

Benjamin P. Bryant – Curriculum Vitae

CONTACT INFORMATION

Water in the West
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Stanford University
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EDUCATION

Ph.D. in Policy Analysis (2013)

Pardee RAND Graduate School, the RAND Corporation
Santa Monica, California, USA

Dissertation: Monopoly and microirrigation in smallholder water markets: Using exploratory modeling to consider interactions between market structure and technology adoption policies

B.S. in Mathematics (2003)

Harvey Mudd College
Claremont, California, USA

Undergraduate Thesis: Modeling Moving Droplets: A precursor film approach
Philosophy concentration with significant beyond-major study in the core sciences, systems engineering, environmental policy, and political and ethical philosophy.

PROFESSIONAL EXPERIENCE

Applied Ecosystem Services Researcher

Water in the West and the Natural Capital Project, Stanford University

Stanford, CA

2014-present

Current applied work as research associate includes identifying, modeling, and valuing benefit streams (hydropower, municipal water supply, ag productivity) from changes in agricultural or fire-prone watersheds, helping optimize water-related ecosystem service investments while accounting for synergies and trade-offs with multiple values. Postdoctoral work included multiple contract-based projects with corporate and NGO clients.

Economist

The Millennium Challenge Corporation (a US government agency)

Washington, DC

2012-2014

Responsible for cost-benefit analysis of approximately US\$1 billion of active grant investments in Senegal and Indonesia, as well as contributions to internal reviews and procedures, and providing input on project development to maximize poverty reduction impacts of MCC funds. Worked in MCC country teams and traveled regularly for meetings with partner-country officials and stakeholders.

Doctoral Fellow/Assistant Policy Analyst

The RAND Corporation

Santa Monica, CA

2005-2012

Methodological experience in analysis for decision making under uncertainty, scenario generation, exploratory modeling. Improved and applied new scenario analysis methodology, resulting in presentations, publications and open-source software toolkit.

Later project work included helping coordinate modeling processes and data structures to assess long-term options for Louisiana coastal hurricane protection and developing algorithms to assist in automated information extraction from literature.

Research Consultant/Scientific Programmer

Scripps Institution of Oceanography/University of California

La Jolla/Merced, CA

2005-2012

Helped design, implement and document research plan and developed software to estimate climate and growth-contingent wildfire impacts in California. Worked primarily with AL Westerling, and coordinated with a broader team as part of two Biannual California-wide climate impacts assessments. Work led to multiple white paper and journal publications.

Tallis, H, thirty-seven others, **BP Bryant**, and seventy-seven others (*accepted*). Aligning evidence generation and use across health, development, and environment. *Current Opinion in Environmental Sustainability*.

Chaplin-Kramer, R, RP Sharp, C Weil, EM Bennett, U Pascual, KK Arkema, KA Brauman, **BP Bryant**, twelve others, and GC Daily (*forthcoming*). Global modeling of Nature's Contributions to People. *Science*.

Gordon, BL, V Kowal, A Khadka, R Chaplin-Kramer, R Roath, **BP Bryant** (2019). Existing accessible modeling tools offer limited support to evaluation of impact investment in rangeland ecosystem services. *Frontiers in Sustainable Food Systems*. 3:77.

Hamel, P, G Blundo, V Kowal, **BP Bryant**, R Chaplin-Kramer, P Hawthorne (2019). Where should livestock graze? Integrated modeling and optimization to guide grazing management in the Cañete basin, Peru. *Socio-Environmental Systems Modelling*. Vol 1.

Bryant, BP, ME Borsuk, P Hamel, K Oleson, CJE Schulp, S Willcock (2018). Transparent and feasible uncertainty assessment adds value to applied ecosystem services modeling. *Ecosystem Services* 33B, 103-109.

BP Bryant, P Hamel, L Mandle (2018). Look beyond peer-reviewed literature and traditional validation when assessing ecosystem services modeling efforts: A response to Ochoa and Urbina-Cardona's review. *Ecosystem Services* 30, 1-2.

Chaplin-Kramer R, S Sim, P Hamel, **BP Bryant**, R Noe, C Mueller, G Rigarlford, M Kulak, V Kowal, R Sharp, J Clavreul, E Price, S Polasky, M Ruckelshaus, G Daily (2017). Life cycle assessment needs predictive spatial modelling for biodiversity and ecosystem services. *Nature Communications* 8, 15065.

Hamel, P and **BP Bryant** (2017). Uncertainty assessment in ecosystem services analyses: Common challenges and practical responses. *Ecosystem Services* 24, 1-15.

Vogl, AL, **BP Bryant**, J Hunink, S Wolny, C Apse, P Droogers (2017). Valuing investments in sustainable land management in Kenya's Upper Tana river basin. *Journal of Environmental Management* 195, 78-91.

Mandle, L, **BP Bryant**, MH Ruckelshaus, D Geneletti, A Pfaff, and J Kiesecker (2015). "Entry points for considering ecosystem services within infrastructure planning: How to integrate conservation with development in order to aid them both." *Conservation Letters* 9 (3), 221-227.

Polasky, S, **BP Bryant**, P Hawthorne, J Johnson, B Keeler, and D Pennington (2015). "Inclusive Wealth as a Metric of Sustainable Development." *Annual Review of Environment and Resources*.

Bryant, BP and AL Westerling (2014). "Scenarios for future wildfire risk in California: links between changing demography, land use, climate, and wildfire." *Environmetrics*, 25(6), 454-471.

Hurteau, MD, AL Westerling, C Wiedinmyer, and **BP Bryant** (2014). "Projected effects of climate and development on California wildfire emissions through 2100." *Environmental Science & Technology*, 48(4), 2298-304.

Westerling, AL, **BP Bryant**, HK Preisler, TP Holmes, HG Hidalgo, T Das and SR Shrestha (2011). "Climate change and growth scenarios for California wildfire." *Climatic Change* 109(s1), 445-463.

McJeon, HC, L Clarke, P Kyle, M Wise, AD Hackbarth, **BP Bryant**, RJ Lempert (2011). "Technology interactions among low carbon energy technologies: What can we learn from a large number of scenarios?" *Energy Economics* 33(4), 619-631.

Bryant, BP and RJ Lempert (2010). “Thinking Inside the Box: A participatory, computer-assisted approach to scenario discovery.” *Technological Forecasting and Social Change* 77(1), 34-49.

Westerling, AL and **BP Bryant** (2008). “Climate Change and Wildfire In California.” *Climatic Change* 87, s231-249.

PAPERS IN
PREPARATION

Bryant, BP, TR Kelsey, AL Vogl, SA Wolny, P Selmants, T Biswas, HS Butterfield (*in prep – manuscript available*). Land change modeling and optimization can identify opportunities for nature and people in water-stressed agricultural landscapes. (Application to San Joaquin Valley, California)

Jain, M, **BP Bryant**, S Winder, S Wood (*in prep*). Causal estimates of wildfire impacts on forest recreation using spatial panels of wildfire and social media data.

Bryant, BP, PC Saksa, JD Herman, K Wilson, E Smith (*in prep*). Forest restoration in California’s Sierra Nevada can promote hydropower generation and environmental flows while enhancing resiliency.

He, X, T Moran, **BP Bryant** (project underway). Climate-informed estimates of water available for managed aquifer recharge in the context of California’s Sustainable Groundwater Management Act.

OTHER
PUBLICATIONS

Vogl, AL, RJP Schmitt, RD Simpson, **BP Bryant**, S Wolny (*forthcoming*). Valuing Green Infrastructure Volume 1: Case Study of Kali Gandaki Watershed, Nepal. The World Bank.

Vogl, AL, RJP Schmitt, RD Simpson, **BP Bryant**, S Wolny (*forthcoming*). Valuing Green Infrastructure Volume 1: Case Study of Mangla Watershed, Pakistan. The World Bank.

Bryant, BP, Z Knight, PC Saksa, and N Wobbrock (2019). The Forest Resilience Bond: Connecting private capital to restoration projects that reduce fire risk and provide ecosystem service co-benefits. Case study box appearing in: Mandle, Ouyang, Salzman and Daily (2019). *Green Growth That Works: Natural Capital Policy and Finance Mechanisms around the World*. Washington, DC: Island Press.

Hamel, P, **BP Bryant**, R Chaplin-Kramer, A Vogl (2018). “Integrating environmental and social impacts with ecosystem services analysis.” In: Bleischwitz et al (pp159-176) *Handbook on the Resource Nexus*. New York, New York: Routledge.

Bryant BP, with contributions from Phil Saksa (2017). “Moving Beyond ‘Fire Bad’ – Wildfire, forest management, and its impact on healthy watersheds.” Stanford University’s Water in the West “Insight” series: <http://waterinthewest.stanford.edu/news-events/news-insights/moving-beyond-fire-bad>

Bryant, BP and P Hamel (2017). “Workshop report: Motivating and improving uncertainty assessment in ecosystem services modeling to inform decisions. SESYNC, Annapolis, 1-3 November 2016.” <http://tinyurl.com/SESYNC-uncertainty-in-ES>

Bryant, BP, S Wolny, A Vogl (2015). Understanding sensitivities, strengths, and weaknesses of the Resource Investment Optimization System: A demonstration in the Coyote Creek watershed. *Natural Capital Project Working Paper*.

Apse, C and **BP Bryant** (co-leads), P. Droogers, J Hunink, F Kihara, C Leisher, A Vogl, S Wolny (2015). “Upper-Tana Nairobi Water Fund: A Business Case.” The Nature Conservancy: Nairobi, Kenya

Bryant, BP (2015). “Ecosystem Services Assessment and Valuation of Proposed Investments for the Upper Tana-Nairobi Water Fund: *A Technical Appendix to the Upper Tana-Nairobi Water Fund*

Business Case.” The Nature Conservancy: Nairobi, Kenya

Fischbach, JR., DR Johnson, D Ortiz, **BP Bryant**, M Hoover, J Ostwald. (2012) “Coastal Louisiana Risk Assessment Model: Technical Description and 2012 Coastal Master Plan Analysis Results.” RAND Technical Report TR-1259 (also formed basis for multiple higher level summary documents)

Bryant, BP and AL Westerling. (2009) “Potential Effects of Climate Change on Residential Wildfire Risk in California.” California Energy Commission White Paper CEC-500-2009-048-F.

Lempert RJ, **BP Bryant** and SC Bankes (2008). “Comparing Algorithms for Scenario Discovery.” RAND Working Paper Series: WR-557-NSF

TEACHING
EXPERIENCE

Pardee RAND Graduate School, Santa Monica, CA

Primary Instructor:

Modern Prediction and Modeling Methods (machine and statistical learning) Spring 2009

Teaching Assistant:

Linear Regression Winter 2008

Decision Analysis Fall 2007

Econometrics Spring 2007

Math for Policy Analysis Fall 2006

Other institutions (as noted)

The Natural Capital Project: Short Course Instructor

Introduction to Natural Capital Approaches

WWF China, Beijing, China June 2018

US Forest Service, Asheville, NC May 2017

UN-REDD/UNDP, Wadduwa, Sri Lanka November 2016

MCC: Trainer for MCC staff and compact country partners

Economic Analysis of Projects 2013-2014

Trainings delivered in Washington DC and Jakarta, Indonesia

Millennium Challenge Corporation

RAND: Short Course Instructor

Cost-Benefit and Cost-Effectiveness Analysis November 2010

Supreme Council on Family Affairs, Doha, Qatar

SELECTED
SEMINARS AND
CONTRIBUTIONS TO
WORKSHOPS

Adventures in decision-oriented ecosystem services modeling. Delta Stewardship Council invited seminar, Sacramento. 31 January 2018.

Reflections on modeling for socio-ecological systems: Uncertainties, values, process. UN FAO Export workshop “Applying social-ecological system frameworks to improve sustainable land-use and enhance resilient agro-food systems under water scarcity.” Rome, Italy. 23-25 January 2018.

SESYNC Workshop on Uncertainty in Ecosystem Service Assessments (co-PI). National Center for Socio-Environmental Synthesis. Annapolis. 1-3 November 2016.

Decision-making in the SGMA Context: Identifying Data Needs and Tools to Support Sustainable Groundwater Management Decisions (presenter and co-coordinator). Water in the West, Stanford University. 3 June 2016.

An intro to ecosystem services assessment with an eye toward policy analysis. Invited seminar. The RAND Corporation, Santa Monica. 12 January 2016.

Sources of Uncertainty in Ecosystem Services Optimization. Optimization Learning Exchange, Natural Capital Symposium, Stanford University. 25 March 2015

Natural Capital and Roads in Development: Connection between roads, people and ecosystems. With Lisa Mandle. Inter-American Development Bank Webinar, Washington, DC. 23 July 2014.

Finding and assessing robust policies for modern energy access. Young Scientists Summer Program, IIASA, Laxenburg, Austria. Workshop Presentation, 26 August 2009.

Overview of Robust Decision Making. RAND Europe, Cambridge, UK. Seminar, 4 August 2009.

A model for climate-related residential wildfire risk. Robust Decision Making Seminar. The RAND Corporation, Santa Monica, CA. Seminar presentation, 4 May 2009.

Analytic scenario discovery to aid decision making under uncertainty: Progress and challenges. Decision Making Under Uncertainty Annual Meeting and Student Workshop, Climate Decision Making Center, Carnegie Mellon University, Pittsburgh, PA. Poster discussion, 21 May 2008.

Algorithms and interfaces for scenario discovery. RAND Robust Decision Making Seminar. The RAND Corporation, Santa Monica, CA. Seminar presentation, 17 April 2008.

What is policy analysis? (unofficially, and in 12 minutes). Research Experience in Carbon Sequestration. Montana State University, Bozeman, MT. Workshop presentation, 9 August 2007.

CONFERENCE
PRESENTATIONS
AND POSTERS

Progress on integrating and communicating uncertainties in robust spatial targeting for multiple ecosystem services provision (June 2018). 9th International Congress on Environmental Modeling and Software. Fort Collins, Colorado. Oral presentation.

Building bridges between disciplines to promote respectful cross-scale decision analysis for food system policy: The role of resilience methods, exploratory modeling, and social choice theory (August 2017). Resilience 2017. Stockholm, Sweden. Poster presentation.

From pixels to bureaucrats to farmers to soil: Accounting for implementation realities when characterizing robustness and uncertainty in spatial multi-objective optimization (November 2017). 4th Annual Decision Making Under Deep Uncertainty meeting. World Bank Headquarters, Washington, DC.

Links between uncertainty, multi-criteria analysis, and valuation of ecosystem services in applied decision contexts: Water and agriculture in the Tana Basin of Kenya. (July 2016). 8th International Congress on Environmental Modeling and Software. Toulouse, France. Oral presentation.

Deep and shallow uncertainty in ecosystem services assessments: Some challenges, some progress, and some help wanted (November 2015). Third Annual Workshop on Decision Making Under Deep Uncertainty. Delft, Netherlands. Oral presentation.

Targeting and valuing conservation investments in support of a water fund: linking upstream land management with downstream services in the Upper Tana catchment, Kenya (December 2014). With P. Droogers, J.E. Hunink, A. Vogl, S. Wolny. American Geophysical Union Fall Meeting. San Francisco. Poster presentation.

A simulation-based approach to studying the interaction of market structure with water efficiency policies: Monopoly and microirrigation in Gujarat water markets (May 2011). 17th annual conference of the International Sustainable Development Research Society, Earth Institute, Columbia University. Poster presentation.

Supporting Robust Decisions with Classification and Data-Mining Algorithms (July 2009) User! 2009. Rennes, France. Oral presentation.

AUTHORED
SOFTWARE
PACKAGES

B.P. Bryant (2009/2014). *sdtoolkit*: Scenario Discovery Tools to Support Robust Decision Making. R package version 2.33-1. <http://CRAN.R-project.org/package=sdtoolkit>

B.P. Bryant and Anthony LeRoy Westerling (2009) *AIGIS*: Areal Interpolation for GIS Data. R Package version 1.0. (superseded and archived)

B.P. Bryant (in prep). *uncertitude*: tools for assessing uncertainty in ecosystem services modeling and spatial prioritization. In prep for repository submission:
<https://bitbucket.org/whetherandhow/uncertitude>

PROFESSIONAL
ACTIVITIES AND
SERVICE

Managing guest editor for special issue of *Ecosystem Services* on “Transparent, Feasible and Useful Uncertainty Analysis.”

Editorial board member

Frontiers in Sustainable Food Systems

Socio-Ecological Systems Modeling

Peer Reviewer (Italics denote selected journals, others are institutions)

Ecosystem Services
Environmental Modelling and Software
Global Environmental Change
Operations Research
Proceedings of the National Academy of Sciences
Nature Communications
Sustainability
Water Resources Research
Center for Global Development
Intergovernmental Panel on Climate Change

BRIDGE Collaborative

Working group member and reviewer helping harmonize principles of evidence and program design across conservation, health, and economic development.
<http://www.nature.org/science-in-action/leading-with-science/bridge-collaborative.xml>

The Natural Capital Project

Supervisor/mentor for interns, undergraduate, and Master’s student thesis
Co-leading efforts to improve NatCap’s uncertainty practice, with guidance, webinars, and coding
Co-designed, secured funding, and ran 3-day workshop at SESYNC on the topic
Organized multiple sessions at annual Natural Capital Symposia

Water in the West

Coordinating watershed health program and liaison between NatCap and Water in the West
Lead or co-lead multiple convenings on model support for groundwater adaptation planning
Representative to Pacific Institute’s multi-benefits green infrastructure working group

Millennium Challenge Corporation

Responsible for developing guidance on economic accounting for indirect benefits
Economics liaison to agriculture practice group
Economics liaison to climate change working group
Trainer and presenter at multiple internal training events

Development activities

Society for Decision Making Under Deep Uncertainty annual meetings 2013-present
Stanford postdoctoral teaching workshop 2018
Stanford Woods Institute Rising Environmental Leaders Program 2016
Stanford Preparing for Faculty Careers course 2016
Alda Center for Communicating Science local workshop 2015
Young Scientists Summer Program, IIASA 2009
Research Experience in Carbon Sequestration, Montana State University 2007

HONORS AND AWARDS

Finalist, Presidential Management Fellowship Program 2010
National Academy of Science stipend for IIASA YSSP 2009
Cazier Dissertation Fellowship in Sustainability, Pardee RAND Graduate School 2007
Graduated with Distinction, Harvey Mudd College 2003
NSF stipend for Global Climate Change and Society REU 2003
Stavros J. Busenberg Prize for Promise in Applied Mathematics, Harvey Mudd College 2002