

GREGORY D. GRAFF, PH.D.

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Associate Professor, Department of Agricultural & Resource Economics
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EDUCATION

Ph.D., University of California at Berkeley, Agricultural and Resource Economics, December 2002
Thesis title: *Innovating and Exchanging Biotechnologies for Agriculture*
Advisors: David Zilberman, Brian Wright

M.S., University of California at Berkeley, Agricultural and Resource Economics, June 1999
Thesis title: *Agricultural Biotechnology's Complementary Intellectual Assets*
Advisor: Gordon Rausser

M.A., Ohio State University, Slavic and East European Area Studies, major in Economics, June 1995
Thesis title: *Financial Intermediary Institutions in Russia's Transition Economy*
Advisor: Warren Eason
[Study abroad: Graduate School of International Studies, Yonsei University, Seoul, Korea, Fall 1995]

B.A., Cornell University, major in Biological Sciences, minor in Russian Language, May 1992
Graduated with honors: "Excellence in All Subjects"
[Study abroad: Puskin Institute of Russian Language, Moscow, USSR, Fall 1990
L'Abri Institute, Huemoz, Switzerland, Spring 1991]

AREAS OF SPECIALIZATION

Management of technological innovation and R&D; Intellectual property rights; Technology transfer; Entrepreneurship; Science and technology policy; R&D and agricultural technologies; Biotechnology

RESEARCH AND PROFESSIONAL APPOINTMENTS

- Associate Professor, Department of Agricultural and Resource Economics, Colorado State University, July 2011 - present.
- Assistant Professor, Department of Agricultural and Resource Economics, Colorado State University, August 2007 - June 2011.
- Research Economist and Program Director, Public Intellectual Property Resource for Agriculture (PIPRA), University of California at Davis, June 2004 - August 2007.
- Visiting Research Fellow, Department of Agricultural and Resource Economics, University of California at Berkeley, February 2004 - August 2007.
- Director of Research, Bio Economic Research Associates LLC (bio-era), Cambridge, Massachusetts, March 2003 - February 2004.
- Senior Analyst, Office of Technology Transfer, University of California Office of the President, Oakland, CA, July 2001 - February 2003.
- Graduate Research Assistant, Agricultural and Resource Economics, University of California at Berkeley, January 1999 - June 2001 and September 1996 - December 1997.
- Editor Intern, Eurasia Publications, Moscow, Russia, September 1992 - August 1993.
- Summer Analytical Chemistry Research Intern, Proctor & Gamble Co., Miami Valley Laboratories, Cincinnati, Ohio, Summer 1990 and Summer 1991.

TEACHING

- *Economics of Innovation and Technological Change* module, in *Advanced Topics in the Economics of Production, Agriculture and Resource Economics (AREC) 705*, Ph.D. field course, Colorado State University, January 2011 - present.
- *Global Interdependence: Food and Population*, Agriculture (AGRI) 270, cross listed as International Education (IE) 270, undergraduate survey course of global agriculture, Colorado State University, January 2009 - present.
- *Agricultural and Natural Resource Policy*, Agricultural and Resource Economics 478, upper division undergraduate course, Colorado State University, August 2007 - present.
- *Sustainable Technology Entrepreneurship for Scientists and Engineers*, experimental offering as an elective course at Masters/PhD level, with co-instructors Paul Hudnut, Business Management, and Anthony Marchese, Mechanical Engineering, Agricultural and Resource Economics (AREC) 581A2, cross listed as Mechanical Engineering (MECH) 581A2, Colorado State University, January 2010 - May 2012.
- *Technology Management*, lecturer, Management (MGT) 250, standard track course for the MBA program, Graduate School of Management, University of California, Davis, Spring quarter 2005.
- *Plants, Agriculture, and Society*, Plant and Microbial Biology (PMB) 10, lower division undergraduate survey course, University of California, Berkeley, Fall semesters 2006 and 2002.
- *Technology, Innovation, and Entrepreneurship* module, in Beahrs Environmental Leadership Program, University of California, Berkeley, July 2001 and July 2002.
- *Industrial Organization of Agricultural and Food Markets*, Graduate Student Instructor with Professor Jerry Siebert, Environmental Economics and Policy (EEP) 141, Agricultural and Resource Economics, University of California, Berkeley, Fall semester 1998.
- *Economics of Natural Resources and the Environment*, Graduate Student Instructor with Professor David Zilberman, Environmental Economics and Policy (EEP) 101, cross listed as Economics (ECON) 125, University of California, Berkeley, Spring semester 1998.

CONFERENCES/MEETINGS ORGANIZED

- *Advancing the Agriculture Economy through Innovation*, Colorado State University, March 18-20, 2015. Proposed and served on planning committee for this major industry focused conference of 350 participants.
- *Analyzing Policy Impacts on Biotechnology Using Patent Data*, Rayburn Office Building, U.S. House of Representatives, Washington DC March 13-14, 2014. Organized briefing workshop in collaboration with colleagues at Duke University, McGill University, and University of Alberta.
- *The Venture Engine: How a School of Entrepreneurship can Bridge the Gap from Invention to Marketplace*, Colorado State University, August 15, 2008. Organized and hosted workshop/conference.
- *Institutional Landscapes in Stem Cell Research and Development: Problems and Solutions*, sponsored by Berkeley Stem Cell Center and UC Berkeley Science, Technology, and Society Center, February 6, 2008, Mission Bay Conference Center, San Francisco, CA. Organized and hosted conference.
- *Economic Opportunities for Information Technology in Agriculture, Resources, and the Environment: Linking University Research and Commercial Application*, UC Berkeley, May 27, 2004. Organized and hosted conference.
- *Sharing the Flame: Excellence in Licensing Practices*, 2003 Winter Meeting, Licensing Executives' Society, February 12-15, 2003, Salt Lake City. Served as a member of conference organizing committee.
- *Intellectual Property Clearinghouse Mechanisms for Agriculture*, UC Berkeley, February 16, 2001. Organized and hosted conference.

GRANTS and FELLOWSHIPS

1. *Characterizing Colorado's Emergent Agricultural Innovation Cluster*, 08/01/2013 - 01/31/2014, with co-PI Kathay Rennels, CSU Chancellor's Venture Fund, CSU Ventures, and CSU College of Agricultural Sciences, \$19,625.
2. *Incentives for Agricultural Innovation in Emerging and Developing Economies: Understanding National Intellectual Property Policies in a Global Context*, 05/01/2013 - 04/30/2013. International Food Policy Research Institute (IFPRI), \$15,274.
3. *The Value Chain of Colorado Agriculture*, 03/01/2012 - 02/28/2013, with co-PI Kathay Rennels, Colorado Department of Agriculture and CSU Office of Engagement, \$50,000.
4. *Designing a Technology-Neutral Benefit Pricing Policy for the Electric Power Sector in Colorado*, with co-PIs Terry Iverson (CSU) and Catherine Keske (CSU), Governor's Energy Office, State of Colorado, \$93,177.
5. *Legal Context of University Intellectual Property (IP) and Technology Transfer*, with co-PIs Sean O'Connor (University of Washington) and David Winickoff (UC Berkeley), National Academies of Science, Science Technology Economics and Policy (STEP) Board, \$4,500.
6. *International Assessments of Patenting in Genetics*, 01/01/2009 - 12/31/2012, with PI Philip Pardey (University of Minnesota), National Institutes of Health (NIH), \$1.4 million.
7. *Intellectual Property Protection and Contractual Relations for Biofuels Innovations*, with PI Brian Wright (UC Berkeley), Energy Bioscience Institute (EBI) at UC Berkeley, \$318,000.
8. *Surveying the Pipeline of Product Quality Innovations from Agricultural Biotechnology*, 07/01/2004 - 05/31/2005, with PI Alan Bennett (UCOP), Council on Biotechnology Information, \$87,000.
9. *Evaluation of Public Sector Intellectual Property Resources in Agricultural Biotechnology*, 07/01/2001 - 06/30/2003, with co-PIs Alan Bennett (UCOP) and David Zilberman (UC Berkeley), Rockefeller Foundation, \$230,000.
10. *Intellectual Property Exchange Mechanisms for Agricultural Biotechnologies*, 07/01/2000 - 06/30/2001, with PI Brian Wright (UC Berkeley), Giannini Foundation, \$23,000.
11. *National Security Education Program (NSEP) Fellowship*, for study at Graduate School of International Studies and research at Institute of East-West Studies, Yonsei University, Seoul, Korea, August 1995 - June 1996.

PUBLICATIONS

Edited Volumes

1. *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices*, Anatole Krattiger, Richard Mahoney, Lita Nelson, Jennifer Thompson, Alan Bennett, Kanikaram Satyanarayana, **Gregory Graff**, Carlos Fernandez, and Stanley Kowalski, Eds., Vol. 1 & 2, Oxford, UK: MIHR and Davis, CA: PIPRA, May 2007. Available online at www.iphandbook.org.

Refereed Publications

1. David Jefferson, **Gregory Graff**, Cecilia Chi-Ham and Alan Bennett, "The Emergence of Agbiogenetics" *Nature Biotechnology* Vol. 33, (August 2015) pp. 819–823
2. **Gregory Graff**, Gal Hochman, and David Zilberman, "The Competing Policy Paradigms of Agricultural Biotechnology: Implications and Opportunities for Emerging and Developing Economies" *AgBioForum*, (August 2015).
3. David Zilberman, **Gregory Graff**, Gal Hochman and Scott Kaplan, "The political economy of biotechnology," *German Journal of Agricultural Economics*, Volume 64 (2015), Number 4: 212-223
4. **Gregory Graff**, Devon Phillips, Zhen Lei, Sooyoung Oh, Carol Nottenburg, & Philip Pardey, "Not Quite a Myriad of Gene Patents," *Nature Biotechnology* Vol. 31, (May 2013) pp. 404-410.
5. Tania Bubela, Richard Gold, **Gregory Graff**, Daniel Cahoy, Dianne Nicol, David Castle, "Patent Landscaping for Life Sciences Innovation: Toward Consistent and Transparent Practices" *Nature Biotechnology*, Vol. 31, (March 2013) pp. 202-206. PMID: 23471065
6. Debra Mathews, **Gregory Graff**, Krishanu Saha, and David Winickoff, "Access to Stem Cells and Data: Persons, Property Rights, and Scientific Progress," *Science*, Vol. 331. (11 February 2011), pp. 725-727.
7. **Gregory Graff**, David Zilberman, and Alan Bennett, "The Commercialization of Biotechnology Traits," *Plant Science*, 179, (2010) pp. 635-644.
8. Sean O'Connor, **Gregory Graff**, and David Winickoff, "Legal Context of University Intellectual Property and Technology Transfer," *National Academies of Science*, Science Technology Economics and Policy (STEP) Board, (September 2010), 101 pages.
9. **Gregory Graff**, David Zilberman, and Alan Bennett, "The Contraction of Agbiotech Product Quality Innovation," *Nature Biotechnology*, Vol. 27, No. 8 (August 2009), pp. 702-704.
10. **Gregory Graff**, Gal Hochman, and David Zilberman, "The Political Economy of Agricultural Biotechnology Policies," *AgBioForum*, Vol. 12, No. 1 (2009), pp. 34-46.
11. David Winickoff, Kris Saha, and **Gregory Graff**, "Opening Stem Cell Research: A Policy Proposal for the Management of Data, Intellectual Property, and Ethics," *Yale Journal of Health Law, Policy and Ethics*, Vol. IX, No. 1 (Winter 2009), pp. 52-127.
12. Karl Bergman and **Gregory Graff**, "The Global Stem Cell Patent Landscape: Implications for Efficient Technology Transfer and Commercial Development" *Nature Biotechnology*, Vol. 25, No. 4 (April 2007), pp. 419-425.
13. **Gregory Graff**, David Roland-Holst, and David Zilberman, "Biotechnology and Poverty Reduction in Low-Income Countries," *World Development*, Vol. 34, No. 8 (2006): 1430-1445.
14. David Zilberman and **Gregory Graff** "Intellectual Property Rights, Innovation, and the Evolution of Biotechnology in Developing Countries," *Quarterly Journal of International Agriculture*, Vol. 44, No. 3 (2005): 247-266.
15. David Zilberman, Holly Ameden, **Gregory Graff**, and Matin Qaim, "Agricultural Biotechnology: Productivity, Biodiversity, and Intellectual Property Rights," *Journal of Agricultural & Food Industrial Organization*, Vol. 2, No. 2 (2004): Article 3.
16. **Gregory Graff**, Brian Wright, Alan Bennett, and David Zilberman, "Access to Intellectual Property: an Obstacle to Developing Transgenic Horticultural Crops," *California Agriculture*, (April-June 2004), pp. 121-126.

17. **Gregory Graff**, “Observing Technological Trajectories in Patent Data: Empirical Methods to Study the Emergence and Growth of New Technologies,” *American Journal of Agricultural Economics*, Vol. 85, No. 5 (2003): 1266-1274.
18. Deborah Delmer, Carol Nottenburg, **Gregory Graff**, and Alan Bennett, “Intellectual Property Resources for International Development in Agriculture,” *Plant Physiology*, Vol. 133 (2003), pp. 1666-1670.
19. **Gregory Graff**, Susan Cullen, Kent Bradford, David Zilberman, and Alan Bennett, “The Public-Private Structure of Intellectual Property Ownership in Agricultural Biotechnology,” *Nature Biotechnology*, Vol. 21, No. 9 (September 2003), pp. 989-995.
20. **Gregory Graff**, Gordon Rausser, and Arthur Small, “Agricultural Biotechnology’s Complementary Intellectual Assets,” *Review of Economics and Statistics*, Vol. 85, No. 2 (May 2003), pp. 349-363.
21. **Gregory Graff**, Amir Heiman, and David Zilberman, “University Research and Offices of Technology Transfer,” *California Management Review*, Vol. 45, No. 1 (Fall 2002), pp. 89-115.
22. **Gregory Graff** and David Zilberman, “An Intellectual Property Clearinghouse for Agricultural Biotechnology,” *Nature Biotechnology*, Vol. 19 (December 2001), pp. 1179-1180.

Book Chapters

1. **Gregory Graff** and David Zilberman, “How the ‘Regulatory-IP’ complex affects incentives to develop socially beneficial products from agricultural genomics” in E. Marden, N. Godfray, R. Manion, Eds., *Innovation in Agricultural Genomics: Overcoming Complexities in the Intellectual Property-Regulatory Complex* (University of British Columbia Press, 2015).
2. **Gregory Graff**, David Zilberman, and Gal Hochman, “The political economy of technology regulation in the face of creative destruction: the case of agricultural biotechnology,” in R. Herring, Ed., *Handbook of Food, Politics, and Society* (Oxford University Press, 2015).
3. Maria Alandete-Saez, Cecilia Chi-Ham, **Gregory Graff**, and Alan Bennett, “Intellectual Property in Agriculture.” *Encyclopedia of Agriculture and Food Systems*, N. Van Alfen, Ed., (Elsevier, 2014).
4. Derek Eaton and **Gregory Graff**, “The dynamic IP system in crop genetics and biotechnology,” Chapter 28 in S.J. Smyth, P.W.B. Phillips, and D. Castle, Eds., *Handbook on Agriculture, Biotechnology, and Development* (Edward Elgar, 2013).
5. **Gregory Graff**, Gal Hochman, David Zilberman, “The research, development, commercialization, and adoption of drought and stress tolerant crops,” in N. Tuteja and S. Gill, *Crop Improvement under Adverse Conditions* (New York: Springer Science + Business Media, 2013), pp. 1-34.
6. **Gregory Graff** and David Zilberman, “Agricultural Biotechnology: Equity and Prosperity,” in J. Popp, M. Jahn, M. Matlock, N. Kemper, Eds. *The Role of Biotechnology in a Sustainable Food Supply* (Cambridge University Press, 2012).
7. Alan B. Bennett, Cecilia Chi-Ham, **Gregory Graff**, and Sarah Boettiger, “Intellectual Property in Agricultural Biotechnology: Strategies for Open Access” in N. Stewart, Ed., *Plant Biotechnology and Genetics: Principles, Techniques, and Applications* (New York: J. Wiley & Sons, 2008).
8. **Gregory Graff** and David Zilberman, “The Political Economy of Intellectual Property: Re-Examining European Policy on Plant Biotechnology” in J. Kesan, Ed., *Seeds of Change: Intellectual Property Protection for Agricultural Biotechnologies* (Wallingford, UK: CABI Press, 2007).
9. Karl Bergman and **Gregory Graff**, “Collaborative IP Management for Stem Cell R&D: Lessons from Agricultural Biotechnology” in *IP and Bioscience* (Steinbeis, 2007).
10. **Gregory Graff**, “Echoes of Bayh-Dole: A Survey of Intellectual Property and Technology Transfer Policies in Emerging and Developing Economies” in A. Krattiger, R. Mahoney, L. Nelsen, et al, Eds., *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (MIHR: Oxford, UK and PIPRA: Davis, CA. 2007).
11. Martha Mutschler and **Gregory Graff**, “Introduction to Intellectual Property Issues in the University Setting: A Primer for Scientists” in A. Krattiger, R. Mahoney, L. Nelsen, et al, Eds., *Intellectual*

- Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (MIHR: Oxford, UK and PIPRA: Davis, CA. 2007).
12. **Gregory Graff** and Alan Bennett, “Intellectual Property and Technology Transfer by the University of California Agricultural Experiment Station” in A. Krattiger, R. Mahoney, L. Nelsen, et al, Eds., *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (MIHR: Oxford, UK and PIPRA: Davis, CA. 2007).
 13. **Gregory Graff**, “Regulation of Transgenic Crops Intended for Pharmaceutical and Industrial Uses” in J. Alston, R. Just, and D. Zilberman, Eds., *Regulating Agricultural Biotechnology: Economics and Policy* (New York: Springer, 2006).
 14. **Gregory Graff**, David Roland-Holst, and David Zilberman, “Agricultural Biotechnology and Globalization: U.S. Experience with Public and Private Sector Research” in J.H.H. Wesseler, Ed., *Environmental Costs and Benefits of Transgenic Crops* (Dordrecht: Springer, 2005).
 15. **Gregory Graff** and David Zilberman, “Towards an Intellectual Property Clearinghouse for Agricultural Biotechnology,” in J. Cooper, L. Lipper, and D. Zilberman, Eds., *Agricultural Biodiversity and Biotechnology in Economic Development* (New York: Springer, 2005).
 16. Alain de Janvry, **Gregory Graff**, Elisabeth Sadoulet, and David Zilberman, “Technological Change in Agriculture and Poverty Reduction: The Potential Role of Biotechnology” in J. Cooper, L. Lipper, and D. Zilberman, Eds., *Agricultural Biodiversity and Biotechnology in Economic Development* (New York: Springer, 2005).
 17. **Gregory Graff**, Matin Qaim, Cherisa Yarkin, and David Zilberman, “Agricultural Biotechnology in Developing Countries,” in C.G. Scanes and J.A. Miranowski, Eds., *Perspectives in World Food and Agriculture* (Ames, Iowa: Iowa State Press, 2004).
 18. Sara Boettiger, **Gregory Graff**, Philip Pardey, Eric Van Dusen, and Brian Wright, “Intellectual Property Rights for Plant Biotechnology: International Aspects,” in P. Christou and H. Klee, Eds., *The Handbook of Plant Biotechnology* (Chichester: John Wiley & Sons Ltd., 2004).
 19. **Gregory Gaff**, Amir Heiman, David Zilberman, Federico Castillo, Douglas Parker, “Universities, Technology Transfer, and Industrial R&D,” in R.E. Evenson, V. Santaniello, and D. Zilberman, Eds., *Economic and Social Issues in Agricultural Biotechnology* (Wallingford: CABI, 2002).

Working Papers

1. “Teams and the Agency of Innovation” with Mats Lundqvist, Chalmers University of Technology.
2. “Innovation in the Global Bioeconomy: The Global Landscape of Patenting in Genetics and the Life Sciences” with Philip Pardey, University of Minnesota.
3. “The Global Patent Landscape in Biofuels Conversion Technologies” with Steven Albers and Annabelle Berklund, Colorado State University.
4. “Incentives for Agricultural Innovation in Emerging and Developing Economies: Understanding National Intellectual Property and Technology Transfer Policies in a Global Context” with David Spielman, International Food Policy Research Institute (IFPRI), and Chubashini Suntharlingam, Malaysian Agricultural Research and Development Institute (MARDI).
5. “Patenting Genes and Genetic Inventions: Protections, Polemics, and Policies” with Erin Hicks and Philip Pardey, University of Minnesota.
6. “Putting New Knowledge to Work: Research at Colorado State University and its impact on innovation in industry” with Yoo Hwan Lee, Sarah Belford, Denichiro Otsuga, Todd Headley, and Pam Harrington, Colorado State University.
7. “Structuring Public-Private Research Alliances to Optimize Collaborative R&D in Bioenergy” with Brian Wright, University of California Berkeley.
8. “The Division of Innovative Labor among Universities, Entrepreneurs, and Corporations in Agricultural Biotechnology,” with David Zilberman, University of California Berkeley.

Position Papers

1. Chan, Sarah, **Gregory Graff**, Kazuto Kabo, Debra J.H. Mathews, Alan Regenberg, Douglas Sipp, and David Winickoff. “Statement on Data and Materials Sharing and Intellectual Property in Pluripotent Stem Cell Science in Japan and China.” Hinxtongroup Asia workshop, Kobe, Japan, January 2012, online at http://www.hinxtongroup.org/consensus_hg12_final.pdf.
2. Chan, Sarah, Peter J Donovan, Ruth Faden, John Harris, Robin Lovell-Badge, Debra JH Mathews, Alan Regenberg, Julian Savulescu, David Winickoff, Robert Cook-Deegan, **Gregory Graff**, Aurora Plomer, Kris Saha, Christopher Scott, John Sulston, and Patrick Taylor. “Statement on Policies and Practices Governing Data and Materials Sharing and Intellectual Property in Stem Cell Science.” Hinxtongroup, November 8-9, 2010, online at www.hinxtongroup.org/Consensus_HG10_FINAL.pdf

Outreach Articles

1. Patrick Byrne, Dustin Pendell, and **Gregory Graff**, “Labelling of Genetically Modified Foods,” Fact Sheet No. 9.371, Colorado State University Extension, October 2014.
2. **Gregory Graff**, Karl Bergman, Alan Bennett, and David Zilberman, “Intellectual Property Clearinghouses as an Institutional Response to the Privatization of Innovation in Agriculture,” *African Technology Development Foundation Journal*, Vol. 3, No. 3 (Fall 2006).
3. **Gregory Graff** and GianCarlo Moschini, “Pharmaceutical and Industrial Products in Crops: Economic Prospects and Impacts,” *Iowa Ag Review*, Vol. 10, No. 4. (Fall 2004), pp. 4-5, 11.
4. **Gregory Graff** and David Zilberman, “Explaining Europe’s Resistance to Agricultural Biotechnology,” *Agricultural and Resource Economics Update*, Vol. 7, No. 5 (May 2004), pp. 1-4.
5. **Gregory Graff**, Amir Heiman, Cherisa Yarkin, and David Zilberman, “Privatization and Innovation in Agricultural Biotechnology,” *Agricultural and Resource Economics Update*, Vol. 6, No. 4 (March-April 2003), pp. 5-7.
6. **Gregory Graff** and David Zilberman. “Towards an Intellectual Property Clearinghouse for Agricultural Biotechnology,” *IP Strategy Today*, No. 3, (2001), pp. 1-13.

Analyst Reports

1. **Gregory Graff**, Annabelle Berklund, and Kathay Rennels, *The Emergence of an Innovation Cluster in the Agricultural Value Chain Along the Colorado Front Range*, Colorado State University, November 2014.
2. **Gregory Graff**, Ryan Mortenson, Rebecca Goldbach, et al, *The Value Chain of Colorado Agriculture*, Department of Agricultural and Resource Economics and the Office of Engagement, Colorado State University, February 2013.
3. Karl Bergman and **Gregory Graff**, *Collaborative IP Management for Stem Cell Research and Development*, the Center of Intellectual Property Studies (CIP), Gothenberg, Sweden, and the Public Intellectual Property Resource for Agriculture (PIPRA), Davis, CA (December 2006), 46 pages.
4. **Gregory Graff**, *The Impact of Blocking Patents on Innovation in Soy Genetics*, report for the United Soybean Board/American Soybean Association, St. Louis, MO (July 2005), 62 pages.
5. Ann Bublitz and **Gregory Graff**, *Crop Biomanufacturing Part II: Implications for the Farm Sector*, Bio Economic Research Associates (bio-era), Cambridge, MA (January 2004), 14 pages.
6. **Gregory Graff**, *Crop Biomanufacturing Part I: Economic Opportunities for the Biotechnology Industry*, Bio Economic Research Associates (bio-era), Cambridge, MA (January 2004), 36 pages.
7. **Gregory Graff** and James Newcomb, *Agricultural Biotechnology at the Crossroads: the Changing Structure of Industry*, Bio Economic Research Associates (bio-era), Cambridge, MA (February 2003), 26 pages.

PRESENTATIONS**Invited Seminar and Selected Conference Presentations (since 2007)**

1. Gregory Graff and Yoo Hwan Lee, "Empirical Evidence of University Knowledge Production and its Impacts on Commercial Innovation: The case of Colorado State University 1989-2012," Technology Management and Economics Seminar, Chalmers University of Technology, Gothenburg, Sweden, December 3, 2015.
2. Gregory Graff and Kathay Rennels, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited presentation Agricultural Experiment Station Directors' Western Region Joint Summer Meetings, Breckenridge, CO, July 7, 2015.
3. Gregory Graff, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," Canadian Consulate conference "A Taste of Canada," Inverness Hotel, Englewood, CO, June 22, 2015.
4. Gregory Graff, speaker for panel on "How Will We Nourish our Planet in the Face of Projected Population Growth?" Global Grand Challenges: CSU Research and Translation," National Press Club, Washington, D.C., June 11, 2015.
5. Yoo Hwan Lee and Gregory Graff, "University Research Productivity and its Impact on the Regional Agricultural Economy: The Case of Colorado State University and the Colorado Economy," invited poster presentation, 2015 AAEA/WAEA Annual Meetings, San Francisco, CA, July 27, 2015.
6. Gregory Graff, Devon Phillips, Philip Pardey, "Innovation in the Bioeconomy," DARE Research Seminar, March 26, 2015.
7. Gregory Graff, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited keynote speaker, *CSU Agriculture Innovation Summit: Advancing the Agriculture Economy through Innovation*, March 19, 2015.
8. Gregory Graff, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited keynote speaker, Innovation After Hours, Rocky Mountain Innosphere, February 12, 2015.
9. Gregory Graff, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited presentation to Agrium/CPS/Loveland Products, Loveland, CO, January 28, 2015.
10. Gregory Graff and Kathay Rennels, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited presentation at CSU Partners Breakfast, National Western Stock Show, January 17, 2015.
11. Gregory Graff, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," invited luncheon speaker VinCO and the Colorado Horticultural Society Annual Meeting, Grand Junction, CO, January 14, 2015.
12. Gregory Graff and Kathay Rennels, "The Emergence of an Innovation Cluster in the Agricultural Value Chain Along Colorado's Front Range," presentation to Colorado Impact Fund and Vestar Capital Partners, Denver, CO, December 17, 2014
13. Gregory Graff and Kathay Rennels, "The Emergence of a Colorado Ag Innovation Cluster" Consultation with Agricultural Industry Association Leaders, Colorado Department of Agriculture, Broomfield, CO, October 2014.
14. Gregory Graff, "The Business of Sustainably Feeding a World of 9 Billion," invited presentation for panel on The Business of Feeding the World, 2014 International Colloquium, Visions of Future Earth: Linking Society, Economics, and the Environment, Lory Student Center, Colorado State University, October 6-8, 2014
15. Gregory Graff, "The Emergence of an Innovation Cluster in the Value Chain of Colorado Agriculture: Consumer Implications," invited presentation at *Consumer Issues Conference: Food Perceptions, Practices, & Policies*, University of Wyoming, Laramie, WY, October 9, 2014.

16. Gregory Graff, “The Emergence of a Colorado Ag Innovation Cluster” invited keynote speaker, Future Seed Executives (FuSE), American Seed Trade Association, La Junta, CO, September 25, 2014.
17. Gregory Graff and Kathay Rennels, “The Emergence of a Colorado Ag Innovation Cluster” College of Agricultural Sciences, Dean’s Leadership Council, CSU Denver Center, September 25, 2014.
18. Kathay Rennels and Gregory Graff, “The Value Chain of Colorado Agriculture: Opportunities for Colorado as a center for innovation in hemp,” presentation for Agriculture Panel, Colorado Hemp Industry Symposium, Boulder, CO, August 20, 2014.
19. Gregory Graff, “The Value Chain of Colorado Agriculture and the Emergence of a Colorado Ag Innovation Cluster,” FCC Services Loan Officer Certification Program, Denver, CO, June 18, 2014.
20. Gregory Graff, Devon Phillips, Philip Pardey, “Innovation in the Bioeconomy,” invited paper presentation for Australian Agricultural & Resource Economics Society (AARES) Organized Symposium, “*Innovation in the Agricultural Bioeconomy: Implications for Yield, Market Concentration, and Regulations in the Crop Sector*,” at the 2014 AAEA Annual Meetings, Minneapolis, MN, July 28, 2014.
21. Kathay Rennels and Gregory Graff, “The Emergence of an Innovation Cluster in the Value Chain of Colorado Agriculture: A First Look,” Economic Development Council of Colorado, 2014 Spring Conference, Grand Junction, CO, May 1, 2014.
22. Kathay Rennels and Gregory Graff, “The Value Chain of Colorado Agriculture,” Boulder County Open Space Organic Options Conference, Boulder, CO, April 5, 2014.
23. Gregory Graff, Devon Phillips, Philip Pardey, “Innovation in the Bioeconomy,” paper presented at NC1034 conference “*Pests, Germs and Seeds: The Economics of Policies, Programs, and Technologies for Managing Agricultural Pests and Diseases*,” University of California Davis, March 28, 2014.
24. Gregory Graff, “The Impact of AMP v. Myriad across Industries: The changing landscape of U.S. gene patents,” invited presentation for Congressional Advisory Workshop “*The Future of Gene Patents: Making Sense of the Supreme Court’s Decision in the Myriad Case*,” Rayburn House of Representatives Office Building, Washington DC, March 13, 2014.
25. Gregory Graff, Devon Phillips, Philip Pardey, “Innovation in the Bioeconomy,” invited papers presentation for Australian Agricultural & Resource Economics Society (AARES) Annual Meetings, Port Macquarie, NSW, Australia, 7 February 2014.
26. Gregory Graff, Devon Phillips, Philip Pardey, et al, “Not Quite a Myriad of Gene Patents: The Changing Landscape of U.S. Patents that Claim Isolated Nucleic Acids,” NC1034 Conference *Biotechnology Trade and Transfer: Barriers and Opportunities*, University of Arizona, Tucson, AZ, March 15, 2012.
27. Gregory Graff, Devon Phillips, Philip Pardey, et al, “A First Look at the INSTEPP Global Genetics Patent Database: Global Patenting Trends in the Genetic Sciences 1970-2010,” Canadian Science Policy Conference, Calgary, Alberta, Canada, November 6, 2012.
28. Gregory Graff, Cecilia Chi-Ham, Mark Szczerba, and Alan Bennett, “The Emergence of Agbiogenetics: Implications for the Future of Crop Genetic Improvement,” invited presentation at the American Agricultural Law Association (AALA) 2012 Annual Meetings, Nashville, TN, October 20, 2012.
29. Gal Hochman, Gregory Graff, and David Zilberman, “The Political Economy of Controversial Technologies,” paper prepared for Selected Paper Session, Agricultural and Applied Economics Association (AAEA) 2012 annual meetings, Seattle, WA, August 12, 2012.
30. Gregory Graff, “The agricultural research and development (R&D) system in the US,” invited seminar for the Department of Economics and Management, Kazakh National Agricultural University, Almaty, Kazakhstan, April 26, 2012.
31. Gregory Graff, “Managing University and Government IP in Emerging and Developing Economies: Plucking ‘Low-Hanging Fruit’ versus Careful Cultivation,” invited presentation to Technology

- Management program at the National Academy for Agricultural Research Managers, Hyderabad, India, 19 January 2012.
32. Gregory Graff, Gal Hochman, and David Zilberman, "The political economy of intellectual property and regulatory policies in agricultural biotechnology: implications for public sector crop genetic development," invited paper presentation for the conference *Biotechnology in Indian Agriculture: Performance, Potential and Concerns*, Centre for Economic and Social Studies (CESS), Hyderabad, India, 17-18 January, 2012
 33. Gregory Graff and David Zilberman, "How the 'Regulatory-IP' complex affects incentives for developing socially beneficial products from agricultural genomics," invited paper for the conference *Changing Goals of Governance for Agricultural Genomics: An Examination of Current Regulatory and Intellectual Property Regimes*, University of British Columbia, Vancouver, BC, Canada, November 17, 2011.
 34. Anthony Marchese, Gregory Graff, and Paul Hudnut, "Development of a new graduate course in sustainable technology entrepreneurship for scientists and engineers," Paper prepared for American Society for Engineering Education (ASEE) annual conference, Vancouver, BC, Canada, June 26-29, 2011.
 35. Gregory Graff, Erin Hicks, and Philip Pardey. "Patenting Genes and Genetic Inventions: Protections, Polemics, and Policies," paper prepared for the *Francis Bacon Conference*, California Institute of Technology, Pasadena, CA, May 7, 2011.
 36. Gregory Graff, Philip Pardey, and Carol Nottenberg, "Patent Pending: the economics, law, and ethics of intellectual property rights (IPRs) in agricultural genetics," invited presentation for the M.E. John Seminar Series in Department of Agricultural Economics, Sociology, and Education, Pennsylvania State University, April 15, 2011.
 37. Gregory Graff and Brian Wright, "Structuring Public-Private Research Alliances: Allocating Intellectual Property and Control Rights to Optimize Collaborative R&D in Biofuels," paper prepared for the Multi-state Research Project NC-1034, *Biotechnology, Bioenergy, and Food Security*, University of California, Berkeley, March 24-26, 2011.
 38. Gregory Graff, "The Origins and Evolution of the Public Intellectual Property Resource for Agriculture (PIPRA)," presented at the VALGEN workshop, Genome Canada, Banff, Alberta, Canada, January 21, 2011.
 39. Gregory Graff, Sean O'Connor, and David Winickoff, "The Legal Context of University Intellectual Property and Technology Transfer" seminar presented at the Department of Management of Organizational Renewal and Entrepreneurship, Chalmers University of Technology, Gothenberg, Sweden, November 10, 2010.
 40. Gregory Graff, "What is 'Sustainability' According to Economists? Considerations for Agriculture," invited presentation for the Farm Foundation Round Table, Winnipeg, Manitoba, June 3, 2010.
 41. David Zilberman, Gregory Graff, and Gal Hochman, "What role for socio-economic assessments? Economic theory of regulation and implications for biosafety assessment," paper presented at the *4th World Congress of Environmental & Resource Economists*, Montreal, Canada, 28 June-2 July, 2010.
 42. Gregory Graff, "Assessing Intellectual Property Risks in the Stem Cell Patent Landscape" invited presentation to the 2010 Annual Meeting of the Scientific & Medical Accountability Standards Working Group, California Institute of Regenerative Medicine (CIRM), San Francisco, May 26, 2010.
 43. Gregory Graff, Terry Iversen, and Katherine Keske, "Developing a Technology Neutral Benefit-Pricing Policy to Stimulate Innovation in the Colorado Electricity Sector" invited presentation at the Cynergy Clean Energy Expo, Colorado State University, April 19, 2010.
 44. Erin Hicks and Gregory Graff, "Genomes, Genes, and Gene Products: Intellectual Assets and Patent Policy," DARE Research Seminar, Colorado State University, March 31, 2010.
 45. Gregory Graff, Sean O'Connor, and David Winickoff, "The Legal Context of University Intellectual Property and Technology Transfer" presented at Association of University Technology Managers (AUTM) annual meetings, New Orleans, LA, March 19, 2010.

46. Gregory Graff, Alan Bennett, and David Zilberman, “Global R&D Pipeline in Transgenic Nutritional and Output Quality Traits” invited seminar for Plant Super Group, Colorado State University, December 11, 2009.
47. Gregory Graff, “Intellectual Property and the Global Agricultural Genetics R&D Pipeline” invited presentation for annual meeting of the Canadian Agricultural Innovation Research Network (CAIRN), Banff, Alberta, Canada, December 5, 2009.
48. Gregory Graff and Mats Lundqvist, “University Open-Innovation Platforms” invited keynote talk for CIP Forum 2009 Summit, Island of Hönö, Sweden, September 6, 2009.
49. “How do Economists Define Sustainability? Considerations for Biofuels Policy” invited presentation for the Biofuels for Aviation Summit, National Center for Food and Agricultural Policy, Washington, DC, September 1-2, 2009.
50. Gregory Graff and David Zilberman, “How European Resistance to Biotechnology Has Hurt the Developing World,” invited presentation for conference Biotechnology in Developing Countries, University of California, Berkeley, January 23, 2009.
51. Gregory Graff and David Zilberman “Agricultural Biotechnology: Achieving Equity and Prosperity in Sustainable Agriculture,” invited paper for conference The Role of Biotechnology in a Sustainable Food Supply, University of Arkansas, Center for Agricultural and Rural Sustainability, and University of Wisconsin, College of Agricultural and Life Sciences, Rogers, AK, November 18-19, 2008.
52. Gregory Graff and Mats Lundqvist, “Co-Evolution of the ‘Public Domain’ and Intellectual Property Rights Regimes for the Commercialization of University Technologies,” presented at workshop on *Commercializing University Technologies*, Vinnova (Swedish Ministry of Innovation), Stockholm, Sweden, September 25-26, 2008.
53. Gregory Graff, Kris Saha, and David Winickoff, “Enabling Stem Cell R&D: A Proposal for Navigating the Technical, Intellectual Property, and Ethical Domains of a Complex and Controversial Field,” poster presentation at Gordon Conference on Science Policy, Governance of Emerging Technologies, Big Sky, Montana, August 17-22, 2008.
54. Gregory Graff, “Issues and Innovations in Intellectual Property for Crop Biotechnology,” invited presentation for conference *The Second Decade of Crop Biotechnology: Opportunities and Challenges for the Food System*, Farm Foundation, Washington DC, January 16-17, 2008.
55. Gregory Graff, “Managing University and Government Intellectual Property in Emerging and Developing Economies,” invited keynote address for *Commercialization and Technology Transfer Workshop*, Malaysia Technology Development Corporation (MTDC), Kuala Lumpur, Malaysia, December 3-4, 2007.
56. Gregory Graff, “Freedom to Operate, IPRs, and Alternative Structures for Financing and Research,” invited presentation for Food and Fuel: The Implications for Agricultural Research Policy, Canadian Agriculture Innovation Research Network (CAIRN) conference, Saskatoon, Saskatchewan, June 4-6, 2007.

Local Outreach and Engagement Presentations

1. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," invited presentation for conference "*Is Organic Agriculture for Me?*" Boulder County Parks and Open Space, Boulder, CO, April 5, 2014.
2. Gregory Graff, "The Value Chain of Colorado Agriculture," International Visitors Leadership Program, WorldDenver and U.S. State Department, seminar held at Colorado State University, Fort Collins, CO, March 31, 2014.
3. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Food and Agriculture Policy Council, Boulder County, Longmont, CO, February 20, 2014.
4. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Pueblo Chamber of Commerce, Pueblo, CO, January 9, 2014.
5. Tom Lipetzky, Kathay Rennels, and Gregory Graff, "Innovation in Colorado Agriculture: Looking Forward," CSU President's Agricultural Advisory Council, Denver, CO, November 15, 2013.
6. Gregory Graff, "The Value Chain of Colorado Agriculture," Greeley Chamber of Commerce, Greeley, CO, November 5, 2013.
7. Gregory Graff, "The Value Chain of Colorado Agriculture," CSU Extension Forum, Colorado State University, November 7, 2013.
8. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," University Economic Development Association (UEDA) 2012 annual meetings, Pittsburgh, PA, October 28, 2013.
9. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Northwest Colorado Council of Governments, Dillon, CO, October 23, 2013.
10. Gregory Graff, "The Resource of Food Depend On: Soils," 5th grade assembly speaker, Range View Elementary School, Severance, CO, October 14, 2013.
11. Gregory Graff, "The Value Chain of Colorado Agriculture," Northern Colorado Economic Development Corp (NCEDC) and Upstate Colorado, Joint Meeting of the Boards of Directors, Loveland, CO, September 26, 2013.
12. Kathay Rennels and Gregory Graff, "Characterizing Colorado's emergent agricultural innovation cluster," Agriculture Innovators Network, Rocky Mountain Innosphere, Fort Collins, CO, September 11, 2013.
13. Gregory Graff, "Policy Issues in Colorado Agriculture," The League of Women Voters, Fort Collins, CO, September 9, 2013.
14. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," The Colorado 50, Burlington, CO, September 5, 2013.
15. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Bioagricultural Science and Pest Management (BSPM) faculty retreat, Fort Collins, CO, August 23, 2013.
16. Gregory Graff, "Not Quite a Myriad of Gene Patents: The Changing Landscape of U.S. Patents that Claim Isolated Nucleic Acids," Colorado BioScience Association, breakfast speaker series, Westin Westminster, August 28, 2013.
17. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Region 13 Colorado Blueprint Advisory Committee, Canon City, CO, August 15, 2013.
18. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Northeastern Colorado Economic Development Advisory (NECO), Fort Morgan, CO, July 25, 2013.
19. Gregory Graff, "Cultivating Innovation in the Agricultural Value Chain," invited luncheon speaker, FCC Services, Board of Directors, Boulder, CO, July 24, 2013.
20. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Colorado River District, Board of Directors, Glenwood Springs, CO, July 16, 2013.
21. Gregory Graff, "The Value Chain of Colorado Agriculture," CEDS Resource Network and Colorado Blueprint Meeting, Durango Public Library, Durango, CO, June 27, 2013.

22. Gregory Graff, "The Value Chain of Colorado Agriculture," Northern Colorado Business Advisory Council (NCBAC), Greeley, CO, June 21, 2013.
23. Gregory Graff, "The public system of agricultural research and higher education in the US," Sumy National Agrarian University, Sumy, Ukraine, May 31, 2013.
24. Gregory Graff, "The Value Chain of Colorado Agriculture," Kharkiv National Technical University of Agriculture of Petro Vasylenko, Kharkiv, Ukraine, 29 May 2013
25. Gregory Graff, "The agricultural research and development (R&D) system in the US," invited seminar for the Poltava State Agrarian Academy, Poltava, Ukraine, May 27, 2013.
26. Gregory Graff, "Innovation in Agricultural Biotechnology: Implications for Biofuels," invited seminar presentation for National University of Life and Environmental Sciences (NULES), Kyiv, Ukraine, May 23, 2013.
27. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Colorado Innovation Network (COIN), Fort Collins, CO, May 16, 2013.
28. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Colorado State Legislature, Joint House and Senate Agriculture Committees, Denver, CO, May 1, 2013.
29. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Colorado Livestock Association Board Meeting, CSU, Fort Collins, CO, April 23, 2013.
30. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Colorado Agricultural Leadership Program, Fort Morgan, CO, April 19, 2013.
31. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," CSU President's Agricultural Advisory Council, Denver, CO, April 10, 2013.
32. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Agriculture Staff of Senator Michael Bennett, Fort Collins, CO, April 2, 2013.
33. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Office of Economic Development and International Trade (OEDIT), Denver, CO, March 19, 2013.
34. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Commissioner of the Colorado Department of Agriculture, Littleton, CO, March 6, 2013.
35. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," Yampa Valley Economic Development Council, Craig, CO, February 6, 2013.
36. Kathay Rennels and Gregory Graff, "The Value Chain of Colorado Agriculture," CSU President's Agriculture Advisory Council, Denver, CO, October 2012.
37. Gregory Graff, "Innovation in Agricultural Biotechnology: Implications for Biofuels," invited talk to Colorado BioScience Association, Rocky Mountain Innosphere, Fort Collins, CO, March 7, 2012.
38. Gregory Graff, "Global Hunger, Sustainability, Organics, and Politics" invited talk for First United Methodist Church, Loveland, CO, April 10, 2011.
39. Gregory Graff, "Sustainable Agriculture: Fad, Fiction, or the Future?" invited luncheon address, Loveland Rotary Club, Loveland, CO, March 22, 2011.