

# Spirit of INNOVATION

Research, Creativity and Commercialization News

OFFICE OF RESEARCH ADMINISTRATION NEWSLETTER June 2007 (Volume VI, No. 12)

The **Office of Research Administration** supports and advocates research and technology transfer by faculty, graduate students and staff. The ORA provides services in conjunction with external and internal sources of funding for research, along with services related to commercializing discoveries through technology transfer. The goal of this newsletter is to inform the campus community of grants received, to highlight the accomplishments of our faculty, graduate students and staff, and to share with you a calendar of important events and deadlines. Please direct any comments or questions regarding the newsletter to Tamara Wilgers ([wilgerst@umsl.edu](mailto:wilgerst@umsl.edu)).

## RECENT AWARDS

April 2007 EXTERNAL FUNDING Sources	
Association	\$20,275
Corporation	\$50,000
Federal	\$147,537
Foundation	\$50,000
MO Local Government	\$0
Other University	\$0
State of Missouri	\$282,000
<b>TOTAL</b>	<b>\$549,812</b>

April 2007 EXTERNAL FUNDING Purposes	
Instruction	\$0
Other Sponsored Activity	\$50,000
Research	\$499,812
Student Financial Aid	\$0
<b>TOTAL</b>	<b>\$549,812</b>

### EXTERNALLY FUNDED AWARDS, April 2007

**Charles Chui**, Mathematics & Computer Science, awarded \$50,000 for "Developing robust Automatic Target Recognition/Detection (ATR/D) algorithms" by the Lockheed Martin Corporation.

**Thomas George**, Chancellor, awarded \$20,275 for "Evaluation and Control of Impurities in Rapid-Detection sensors" by the North Atlantic Treaty Organization.

**David Laslo**, Public Policy Research Centers, awarded \$282,000 for "Annual survey and job vacancy estimates for State of MO" by the Missouri Department of Economic Development.

**Robert Ricklefs**, Biology, awarded \$137,537 for "Community relationships of malaria parasites and their avian hosts" by the National Science Foundation.

**Teresa Thiel**, Biology, awarded \$10,000 for "Genetic Analysis of Nitrogen Fixation in *A. variabilis*" by the National Science Foundation.

**James Tierney**, English, awarded \$50,000 for "Eighteenth-Century British Periodicals" by the Andrew W. Mellon Foundation.

**Total Awarded: \$549,812**

### UM SYSTEM RESEARCH BOARD AWARDS, Spring 2007

**Eike Bauer**, Chemistry & Biochemistry, \$25,062 for "Novel Metal Complexes as catalysts for the catalytic substitution on propargylalcohols"

**Berit Brogaard**, Philosophy, \$10,000 for "Transient Truths: A Defense of Temporalism"

**Steven Bruce**, Psychology, \$24,000 for "Neuroimaging & PTSD Treatment Outcome in Sexual Assault Victims"

**Laurie Greco**, Psychology, \$40,000 for "ACT for Adolescent Girls at Risk for Bulimia & Obesity"

**Jingyue Liu**, Physics & Astronomy, \$18,000 for "Synthesis of Nanostructured Metal Oxides"

**Wendy Olivas**, Biology, \$30,100 for "mRNA Decay Control by the Yeast Puf Proteins"

**Patricia Parker**, Biology, \$34,800 for "Population genetic structure of avian parasites in Galapagos Islands"

**Eamonn Wall**, English, \$10,000 for "Representing the West: Contemporary Writing from Connacht"

**Total Awarded: \$191,962**

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## FUNDING OPPORTUNITIES

Opportunities listed are a sampling only. For additional opportunities, visit [Grants.gov](http://www.grants.gov) (<http://www.grants.gov>), [Grant Advisor Plus](http://www.grantadvisor.com/tgaplus/) (<http://www.grantadvisor.com/tgaplus/>), [InfoEd](http://www.infoed.org/new_spin/spinmain.asp) ([http://www.infoed.org/new\\_spin/spinmain.asp](http://www.infoed.org/new_spin/spinmain.asp)) and the RFP Bulletin of the [Foundation Center](http://www.fdncenter.org/pnd/rfp/index.jhtml) (<http://www.fdncenter.org/pnd/rfp/index.jhtml>), or contact [Tamara Kratochvil](mailto:kratochvilt@umsl.edu) ([kratochvilt@umsl.edu](mailto:kratochvilt@umsl.edu)) for a customized database search.

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**FOR HELP GETTING SET UP TO RECEIVE CUSTOM EMAIL ALERTS FOR FEDERAL GRANT OPPORTUNITIES, CONTACT BRENDA STUTTE AT 516-5897 OR [STUTTE@UMSL.EDU](mailto:STUTTE@UMSL.EDU).**

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### EXTERNAL FUNDING OPPORTUNITIES

#### **Agency for International Development (USAID)**

- Nepal USAID-Kathmandu, Nepal Family Health Program, Phase II Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13918>
- Russia USAID-Moscow, The North Caucasus Youth Exchange Program Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14043>
- Thailand USAID-Bangkok, US-China University Collaboration on Rule of Law Program Objectives Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13917>
- USAID/DCHA/OFDA Annual Program Statement (APS) for Supporting Food Security for Extremely Vulnerable Communities in Southern Africa <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13566>

#### **Department of Defense (DOD)**

##### Air Force – Research Lab

- Call 0006 to Space Electronics Open 5 year BAA Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13871>
- Call 8 - Advanced Noretip Development for Hypersonic Vehicles Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=14012>
- Space-Based Advanced Sensing and Protection Open 5 Year Broad Agency Announcement  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13847>

##### Defense Advanced Research Projects Agency (DARPA)

- MTO - BAA0718 Electromagnetic Pulse Tolerant Microwave Receiver Front-End Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13938>
- Strategic Technology Office Intrinsically Assurable Mobile Ad-Hoc Networking (IAMANET) Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13719>

##### Department of the Army

- Autism Spectrum Disorder Research Program (ASDRP) Clinical Partnership Award  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13984>
- Autism Spectrum Disorder Research Program (ASDRP) Concept Award  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13982>

**WHEN PREPARING A GRANT PROPOSAL, YOU MUST SUBMIT YOUR BUDGET TO GINNY SCHODROSKI AT LEAST 2 WEEKS BEFORE THE PROPOSAL SUBMISSION DEADLINE. ANY EXCEPTION MUST BE APPROVED BY VICE PROVOST NASSER ARSHADI.**  
[ginny@umsl.edu](mailto:ginny@umsl.edu) or x.5284

- Department of Defense (DoD) Autism Spectrum Disorder Research Program(ASDRP) IDEA Development Award <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13986>

#### Office of Naval Research

- Broad Agency Announcement (BAA) for Payload Implosion and Platform Damage Prediction and Validation <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13822>

#### Department of Education (ED)

- Children With Disabilities; Personnel Development to Improve Services and Results Program CFDA 84.325Q Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13907>
- Postsecondary Education Improvement Fund Comprehensive Program CFDA 84.116B Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13906>

#### Department of Energy (DOE)

- Demonstration of integrated Biorefinery Operations for Producing Biofuels and Chemical/Materials Products <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13741>
- Global Nuclear Energy Partnership Deployment Studies <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13846>
- Solid State Lighting Core Technologies
  - Area of Interest 1 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13946>
  - Area of Interest 2 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13947>
  - Area of Interest 3 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13948>
  - Area of Interest 4 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13949>
  - Area of Interest 5 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13950>
  - Area of Interest 6 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13951>

#### Department of Health and Human Services (HHS)

##### Administration for Children and Families

- Help America Vote Act (HAVA) Training and Technical Assistance (T/TA) to Assist Protection and Advocacy Systems (P & As) to Establish or Improve Voting Access for Individuals with Disabilities Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13856>
- National Child Care Toll-Free Hotline Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14022>
- Secondary Analysis of Head Start Data <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13712>

##### Centers for Disease Control and Prevention

- Health Promotion among People with Thalassemia Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13954>
- National Public Health Leadership Institute Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13867>
- Network of State and Regionally Based Leadership Institutes Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14048>
- Packaging Proven HIV Behavioral Interventions for Use with Women at Highest Risk of Acquiring HIV (REP 9) <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13962>
- Promoting the Health of People with Bleeding and Clotting Disorders Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13865>
- Sexually Transmitted Diseases (STD) Prevention Program National Communication Network Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13961>

##### Health Resources & Services Administration

- GERIATRIC ACADEMIC CAREER AWARD Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13909>
- Health Information Technology Innovation Initiative Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13720>
- Quality Improvement Center Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13768>

##### National Institutes of Health

- Addressing the Role of Pregnancy in HIV Prevention (R01) Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13959>
- Framework Programs for Global Health (R25) Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13758>
- Implicating Noncoding RNAs in the Genetics of Mental Disorders: (Collaborative R01) Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13755>; (R01) Grant

<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13754>; (R21) Grant

<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13756>

- Investigator Initiated Multi-Site Clinical Trials (R01) Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13908>
- Outcomes in Children with Mild to Severe Hearing Loss (R01) Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13882>
- Predoctoral Training at the Interface of the Behavioral and Biomedical Sciences (T32)  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=10469>

#### Office of Public Health and Science

- 2007 Intergenerational Approaches to HIV/AIDS Prevention Education with Women Across the Lifespan Pilot Program Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13759>
- 2007 National Family Planning Training Center Cooperative Agreement  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13821>

#### Department of Homeland Security (DHS)

- Biometric Detector Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13753>
- Document Validator Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13752>
- First Responder Reliable Link (First NET) Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13751>
- Improvised Explosive Device & Vehicle-Borne Explosive Device Defeat: Technologies for Blast Mitigation and Suicide Bomber Defeat Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13749>

#### Department of Housing and Urban Development (HUD)

- Doctoral Dissertation Research Grant Pro  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=12966>
- Early Doctoral Student Research Grant Program  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=12965>
- Healthy Homes Technical Studies Program  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13009>
- Lead Outreach Program <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13017>
- Lead Technical Studies <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13010>
- Operation Lead Elimination Action Grant Program  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13014>

#### Department of Justice (USDOJ)

- FY 2007 Edward Byrne Memorial Byrne Discretionary Grants Program Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13960>
- OJJDP FY 2007 Substance Abuse Prevention and Intervention Programs Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=14005>

#### Department of Labor (DOL)

- Multiple Education Pathways Blueprint Grants (MEPB) Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13842>
- National Tech Asst. Cntr on Transition and Emp. for Youth with Disabilities Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13929>

#### Department of State (DOS)

##### Bureau of Educational and Cultural Affairs

- Educational Adviser Training and Support Services Grant  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13868>

#### Department of the Interior (DOI)

##### U. S. Fish and Wildlife Service

- Surveillance for Highly Pathogenic Avian Influenza  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13767>

#### Department of Transportation (DOT)

- Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13223>
- OSDBU's Small Business Transportation Resource Centers (SBTRC) under the Minority Resource Center (MRC) program. <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13844>
- Transportation Equity and Emergency Preparedness  
<http://www.grants.gov/search/search.do?mode=VIEW&oppld=13945>

### **Environmental Protection Agency (EPA)**

- FY 2007 Request for Proposals (RFP) for the Pollution Prevention Information Network (PPIN) Grants Program Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13831>
- GHG Emission Factor Development Project for Selected Sources in the Natural Gas Industry Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14049>
- Nanotechnology Research Grants Investigating Fate, Transport, Transformation, and Exposure of Engineered Nanomaterials: A Joint Research Solicitation - EPA, NSF, & DOE Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14026>
- Reducing the Environmental and Health Impacts of School Siting, Request for Proposals (RFP) <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13912>
- Smart Growth Streets and Emergency Response Request for Proposals (RFP) Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13718>

### **National Aeronautics and Space Administration (NASA)**

- Aviation Safety: Aircraft Aging and Durability Project 2 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13739>
- NASA RESEARCH ANNOUNCEMENT FOR CONNECT PROGRAM Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14051>
- RESEARCH OPPORTUNITIES IN AERONAUTICS – 2007 Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13914>
- Research Opportunities in Space and Earth Sciences (ROSES) 2007
  - Land-Cover/Land-Use Change Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13903>
  - Near Earth Object Observations Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13901>
  - Planetary Instrument Definition and Development Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13931>
  - Planetary Protection Research Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14114>
  - Terrestrial Ecology <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13902>

### **National Endowment for the Humanities (NEH)**

- America's Historical and Cultural Organizations Planning Grants <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14046>

### **National Science Foundation (NSF)**

- Community-based Data Interoperability Networks Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14052>
- CreativeIT Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13845>
- Cyberinfrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13920>
- EAR Education and Human Resources Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=14050>
- Materials Research Science and Engineering Centers Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13869>
- Science of Learning Centers Grant <http://www.grants.gov/search/search.do?mode=VIEW&oppld=13836>
- Strategic Technologies for Cyberinfrastructure Program (STCI) <http://www.grants.gov/search/search.do?mode=VIEW&oppld=11299>

### **NEW ANNOUNCEMENTS: FOUNDATIONS & OTHER; DEADLINE MEMO**

<http://www.grantadvisor.com/tgaplus/saved.pdf>

### **GRANT SUBMISSION POLICY**

#### **PeopleSoft Signature Routing Sheet (PSRS)**

Must be delivered to the Office of Research BEFORE the grant will be submitted. Applies to any grant being submitted to any agency. Must include ALL signatures (all PIs Co-PIs, Dept. Chairs, Deans of each person, dept, and/or school who has time/resources committed through direct costs or cost sharing/match).

**Budgets: SUBMIT YOUR BUDGET TO GINNY SCHODROSKI TWO WEEKS PRIOR TO SUBMISSION DEADLINE.** Large or complex budgets should be finalized a week before submission

so that the PSRS can be prepared and routed for ALL required signatures. Proposal review time must be allowed before asking someone to commit their unit.

**Note:** If you are going to be away from the University at the time of submission, you must arrange before leaving to sign the PSRS signature page.

**Questions?** Contact Ginny Schodroski at 516-5284 or [gabby@umsl.edu](mailto:gabby@umsl.edu).

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## RESEARCH AND COMMERCIALIZATION NEWS

- **Electronic Submission News from the NIH**
  - **Electronic Grant Application Submission: NIH eSubmission Transition 80 Percent Complete**
  - **The NIH Electronic Application Validation Process — Why We Do What We Do**
  - **Designating Roles in Electron Applications — PIs, Multiple PIs and Co-Investigators**
- **U.S. Ethnic Scientists and Entrepreneurs**
- **The Economics of Ethanol**
- **Missouri and Illinois Join National Tech Revival**
- **From Clipboards to Keyboards**

### **Electronic Grant Application Submission: NIH eSubmission Transition 80 Percent Complete**

From NIH Extramural Nexus

May 2007

Since December 2005, NIH has systematically transitioned grant programs from paper PHS 398 application forms to electronic SF424 (R&R) application packages submitted through Grants.gov. Approximately 80 percent of all NIH competing grant applications now use the electronic process. Among the remaining grant programs to transition are Career Development (K), Fellowships (F), Training (T) and complex programs (primarily P and U). The transition of these grant programs to electronic applications was delayed in January (see NIH Guide notice NOT-OD-07-038) as Grants.gov focused all of its efforts on transitioning to Adobe®-based forms and system processing improvements.

NIH is working closely with Grants.gov while they continue to refine forms and systems. We expect to make an announcement soon about the transition of K, F, T and complex grant mechanisms to electronic application submission. ●

### **The NIH Electronic Application Validation Process — Why We Do What We Do**

From NIH Extramural Nexus

May 2007

Did you submit your electronic application, check the status in the Electronic Research Administration (eRA) Commons and let out a sigh as you read your errors and / or warnings? Did you think, "Sure, the system flagged an error, but why can't I just take care of it later, after I get rave reviews and NIH is ready to fund my research?" If you did, you were not alone. In fact, some of you took it one step further and provided specific feedback on the process. We have reviewed your feedback, analyzed the submission results to date, and offer the following response. ● **READ MORE:**  
<http://grants.nih.gov/grants/partners/0507Nexus.htm#Validation>

## **Designating Roles in Electron Applications — PIs, Multiple PIs and Co-Investigators**

From NIH Extramural Nexus

May 2007

Here is a quick explanation on NIH's approach for designating the roles of Principal Investigator, Multiple Principal Investigator, and Co-Investigator on electronic applications.

### ***Principal Investigator***

The SF424 (R&R) cover component includes a section for the Project Director / Principal Investigator (PD / PI). The information from this section is used to auto-fill other sections of the application including the Senior / Key Person Profile and the R&R Budget forms. The role of PD / PI is automatically set as the default.

### ***Multiple PIs***

NIH has chosen the approach recommended by the Office of Science and Technology Policy (published in the Federal Register) that considers all PD / PIs on a multiple PI application to be equal in terms of responsibility, authority and accountability. Therefore, they should have the same role designation on the application. It was determined that designating one individual as the PD / PI and all others as Co-PD / PIs implied some hierarchy that does necessarily not exist. For this reason, PD / PI is the only role that NIH recognizes for PI status and each of the multiple PIs should use this role. Realizing that some other federal agencies may use Co-PD / PI for their multiple PI implementations (e.g., National Science Foundation), NIH provides a warning message when the Co-PD / PI role is used to let you know that if you meant to designate multiple PIs, you have not used the appropriate role for NIH applications. NIH guidance is to avoid the use of Co-PD / PI entirely for NIH applications to avoid confusion. If you choose to ignore the warning, the Co-PD / PI role is stored but no PI status is provided.

### ***Co-Investigators***

NIH views the roles of Co-Investigator and PD / PI as distinct. Although NIH does not give PI status to anyone designated as a Co-Investigator, it is an acceptable project role for NIH while the role of Co-PD / PI is not. Co-Investigator is not a value listed in the role picklist of the Senior / Key Person Profile form. To assign the role of Co-Investigator you must select "Other" for the Project Role field and then insert the appropriate role descriptor of "Co-Investigator" in the Other Project Role Category field. In the R&R detailed budget component the Project Role field is free-form text so you can insert any appropriate role. ●

## **U.S. Ethnic Scientists and Entrepreneurs**

April 01, 2007

By WILLIAM R. KERR

Published online by the Federal Reserve Bank of Cleveland:

<http://www.clevelandfed.org/Research/commentary/2007/040107.cfm>

Immigrants are critical to the formation of U.S. technology. While they account for around 10 percent of the U.S. working population, immigrants represent 25 percent of the U.S. science and engineering workforce and almost 50 percent of those with doctorates.

In addition to the number of scientists immigrants add to the U.S. workforce, star immigrant researchers make an exceptional contribution in quality to the nation's science as measured by Nobel Prizes, election to the National Academy of Sciences, patent citations, and so on. The contributions of immigrants extend well beyond the laboratory, too. Ethnic entrepreneurs are also prominent in commercializing new technologies, especially in areas where high-technology firms are clustered, such as Silicon Valley.

The magnitudes of these ethnic entrepreneurial and scientific contributions raise many research and policy questions on both short-term and long-term horizons. This *Economic Commentary* highlights a new methodology for studying such contributions. The methodology makes use of patent records for the information they contain about ethnic scientific and engineering inventors.

The data confirm the growing scientific contributions that ethnic inventors have been making in the United States, especially in high-technology fields. In addition, related research using the same

dataset finds that the benefits of immigration run in more than one direction: U.S. ethnic researchers make important contributions to the international diffusion of technology as well.

### ***Ethnic Patenting Data***

Empirical studies of immigrant scientists and engineers face substantial data constraints. One source of potentially useful information that has not been exploited in such studies is the patent records of the U.S. Patent and Trademark Office (USPTO). Each patent filed with the USPTO contains the name of at least one inventor, and multiple inventors are allowed. In total, 4.3 million inventor names are associated with the 2.9 million patents that have been granted from 1975 to 1999.

I was able to map these inventor names into an ethnic-name database that is typically used for commercial marketing campaigns. This approach exploits the idea that inventors with the surnames Ming or Yu are likely of Chinese ethnicity, Agrawal or Banerjee have a greater probability of being Indian, and Rodriguez or Martinez are likely of Hispanic descent. In cases of overlapping surnames (such as Lee), Census records are used to apportion ties.

The match rate is 98 percent for inventors residing in the United States, and nine ethnicities can be distinguished: Chinese, English, European, Hispanic/Filipino, Indian/Hindi, Japanese, Korean, Russian, and Vietnamese.

The USPTO grants patents to inventors living within and outside of the United States, with the latter accounting for just under half of all patents issued. Quality assurance exercises using the inventor records for those filing USPTO patents from abroad confirm the approach works well. For example, 99 percent of the inventors filing from Japan are found to be Japanese.

The primary limitation of the ethnic-name approach is that first-generation cannot be distinguished from later-generation immigrants.

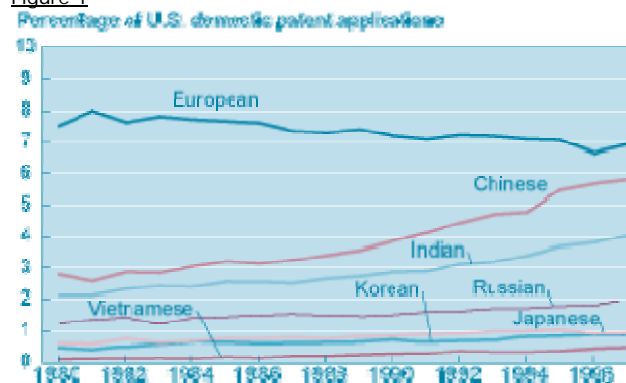
But the approach yields quantifiable data in previously unavailable detail on the ethnic composition of U.S. inventors. Because the ethnic assignment is done at the microlevel, greater detail on the ethnic composition of inventors is available annually on multiple dimensions. Each patent contains very detailed technology categories, so that differences in ethnic contributions across sectors can be analyzed (for example, semiconductors and biotechnology).

Likewise, ethnic populations can be described annually for each city or state. Finally, most patents are assigned to a corporation, university, or government body (for example, IBM, MIT, or the U.S. Army). The ethnic composition of each institution's inventors, by city and line of business, can be similarly described.

### ***U.S. Ethnic Inventors***

Figure 1 illustrates the evolving ethnic composition of U.S. inventors from 1980 to 1997. This graph includes only inventors who resided within the United States at the time of their patent filing. The USPTO issues many more patents today than in previous years, and it is difficult to interpret changes in the levels of patents granted.

Figure 1



The trends are presented as annual shares of ethnic inventors to abstract from these issues. The English share, omitted from the graph, declines from 82 percent in 1980 to 75 percent in 1997. The European ethnicity represents the largest foreign contributor to U.S. technology development. Like the

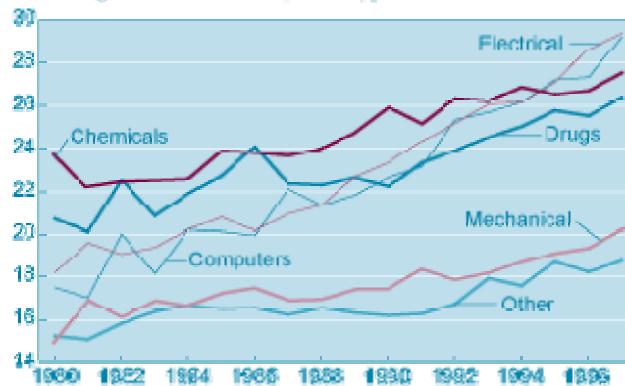
English ethnicity, however, the European share of U.S. domestic inventors declines steadily over the period.

These declining English and European shares are partly due to the exceptional growth of the Chinese and Indian ethnicities, which increase from 3 percent to 6 percent and 2 percent to 4 percent, respectively, over the 17-year period. Recent data suggest that these upward trends have continued through at least 2002, and work on collecting data that continue through 2006 is ongoing. Growth in Chinese and Indian patenting activity is particularly concentrated in high-technology sectors, where Chinese inventors have supplanted European researchers as the largest ethnic contributor to U.S. technology formation beside the English.

Figure 2 explores the technology dimension of the contributions made by ethnic inventors. Patents are separated into six broad technology areas: chemicals, computers and communications, drugs and medical, electrical and electronic, mechanical, and miscellaneous (labeled “other” on the graph). The miscellaneous group includes patents for agriculture, textiles, furniture, and the like. Growth in ethnic patenting is clearly stronger in high-technology sectors than in more traditional industries.

Figure 2

Percentage of U.S. domestic patent applications



### **International Technology Diffusion**

Ethnic scientists and engineers are an important and growing contributor to U.S. technology development. Chinese and Indian ethnicities, in particular, are now an integral part of the country's invention and commercialization activities in high-technology sectors.

The dataset developed through patent records is useful for studying several important policy questions. Examples include the appropriate immigration quotas for high-skilled workers and the impact of foreign-born workers on native workers and students.

But the contributions of immigrants do not run in just one direction; there is a special relationship that exists between U.S. ethnic scientific communities and their home countries. Immigrants in the United States often retain a special interest in their native lands, which they still influence in ways ranging from financial transfers to political inputs.

Quantifying these flows is important for evaluating whether the emigration of top talent to the United States is a gain or loss to the sending nation (sometimes referred to as the “brain drain” versus “brain circulation” debate). The extent to which technologies diffuse faster to countries through ethnic scientific channels is very important for achieving the positive gains from these expatriates.

Empirical work finds that U.S. ethnic scientific communities do aid the transfer of technologies developed in the United States to their native countries. This work moves beyond case studies by examining more than 40 countries and 20 manufacturing industries over the 1980–1997 period. This technology transfer boosts the economic development of the home countries as measured by output and productivity growth. Moreover, countries are found to increase exports—to countries other than the United States—in the industries in which they receive technology stimulants, signifying the development of comparative trade advantages.

Current research is also evaluating the channels through which this technology transfer operates. Scientific collaboration certainly plays a role, with ethnic inventors outside of the United States being found to cite ethnic inventors within the United States at a higher rate, even after controlling for specific technological fields. This effect is most prominent immediately after new inventions are

developed, with the special ethnic collaborations promoting both greater awareness of new technologies and greater tacit understanding of how they work.

More recent projects with Fritz Foley of Harvard Business School are looking within the firm. We have gathered data on firm-level foreign direct investment (FDI) and trading patterns. On the FDI front, we have found evidence that a stronger U.S. ethnic research presence with multinationals facilitates greater FDI into the scientists' home countries. We are further exploring how the organizational forms of FDI change—for example, entry through fully owned facilities versus joint ventures—and how within-firm trade is shaped.

Immigrants have a disproportionate influence on U.S. technology formation and diffusion. Understanding these ethnic contributions and the scientific networks through which they operate is essential for crafting appropriate U.S. immigration and innovation policies. With increasing globalization of research and development and innovative efforts, and the rapid development of China and India, these topics will continue to grow in importance. ●

*William R. Kerr was a participant at the Federal Reserve Bank of Cleveland's Conference on Universities, Innovation and Economic Growth, held in November 2006. Dr. Kerr is an assistant professor at the Harvard Business School and a research associate at the Center for Economic Studies.*

*The views expressed here are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland, the Board of Governors of the Federal Reserve System, or its staff.*

## **The Economics of Ethanol**

### ***Ethanol is rapidly transforming life in Iowa and the rest of the corn belt***

Excerpted from *The Economist*

May 10, 2007

YOU might think that the opening of a new ethanol facility in Nevada, Iowa—a town of 6,700 in the centre of the state—would be of interest mainly to the local farmers who supply the corn that the factory turns to car fuel. You would be wrong. Investors in the refinery include the person who delivers fuel to it, a couple of local parts-suppliers for John Deere (a big farm-equipment company) and the local school-bus driver, among 900 or so other small investors. Like many others in the corn belt, the Nevada refinery is seen as a way for the whole rural community to thrive by exploiting America's new craving for ethanol and the corn (maize) that is being used to make it.

Corn-based ethanol is neither cheap nor especially green: it requires a lot of energy to produce. Production has been boosted by economically-questionable help from state and federal governments, including subsidies, the promotion of mixing petrol with renewable fuels and a high tariff that keeps out foreign ethanol. The federal government offers ethanol producers a subsidy of 51 cents per gallon (13.5 cents per litre); and a growing number of states are pushing for wider use of E85, a fuel blend that is 85% ethanol and only 15% petrol. Since oil prices rose above \$30 a barrel in 2004 (they are more than double that now), ethanol capacity has grown especially rapidly. And although the country is experimenting with other renewable plant-based fuels of varying feasibility, from biodiesel to (much greener) ethanol derived from trees, the biggest boom has been in corn-based ethanol.

California has helped to lead the way. When the state banned the use of methyl tertiary butyl ether (MTBE) as a fuel additive after 2003, everyone had to use ethanol instead to meet clean-air standards; and local refineries for the product began popping up to cash in on a state subsidy of 40 cents per gallon at the time.

Outside the Golden State, however, the states most eager to subsidise ethanol were those with golden fields of corn. Wallace Tyner, an agricultural economist at Purdue University, points out that states that had introduced subsidies early, such as Illinois, Iowa, Minnesota and Nebraska, were already building lots of ethanol factories before 2004, whereas corn-belt states without subsidies, such as Indiana and Ohio, did not do much until oil prices rose. Since then, rural areas across the region have been swept up in the ethanol craze, with new facilities sprouting all over corn country.

Iowa, in the heart of the region, already has 28 ethanol refineries, producing 1.9 billion gallons of the stuff a year, nearly a third of America's total capacity. Many new facilities and expansions of existing ones are in the works. ● [READ MORE:](#)

[http://www.economist.com/world/na/displaystory.cfm?story\\_id=9149882](http://www.economist.com/world/na/displaystory.cfm?story_id=9149882) (access available for limited time)

### **Missouri and Illinois Join National Tech Revival**

Excerpted from The St. Louis Post-Dispatch  
April 24, 2007

Missouri and Illinois are adding information technology jobs for the first time since the dot-com bubble burst in 2000 — but industry leaders warn that without significant changes in education and immigration policy, the trend could reverse.

Nationwide, companies that sell IT products and services added 146,600 jobs in 2006, building on growth that began in 2005 after four years of dramatic decline, according to a study set for release today by the nonprofit technology trade group AeA. With nearly 5.8 million jobs last year, the industry remains shy of its peak employment of 6.6 million in 2000, but AeA said it is encouraged.

Missouri ranked 19th among states in IT employment, with 88,300 workers at 5,500 firms who earned a total of \$5.8 billion in 2005, the most recent year for which state-level data is available, the study said. In Illinois, the 7th-ranked state, 205,700 IT workers at 15,400 companies earned a total of \$15.4 billion.

And those numbers leave out what local business leaders say is equally significant for the local economy: people who create and manage information technology used within a non-IT corporation.

For example, Monsanto Co., which sells genetically modified and hybrid seeds, is building a \$19 million data center at its Creve Coeur headquarters. The company has more than 600 IT workers in the St. Louis area among 1,000 it employs globally, which represents nearly 6 percent of its total work force, said spokeswoman Sara Duncan.

Yet Missouri mirrors the nation in its need to improve education and training programs, beginning at the grade-school level. It needs to do more to retain highly skilled graduates of local universities. ●

The TECHNOLOGY industry in Missouri

- Employs 39 of every 1,000 private sector workers.
- Pays an average wage of \$65,400, 81 percent more than the state's private sector average.
- Is focused on telecommunications services, computer system design and Internet services.

SOURCE: AeA. Figures are for 2005, the most recent data available.

### **From Clipboards to Keyboards**

#### ***America's health-care industry has been slow to adopt information technology***

Excerpted from The Economist  
May 17, 2007

"PAPER kills," Newt Gingrich likes to say these days. America's former House speaker points to Hurricane Katrina, after which many survivors suffered needlessly or died because their paper records had washed away. But the lucky few whose doctors had been wired up could retrieve electronic medical records (EMRs) nationwide. An official in New Orleans puts it bluntly: "Katrina taught us that America has to change its health-information systems immediately."

The health-care sector in North America spends surprisingly little on information technology (IT). The financial-services industry spends about \$200 billion a year on high-tech kit; health providers spend just over a tenth of that amount (see chart). But John-David Lovelock of Gartner, a market-research firm, predicts that IT spending in health care will increase by an average of 4.7% per year between 2005 and 2010, the fastest growth-rate of any industry and well above the average of 3.7%.

Technology firms sense the coming bonanza, judging by the mood at a gathering of health-care experts held in New York on May 15th and hosted by Jeffrey Immelt, the chairman of GE. Joseph Hogan, the head of GE's health-care division, declared that "technology will be at the heart of fixing the health-care crisis." A spokesman for Siemens, a German rival, argued that the "explosion of

medical knowledge" from the field of genomics means that information systems are no longer optional.

But there have been many previous false dawns. Steven Van Kuiken of McKinsey, a consultancy, argues that the main obstacle to EMRs is the misalignment of costs and benefits among different groups. Although large hospitals, insurers and vendors would reap big gains from computerisation with quite small investments, he notes, small surgeries with just a few doctors face enormous headaches in converting from clipboards to keyboards. So they tend to be wary: a recent study by Accenture, another consultancy, estimated that barely 10% of American doctors use modern EMR systems.

In addition, many hospitals and insurers have not embraced open, interconnected EMR systems, choosing instead to keep patient data locked away from competitors' eyes in proprietary systems. Historically, IT spending has tended to focus on payment systems and other internal processes rather than better customer service or improved outcomes. But that may be changing as a result of pressure from government, employers and consumers. ● READ MORE: [http://www.economist.com/business/displaystory.cfm?story\\_id=9196289](http://www.economist.com/business/displaystory.cfm?story_id=9196289) (*access available for limited time*)

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