chain – does not automatically reduce a distributor’s profits.” She admits that there is now a struggle between corporate goliaths who seek to have the Fair Trade label and those fearful that these interlopers will compromise the social-justice goals of the movement. These are ongoing debates, and Janet Hope believes that the bioscience community would do well to step up engagement with this rough-and-tumble aspect of the open source revolution.

Featured Publications

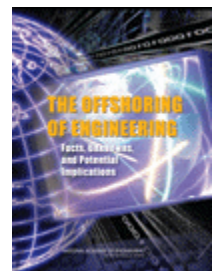
[The Offshoring of Engineering: Facts, Unknowns, and Potential Implications](#)

Committee on the Offshoring of Engineering, National Academy of Engineering

Description: The engineering enterprise is a pillar of U.S. national and homeland security, economic vitality, and innovation. But many engineering tasks can now be performed anywhere in the world. The emergence of offshoring the transfer of work from the United States to affiliated and unaffiliated entities abroad has raised concerns about the impacts of globalization.

The Offshoring of Engineering helps to answer many questions about the scope, composition, and motivation for offshoring and considers the implications for the future of U.S. engineering practice, labor markets, education, and research. This book examines trends and impacts from a broad perspective and in six specific industries software, semiconductors, personal computer manufacturing, construction engineering and services, automobiles, and pharmaceuticals.

The Offshoring of Engineering will be of great interest to engineers, engineering professors and deans, and policy makers, as well as people outside the engineering community who are concerned with sustaining and strengthening U.S. engineering capabilities in support of homeland security, economic vitality, and innovation.



Innovative Flanders: Innovation Policies for the 21st Century: Report of a Symposium

Committee on Comparative Innovation Policy: Best Practice for the 21st Century, Board on Science, Technology, and Economic Policy

Charles W. Wessner, Editor

National Research Council *of the National Academies*

Description: Recognizing that innovation is the key to international competitiveness in the 21st century, policymakers around the world are seeking more effective ways to translate scientific and technological knowledge into new products, processes, and businesses. They have initiated major programs, often with substantial funding, that are designed to attract, nurture, and support innovation and high-technology industries within their national economies.

To help U.S. policymakers become more aware of these developments, a committee of the National Academies' Board on Science, Technology, and Economic Policy undertook a review of the goals, concept, structure, operation, funding levels, and evaluation efforts of significant innovation programs around the world. As a part of this effort, the committee identified Flanders, a region of Belgium with substantial autonomy, which is recognized for its comprehensive approach to innovation. Based on initial meetings in Washington and Brussels, and with the endorsement of Flanders Vice Minister-President Fientje Moerman, it was agreed to organize a conference that would review regional innovation policies in the context of the policies and programs of the Flanders government, and their interaction with those of the European Union. This book provides a summary of that symposium.

Full text available at: <http://www.nap.edu>



Upcoming Events

We are pleased to announce two seminars sponsored by the Sloan West Coast Program on Science and Engineering Workers project, which is examining issues related to S&E workers in California and other western states. The goal of each seminar is to examine an aspect of S&E workers and the S&E labor market and discuss areas of consensus and disagreement, as well as the research agenda.

On **Friday, January 30, 2009**, the WCPSEW will sponsor a seminar at UCLA dealing with the impacts of highly skilled Asian S&E workers and immigrants in the US and Asia. The draft agenda is posted at: <http://migration.ucdavis.edu/wcpsew/> Participation is by invitation only; please contact Yen Ling Shek, yenling.shek@gmail.com

On **Friday, March 13, 2009**, the WCPSEW will sponsor a seminar at Stanford dealing with how US employers evaluate credentials earned abroad and the US career paths of foreigners employed in US high-tech industries. The draft agenda is posted at: <http://migration.ucdavis.edu/wcpsew/> Participation is by invitation only; please contact Rafiq Dossani-- dossani1@stanford.edu

In addition, the NBER Science and Engineering Program will be hosting the following conference in Washington, DC on **March 2, 2009**:

Science and Technology for the Good, Senate Conference Room

Energy crisis. Global warming. Natural resource scarcities. Shortfalls of food and water. Risk of global pandemic. Every day the media reminds us that humankind faces great problems as we seek to spread modern economic growth to all parts of the world and provide rising living standards worldwide.

To help resolve these problems we have more brainpower and computer resources than ever before and a wider base of knowledge about the biological and physical world from which to find ways to make our lives better.

How can federal support of science and technology (S&T) help the US and the rest of the world solve the great problems facing humankind and improve the lives of Americans and others around the world?

Updates regarding this conference will be available at: www.scienceandtechnologyforgood.org

The **Science and Technology for the Good** conference poses this question in a time of economic crisis when governments and firms often shortchange long term solutions in favor of more immediate problems. But investing in S&T as in other forms of infrastructure can contribute to overcoming short term as well as long term problems and get the country moving in "the right direction."

NSF Distinguished Lecture in Mathematical and Physical Sciences: *My Half-Century Experience in Technology and Diversity*

January 12, 2009 2:00 PM , Room 375, National Science Foundation

Prof. James E. West, National Medal of Technology; National Inventors' Hall of Fame

Overview: My nearly half-century career at Bell Labs led to advances in both the sciences and humanities. First, my research on charge storage and transport in polymers led to finding the right combination of materials and techniques to implant real charge with very long lifetimes. This made possible the design of high-fidelity microphones at reasonable cost for applications ranging from telephony to professional use. More than two-billion electret microphones are made each year. Recognizing the need to attract more under-represented minorities and women to the scientific community, we implemented early two very successful programs, namely the Summer Research Program (SRP) and the Graduate Research Fellowship Program (GRFP). The SRP provided an opportunity for several hundred college women and under-represented minorities to have a real laboratory experience each summer, while the GRFP supported more than 500 under-represented minorities and women through their Ph.D. by providing both financial and mentoring support.



S | E | W | P

Science & Engineering Workforce Project
at the National Bureau of Economic Research (NBER)

About SEWP

Among all workers, scientists, mathematicians, and engineers are believed to have a disproportionately strong impact on the growth and prosperity of an economy. How society provides training, incentives, and jobs to such individuals therefore merits special attention.

The Science and Engineering Workforce Project (SEWP) based at the National Bureau of Economic Research (NBER) is a network of labor economists and other researchers studying the professional development, deployment, and productivity of scientists, engineers, and highly skilled technical workers. Set up in 2001 with funding from the Sloan Foundation, the Project is directed by Professors Richard Freeman and Daniel Goroff of Harvard University.

Current research foci for SEWP include: wage levels and stipend policy, education and recruitment, graduate student unionization, career choices and trajectories, scientific competition and collaboration, funding mechanisms and incentives, as well as international development and immigration reform.

SEWP seeks to provide government, business, and labor with objective and timely analyses of scientific workforce issues. Network members meet each semester to connect their work with the concerns of policymakers, hi-tech employers, and academic institutions.

In addition to economists, we welcome the participation of social scientists, statisticians, government officials, hi-tech employers, educational leaders, reformers, and researchers, as well as current or future scientists, mathematicians, and engineers.

Administered jointly by

The [Labor & Worklife Program at Harvard Law School](#) and the [\[National Bureau of Economic Research\]](#) (NBER)

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