

## ZHEN LEI

**Associate Professor of Energy and Environmental Economics**  
**Department of Energy and Mineral Engineering**  
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### RESEARCH INTEREST

Applied Economics, Science and Technology Policy, Economics of Innovation and Intellectual Property Right, Energy and Environmental Economics, Industrial Organization, Development Economics, Big Data and Data Analytics

### EDUCATION

Ph.D., 2009, Agricultural and Resource Economics  
University of California, Berkeley

Ph.D., 2000, Pharmaceutical Sciences  
Peking University Health Science Center, China

M.S., 1997, Chemistry  
Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, China

B.S., 1993, Chemistry  
Wuhan University, China

### EMPLOYMENT

Associate professor of energy and environmental economics (with tenure), 2015-  
Department of Energy and Mineral Engineering, Penn State University

Assistant professor of energy and environmental economics, 2009-2015  
Department of Energy and Mineral Engineering, Penn State University

Postdoctoral Researcher, 2000-2003  
Department of Nutritional Science and Toxicology, UC Berkeley

## RESEARCH GRANTS

National Science Foundation Grant (SciSIP, Science of Science and Innovation Policy), “Impacts of Greater Public Accessibility to Federally Funded Research Publications: Evidence from the NIH Public Access Policy”, Principle Investigator, \$619,768.00, 6/1/2014-5/30/2017.

National Science Foundation Grant (SciSIP, Science of Science and Innovation Policy), “The Impacts of University Research and Funding Sources in Chemical Sciences: Publishing, Patenting, Commercialization”, Principal Investigator, 5/1/2011-4/30/2014, \$215,765.

National Institute of Health Grant (subcontract from University of Minnesota), “International Assessments of Patenting in Genetics,” Principal Investigator, 07/01/2011-06/30/2012, \$39,421.

DOE Hub “Greater Philadelphia Innovation Center for Energy Efficient Building (GPIC)”, Subtask on “GPIC EEB Hub History and Assessment”, Co-Principal Investigator, 07/01/2011-01/31/2014, \$580,160

Penn State Sustainability Seed Grant, “China’s Monopoly on Rare Earth Elements and the Sustainability of Green Technology”, Co-Principal Investigator, 6/1/2010-5/31/2011, \$40,000.

Pennsylvania State Electricity Markets Initiative, Consortium of Electric Utilities, Co-Principal Investigator, 1/1/10 – 12/31/11, \$250,000.

Center for Rural Pennsylvania Grant, “Assessing and Mitigating Rising Electricity Prices in Rural Pennsylvania,” Co-Principal Investigator, 1/1/08-5/31/10, \$100,000.

## PUBLICATIONS

### Academic Papers in Economics, Policy and Law:

#### Peer Reviewed Publications

Kyriakos Drivas, Zhen Lei and Brian Wright, “Academic Patent Licenses: Roadblocks or Signposts for Nonlicensee Cumulative Innovation?” *Journal of Economic Behavior & Organization*, R&R.

Kyriakos Drivas, Zhen Lei and Brian Wright, “Information Disclosure or Patent Grant: Which Matters More for Academic Technology Licensing?” *International Journal of Industrial Organization*, R&R.

Zhen Lei and Brian D. Wright, “Why Weak Patents? Testing the Examiner Ignorance Hypothesis.” *Journal of Public Economics*, 2017, 148, 43-56.

Daniel R. Cahoy, Zhen Lei, Yuxi Meng and Seth Blumsack, “Global Patent Chokepoints,” *Stanford Technology Law Review*, forthcoming, 2017.

Zhen Lei, Chen-Hao Tsai and Andrew N. Kleit, “Deregulation and Firm Investment Incentives: Evidence from Nuclear Power Uprates,” *Energy Journal*, forthcoming, 2017.

Maoyong Fan, Zhen Lei and Gordon Liu, “Discounting of Medical Saving Accounts,” *American Journal of Health Economics*, 2016, 2(2): 161-183.

Lei Cheng and Zhen Lei, “Does the Expansion of Chinese State-owned Enterprises Affect the Innovative Behavior of Private Enterprises?” *Asian-Pacific Journal of Accounting & Economics*, 2015, 22 (1), 24-54.

Mingwei Fu, Jingyi Ye, Yuxi Meng and Zhen Lei, “The Impacts of Domestic Content Protection on Indigenous Innovation,” (in Chinese) *Economic Research Journal*, 2015, 50(2), 118-131.

Zhen Lei and Anastasia V. Shcherbakova, “Revealing Climate Change Opinions through Investment Behavior: Evidence from Fukushima,” *Journal of Environmental Economics and Management*, 2015, 70, 92-108.

Mier Zhang, Wei Guo, and Zhen Lei, “Patent Analysis of Shale Gas Technology in China and Implications for the Exploitation,” *Energy Technology*, 2014, 2(12), 1040-1045.

- Kyriakos Davis, Zhen Lei, Steve Merrill and Brian D. Wright, "Technology Transfer: Industry-funded Academic Inventions Boost Innovation," *Nature*, 2014, 507, 297-299.
- Gregory D. Graff, Devon Phillips, Zhen Lei, Sooyoung Oh, Carol Nottenburg, and Philip G. Pardey. "Not Quite a Myriad of Gene Patents: Assessing the Potential Impact of the U.S. Supreme Court on the Changing Landscape of U.S. Patents that Claim Nucleic Acids," *Nature Biotechnology*, 2013, 31(5), 404-410.
- Daniel R. Cahoy, Joel Gehman and Zhen Lei, "Fracking Patents: The Emergence of Patents as Information Containment Tools in Shale Drilling," *Michigan Telecommunications and Technology Law Review*, 2013, 19(2), 279-330.
- Jingyi Ye, Chenle Li, Zhen Lei and Heping Cao, "Early Application Publication, Patent Quality and Knowledge Dissemination," (in Chinese) *Journal of World Economy*, 2012, 8, 115-133.
- Zhen Lei, Rakhi Juneja and Brian D. Wright, "Patents vs. Patenting: Implications of Intellectual Property Protection for Biological Research", *Nature Biotechnology*, 2009, 27(1), 36-40.
- Steven E. Sexton, Zhen Lei and David Zilberman, "The Economics of Pesticides and Pest Control", *International Review of Environmental and Resource Economics*, 2007, 1(3), 271-326.

#### Book Chapters and Reports

- Daniel R. Cahoy, Joel Gehman and Zhen Lei, "The transformation of patents into information containment Tools", in "The Changing Face of US Patent Law and its Impact on Business Strategy," Edited by Daniel R. Cahoy and Lynda J. Oswald, *The New Horizons In International Business*, Edward Elgar, 2013.
- Kyriakos Drivas, Zhen Lei and Brian Wright, "A Preliminary View of University of California Data on Disclosures, Licensing and Patenting," Prepared for *The Committee on Management of University Intellectual Property: Lessons from a Generation of Experience, Research, and Dialogue*, National Research Council, The National Academies.

## **Academic Papers in Big Data and Data Science:**

### **Peer Reviewed Publications**

- Tao-Yang Fu, Zhen Lei, and Wang-Chien Lee, “Modeling Knowledge Diffusion with Time Lags in Citation Networks.” *IEEE International Conference on Data Mining, (ICDM 2016)*, Accepted.
- Tao-Yang Fu, Zhen Lei, and Wang-Chien Lee, “Patent Citation Recommendation for Examiners.” *IEEE International Conference on Data Mining, (ICDM 2015)*, 751-756, Atlantic City, NJ, November 14-17, 2015.
- Shuting Wang, Zhen Lei and Wang-Chien Lee, “Exploring Legal Patent Citations for Patent Valuation,” *ACM International Conference on Information and Knowledge Management (CIKM 2014)*, 1379-1388, Shanghai, China, November 2014.
- Sooyoung Oh, Zhen Lei, Wang-Chien Lee, and John Yen, “Recommending Missing Citations for Newly Granted Patents,” *The 2014 International Conference on Data Science and Advanced Analytics (DSAA 2014)*, 442-448, Shanghai, China, October 2014.
- Shuting Wang, Wang-Chien Lee, Zhen Lei, Xianliang Zhang and Yu-Hsuan Kuo, “Exploring Technological Trends for Patent Evaluation,” *The 2014 International Conference on Data Science and Advanced Analytics (DSAA 2014)*, 277-283, Shanghai, China, October 2014.
- Sooyoung Oh, Zhen Lei, Wang-Chien Lee, and John Yen. “Patent Evaluation Based on Technological Trajectory Revealed in Relevant Prior Patents,” *The 18<sup>th</sup> Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD 2014)*, 545-556, Tainan, Taiwan, May 13-16, 2014.
- Sooyoung Oh, Zhen Lei, Wang-Chien Lee, Prasenjit Mitra and John Yen. “CV-PCR: A Context-Guided Value-Driven Framework for Patent Citation Recommendation,” *ACM International Conference on Information and Knowledge Management (CIKM 2013)*, 2291-2296, San Francisco, CA, U.S.A., Oct. 2013.
- Sooyoung Oh, Zhen Lei, Prasenjit Mitra and John Yen, “Evaluating and Ranking Patents Using Weighted Citations,” in *Proceedings of The ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012)*, 281-284, Washington D.C., U.S.A., 2012.

## **Academic Papers in Chemistry and Biochemistry:**

### **Peer Reviewed Publications**

Weisheng Tian, Kai Ding, Yun-Shan Sun, Ling Chen and Zhen Lei, "Total Synthesis and Establishment of the Stereochemistry of Spiniferin-1, a Rare Planar Chiral Marine Natural Product with a 1,6-Methano[10]annulene Skeleton", *Synthesis*, 2013, 45(4), 438-447.

Zhen Lei, Weiguo Chen, Min Zhang and Joseph L. Napoli, "Reduction of all-trans-retinal in the mouse liver peroxisome fraction by the short-chain dehydrogenase/reductase RRD: induction by the PPAR $\alpha$ -ligand clofibrate", *Biochemistry*, 2003, 42, 4190-4196.

Zhen Lei, Ling Zhang, Liang Ren Zhang, Jun Chen, Jimei Min and Lihe Zhang, "Hybrid Characteristics of oligonucleotides consisting of isonucleoside 2',5'-anhydro-3'-deoxy-3'-(thymine-1-yl)-D-mannitol with different linkage modes", *Nucleic Acids Research*, 2001, 29(7), 1470-1475.

Zhen Lei, Jimei Min, Lihe Zhang, "Synthesis of 3-deoxy-3-nucleobase -2,5-anhydro-D-mannitol: a novel class of hydromethyl-branched isonucleosides", *Tetrahedron Asymmetry*, 2000, 11, 2899-2906.

Weisheng Tian, Zhen Lei, Ling Chen, Ying Huang, "Some new reactions of per(poly)alkyl sulfonyl fluoride with steriodic molecules", *Journal of fluorine chemistry*, 2000, 101, 305-308.

## **PATENTS**

Weisheng Tian and Zhen Lei, 6,10-methylene-19-nor-4-ene-3-one steriodic compounds and their synthesis, *Chinese Patent, CN 97106575.6*

## PRESENTATIONS

- A Joint NIH-NSF Workshop: NIH and the Science of Science and Innovation Policy, National Institutes of Health, Bethesda, MD, April, 2016.
- Quantifying Science at the Conference on Complex Systems 2015, September, Tempe, Arizona, USA.
- The USPTO PatentsView Workshop, September, 2015, US Patent and Trademark Office.
- The Workshop on “New Perspectives on Innovation and Intellectual Property Policy in China: What Does the Evidence Say?” University of California, San Diego, May 2015.
- The United States Patent and Trademark Office (USPTO), Arlington, Virginia, June, 2014.
- The International Workshop on Analyzing Policy Impacts on Biotechnology Innovation Using Patent Data, Washington, D.C., March, 2014.
- The 36<sup>th</sup> Annual IAEE International Conference, Daegu, Korea, June, 2013.
- The 2013 Annual Conference, Industry Studies Association, Kansas City, May, 2013.
- Tsinghua University-UC Berkeley Workshop on Chinese Innovation and Intellectual Property Protection,” Beijing, March, 2013.
- Workshop on “China’s Patent Regime and its Quest to Become an Innovative Economy,” George Washington University Law School, January, 2013.
- The Asia Pacific Innovation Conference 2012, Seoul, South Korea, Oct, 2012.
- Science of Science and Innovation Policy Conference 2012, National Research Council of the National Academies, Washington D.C, September, 2012.
- Penn State-Tsinghua Conference on “China and the World Economy”, Penn State University, May, 2012.
- The 4th Annual International Workshop on Patent Analysis on “Output of R&D activities: Harnessing the Power of Patents Data”, The Institute for Prospective Technological Studies (JRC-IPTS) of the European Commission, Seville, Spain, May 2012.
- Seminar at Chinese Intellectual Property Office (SIPO), Beijing, China, March 2012.

USDA NC1034 Annual Conference (Impact Analysis and Decision Strategies for Agricultural Research), Washington D.C., March 2012.

Seminar at School of Economics, Renmin University, China, December 2011.

The Workshop on Energy Modelling Methods and Tools, The China National Renewable Energy Centre, Beijing, November, 2011.

Patent Statistics for Decision Makers Conference (USPTO), Washington D.C., November 2011.

Workshop on Innovation and Patent Harmonization, Boston University School of Law, Boston, September, 2011

UC Berkeley- Peking University Workshop on Evolution of Chinese Patenting and Its Implications for Research and Innovation, Beijing, China, May, 2011

International Workshop on Technology and Economics of Rare Earths and Metals, Beijing, China, 2011

Penn State Environmental Seminar, March, 2011.

Joint Seminar in IO and Innovation, Department of Economics and School of Business at UC Berkeley, Berkeley, February, 2011.

American Economic Association Annual Meeting, Denver, January, 2011.

US Patent and Trademark Office (USPTO), Washington D.C., November, 2010.

The Conference on Patent Statistics for Decision Makers, organized by the European Patent Office and The Organization for Economic Cooperation and Development (OECD), Vienna, Austria, November, 2010.

The third Biennial Conference of the American Society of Health Economists, July, 2010.

Intellectual Property Scholarship Seminar, UC Berkeley School of Law, March, 2010.

Joint Seminar in IO and Innovation, Department of Economics and School of Business at UC Berkeley, Berkeley, March, 2010.

The Fourth Annual Conferences on Empirical Legal Studies, the Society of Empirical Legal Studies, LA, 2009.

The China Task Force meeting, The Initiative for Policy Dialogue, Beijing, China, October 2009.



The Annual Meeting of Agricultural and Applied Economics Association, Milwaukee, July 2009.

The Innovation and Intellectual Property Policy meeting, National Bureau of Economic Research, Summer Institute, Boston, July 2009.

Presentations to the Gathering 2 patent trader and buyer group, in a presentation at Intel Corporation in Silicon Valley, and to Gathering 1, via video to AT&T in Georgia, March, 2009.

USDA NC1034 Annual Conference (Impact Analysis and Decision Strategies for Agricultural Research), Washington D.C., March 2009.

The Symposium on Theory and Practice of Patent Evaluation, Center for Law and Technology at School of Law, UC Berkeley School of Law, February, 2009.

Mirrison & Foerster LLP Lunch Seminar, San Francisco, November 2008.

Joint Seminar in IO and Innovation, Department of Economics and School of Business at UC Berkeley, Berkeley, September 2008.

Environment & Resource Economics Seminar, Department of Agricultural and Resource Economics at UC Berkeley, Berkeley, September 2008.

### **Reviewer for Refereed Journals**

Australian Economic Review, China Economics Quarterly, Development and Sustainability, Energy Journal, Energy Policy, Environment, European Review of Agricultural Economics Health Policy, Information & Management, Journal of Energy Engineering, Journal of Technology Transfer, Natural Hazard, Science and Public Policy, Value in Health

### **Peer Reviewer for Grants**

1. National Science Foundation, Science of Science and Innovation Policy (SciSIP) Program

### **Other Educational Affiliations**

1. Fellow, International Science and Technology Practice and Policy (InStePP) Center, University of Minnesota, 2012-present.
2. Summer Faculty Member, Renmin University, China.

## **OTHER INFORMATION**

***Affiliation:*** American Economic Association  
International Association for Energy Economics  
Agricultural and Applied Economics Association  
The Society for Empirical Legal Studies  
Chinese Economists Society

***Languages:*** English (fluent), Chinese (native)

***Citizenship:*** China