



LEEP in 2019

The LEEP Institute's Meeting of International Excellence
in Environmental and Resource Economics

University of Exeter Business School

Monday 24th & Tuesday 25th June 2019



LAND, ENVIRONMENT, ECONOMICS AND POLICY INSTITUTE



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AGENDA

Sunday 23rd June

| | | |
|-----------|---------------------------|--|
| 1900-late | Evening meal ¹ | The Old Firehouse 50 New North Rd, Exeter, EX4 4EP |
|-----------|---------------------------|--|

Monday 24th June

| | | |
|-----------|---|---------------------------|
| 1130-1215 | Registration & Lunch | XFi atrium |
| 1215-1250 | Opening address | Henderson lecture theatre |
| 1250-1355 | Plenary 1 – Paul Ferraro | Henderson lecture theatre |
| 1405-1535 | Parallel session 1 | ² |
| 1535-1600 | Break | XFi atrium |
| 1600-1705 | Plenary 2 – Brett Day | Henderson lecture theatre |
| 1705-1810 | Plenary 3 – Georgina Mace | Henderson lecture theatre |
| 1900-late | Conference Dinner ¹ (Dinner will be served at 1930) | Reed Hall |

Tuesday 25th June

| | | |
|-----------|---------------------------|---------------------------|
| 0845-0900 | Welcome to Day 2 | Henderson lecture theatre |
| 0900-1005 | Plenary 4 – Cathy Kling | Henderson lecture theatre |
| 1015-1115 | Parallel session 2 | ² |
| 1115-1140 | Break | XFi atrium |
| 1140-1310 | Parallel session 3 | ² |
| 1310-1325 | Conference Photo | XFi Atrium |
| 1325-1410 | Lunch | XFi atrium |
| 1410-1515 | Plenary 5 – Steve Polasky | Henderson lecture theatre |
| 1515-1530 | Closing remarks | Henderson lecture theatre |

¹Unfortunately spaces at the Evening Meal (23/06/19) and Conference Dinner (24/06/19) are limited to those that have pre-registered. If you are unsure whether you have registered, please do not hesitate to ask.

²The parallel sessions will be hosted across several rooms (Henderson lecture theatre, XFi conference room, Bateman lecture theatre and Matrix lecture theatre). The location of each session is given in the “Parallel Sessions” section of this programme, pages 10-27.

Welcome to LEEPIn2019

Dear Friends,

The LEEP Team is delighted to welcome such a large and enthusiastic audience to Exeter; demand for spaces outstripped supply weeks beforehand and we are grateful to everyone who has travelled here.

We hope that you have a thoroughly enjoyable time and come back to visit us in the future.

On behalf of the whole team, have a great time everyone!

Best wishes



Ian Bateman
Director, LEEP Institute



Brett Day
Director, LEEP Institute

Plenary talks

(Henderson lecture theatre)



Paul Ferraro

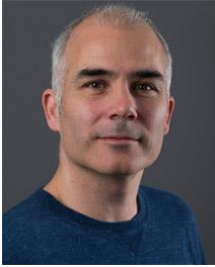
Johns Hopkins University

Paul Ferraro is the Bloomberg Distinguished Professor of Business and Engineering at Johns Hopkins University and has a joint faculty appointment in the Whiting School of Engineering and the Carey Business School. His research focuses on behavioural economics and the design and evaluation of environmental programs in the private and public sector.

Applying Behavioural Economics to Improve Environmental Programs: Knowns and Unknowns

Chair: Sabrina Eisenbarth, LEEP Institute

To make public programs more effective, practitioners are turning to interventions inspired by behavioural economics. The reported behavioural impacts of such interventions, however, are likely to be exaggerated. Moreover, to be useful for environmental applications, more attention needs to be paid to: (i) the persistence of behavioural changes; (ii) effects on experienced agents acting in competitive environments; (iii) welfare implications; and (iv) interactions among psychology-inspired interventions and traditional economic instruments. Professor Ferraro describes new research that addresses these issues and discusses related experiences as Director of the Environmental Program Innovations Collaborative (EPIC) and Co-Director of the Center for Behavioral and Experimental Agri-environmental Research (CBEAR).



Brett Day

LEEP Institute, University of Exeter

Professor Brett Day is an environmental economist working in the field of ecosystem services, the particular focus of his research being the development of methods and knowledge for the support of environmental decision-making. He took up a faculty position in the School of Environmental Sciences at the University of

East Anglia in 2005, and in 2015 joined the Department of Politics in the University of Exeter.

Evolving Tools in Environmental Valuation: From the Ivory Tower to the Desktop

Chair: Greg Smith, LEEP Institute

The central purpose of environmental valuation is to furnish decision-makers with evidence as to the potential environmental costs and benefits of projects and policies. And, for several decades academics have been developing increasingly sophisticated methods for determining those values. More often than not, however, the evidence actually used in decision-making is derived from crude transfers from existing studies. This talk will examine that disconnect and drawing on recent work of the LEEP Team, show how modern methods of computing are finally providing decision-makers with access to sophisticated environmental valuation evidence at the touch of a button.



Georgina Mace

University College London

Professor Georgina Mace is Head of the Centre for Biodiversity and Environment Research at University College London. Her research interests are in the assessment of extinction risk and measuring the trends and consequences of biodiversity loss and change. She led the process to develop, test and document criteria for listing species on IUCN's Red List of threatened species, and subsequently worked on the biodiversity elements of the Millennium Ecosystem Assessment and measures for the CBD 2010 target. She contributed to the UK National Ecosystem Assessment and the IPCC 2014 chapter on the impacts of climate change on ecosystems. Georgina was previously the Director of Science at ZSL, and the Director of the Centre for Population Biology at Imperial. She was awarded a CBE in 2007, elected FRS in 2002, and was the 2007 winner of the international Cosmos prize.

Biodiversity Conservation and the Valuation of Nature

Chair: Katrina Davis, LEEP Institute

Biodiversity and its conservation pose a number of challenges for the design of economic approaches to environmental management. One challenge is that 'biodiversity' can have different meanings: species conservation, local species richness, resilient ecosystem functioning, or green space and recreation. Each of these has different desired outcomes and consequences for economic valuation. Using a natural capital framework, Professor Mace will disaggregate the roles and components of biodiversity in order to propose a more consistent framework for large scale (national/regional) land use planning and assessment.



Cathy Kling

Cornell University

Catherine L. Kling is a Tisch University Professor in the Dyson School of Applied Economics and Management and Faculty Director at the Atkinson Center for a Sustainable Future. She is past Director of

the Center for Agricultural and Rural Development at Iowa State University where she also held the President's Chair in Environmental Economics. She was elected to the National Academy of Sciences in 2015. Kling has published nearly 100 refereed journal articles and books chapters which have received over 8000 citations and is the editor of the Review of Environmental Economics and Policy. She specializes in the economic valuation of ecosystem services and integrated assessment modelling for water quality modelling.

The Social Cost of Water Pollution: Theoretical Underpinning and Implications

Chair: Michela Faccioli, LEEP Institute

(Work in collaboration with David A. Keiser and Daniel J. Phaneuf)

Water is a natural resource that affects our daily lives in dozens of ways: we drink and cook with it, use it in the manufacturing of consumer goods, recreate in and around it, enjoy it for its aesthetic value and support of wildlife habitat, and more. Water pollution degrades the value of these services. This paper provides a framework for the construction of the social cost of water pollution that incorporates the spatial variability of the damages from pollution. A consumer theory model that explicitly represents the multiple pathways through which water quality affects utility is presented. The model also provides guidance for the construction of the social cost of water pollution.



Stephen Polasky

University of Minnesota

Stephen Polasky is the Regents Professor and Fesler-Lampert Professor of Ecological/Environmental Economics at the University of Minnesota. His research focuses on issues at the intersection of ecology and economics and includes the impacts of land use and land management on the provision and value of ecosystem services and natural capital, biodiversity conservation, sustainability, environmental regulation, renewable energy, and common property resources. Stephen previously held faculty positions at Oregon State University and Boston College. Professor Polasky was the senior staff economist for environment and resources for the President's Council of Economic Advisers 1998-1999. He was elected into the National Academy of Sciences in 2010, and elected as a Fellow of the American Academy of Arts and Sciences in 2009 and a Fellow of the American Association for the Advancement of Science in 2007.

Making Nature Count at Micro to Macro Scales

Chair: Amy Binner, LEEP Institute

Nature provides a wide range of valuable goods and services to people (ecosystem services), but current political and economic systems typically do not account for these values, nor provide adequate incentives for conserving the natural capital necessary for their continued provision. Correcting this problem requires integrating natural science and economics to assess the value ecosystem services and natural capital, and to incorporate these values into policy and market mechanisms to internalize external benefits and costs. I discuss examples of ecosystem service valuation and incentives from local scales (watershed analysis), to national scale (ecosystem accounting in China), to global scale analysis.

Parallel sessions

Please note that the presenting author(s) appear first and in bold. The institutional address is given for the presenter(s) only.

Parallel Session 1

Monday 24th June, 1405-1535

| Overview | |
|---|---|
| Room | Speakers |
| Henderson lecture theatre <i>Stated preference studies in practice (1)</i> <i>Chair: Graham Loomes</i> | Christian Vossler Michela Faccioli Graham Loomes |
| Bateman lecture theatre <i>Designing environmental policy in reality</i> <i>Chair: Jordan Suter</i> | Ben Groom & Charlie Palmer Andrew Balmford Jordan Suter |
| Matrix lecture theatre <i>Improvements to the energy sector</i> <i>Chair: Gemma Delafield</i> | Alastair Fraser Inge van den Bjiigaart Gemma Delafield |
| XFi conference room <i>Climate policy</i> <i>Chair: David Maddison</i> | Chi Man Yip David Maddison Dabo Guan |

Henderson lecture theatre - Stated preference studies in practice (1)

Chair: Graham Loomes

Christian Vossler, Dong Yan

University of Tennessee

An Experimental Investigation of Updating Under Ambiguity

Multi-prior ambiguity models are increasingly used to examine environmental and natural resource issues, although their implications can be very sensitive to model specification. We formulate and experimentally test new hypotheses that take advantage of information updating to discriminate between the two major specifications of multi-prior ambiguity

models: “kinked” and “smooth”. Relative to prior work, which has yielded mixed results, our methods allow for simple tests of decision-making under ambiguity without placing restrictions on the weights participants place on priors, or reliance on comparisons to decision-making under risk. We find that the kinked specification consistently predicts choices from most participants.

Michela Faccioli, Klaus Glenk, Christoph Schulze

LEEP Institute, University of Exeter

More in Good Condition or Less in Bad Condition? Valence-based Framing Effects in the Valuation of Ecosystem Restoration

In discrete choice experiment (DCE) surveys, how information is presented to respondents can lead to different estimates of preferences and welfare measures. Our paper focuses on testing the impacts of describing the attribute levels in DCEs in positive versus negative ways, but which are otherwise identical in terms of the outcomes presented. Drawing from a DCE on peatland restoration in Scotland, we find that describing the same environmental improvement as a decrease in the share of peatlands in bad condition (rather than an increase in good condition), triggers significantly higher preferences and willingness-to-pay. Our study outlines some implications for the conception of DCE exercises, the modelling of related data and the design of environmental policies.

Graham Loomes

Warwick Business School

Eliciting Values for Health and Life when Preferences are... Elusive

Environmental policies often have implications – sometimes very considerable – for human health and life expectancy that need to be weighed in the cost-benefit balance. Other areas of policy – health and safety at work and at home, transport, crime and, of course, health care – also need to incorporate values for human health and life expectancy into resource allocation decisions. However, it has proved challenging (to say the least) to elicit a robust set of values reflecting the preferences of the population that can be confidently and consistently applied across the public sector. Why?

Bateman lecture theatre – Designing environmental policy in reality

Chair: Jordan Suter

Ben Groom, Charlie Palmer, Lorenzo Sileci

London School of Economics and Political Science

Is the Moratorium on Oil Palm Concessions in Indonesia Effective in Reducing Greenhouse Gas Emissions? A Quasi-experimental Analysis of Forest Fires, Spatial Leakage and Expropriation Effects.

The 2011 Moratorium on new oil palm, timber and logging concessions in primary forests and peatlands is an area-based policy, which was implemented in Indonesia to scale up efforts to reduce emissions from deforestation and forest degradation (REDD+). Using quasi-experimental methods (Matched DID) and satellite fire observations, this paper evaluates the extent to which the policy was effective in preventing the occurrence of fire, typically used to clear forests in preparation for new concessions. We test for displacement of fires ("spatial leakage") by looking at buffer areas of varying sizes around the conservation area, and potential "expropriation effects", potentially arising if perceptions of property rights are weakened. Each of these effects could reduce the overall impact of the Moratorium. We find that the Moratorium reduced the incidence of fires on virgin forest land, as intended. Yet, the impact is minute, a mere 1.4% reduction, resulting in a negligible, indicating a small positive when considering global changes in fire regimes from 2006-2011 to 2011-2016. Other than that the Moratorium has no effect on land clearance, hence emissions via fires from various land-uses. Logging and Timber concessions, and comparisons across Oil Palm concessions inside and outside of the Moratorium areas. The paper concludes with some thoughts on why the Moratorium appears to be having a negligible effect, focusing on the political economy of forest management in Indonesia, and the Role of REDD+ in the wider world.

Andrew Balmford, Rhys Green & Tom Finch

University of Cambridge

How Can We Afford Re-wilding? The Importance of High-yield Farming.

Re-wilding is likely to take up land currently used for farming. As such, given the continued growth of our population, it can only be accommodated if lost

production is offset by converting natural habitats to farmland elsewhere, by reducing per capita demand (through changes in diet or levels of food waste), by increasing yields on remaining farmland, or by some combination of these approaches. We consider the scope in the UK of each of these, and show that yield increases may be both essential and potentially desirable. Using data for UK birds we report that populations of most species of conservation concern would be increased by linking yield growth and habitat restoration. This land-sparing approach could also dramatically reduce net greenhouse gas emissions from UK agriculture. We close by examining some widely perceived costs of high-yield farming, and considering the changes in both governmental and conservation policy needed to enable large-scale habitat recovery while meeting food demand.

Jordan Suter, Mani Rouhi Rad, Dale Manning, Christopher Goemans
Colorado State University

Policy Leakage or Policy Benefit? Spatial Spillovers from Groundwater Conservation

This research evaluates the impacts of a program that pays landowners to permanently retire groundwater wells used for irrigation. We use well-level panel data to identify the causal impact of well retirement on groundwater use at nearby wells. Groundwater use is reduced by approximately five percent on average when neighbouring wells are retired, which we attribute to reduced competition for the common pool resource. Over time, water use relative to the counterfactual increases, however, due to higher groundwater levels near the retired wells. The results show that spatial spillovers determine the efficacy of CPR conservation programs.

Matrix lecture theatre – *Improvements to the energy sector*

Chair: Gemma Delafield

Alastair Fraser

University of Sydney

Intensive and Extensive Margin Responses in Electricity Conservation: How Households Respond to Financial Rewards

I investigate how households respond to repeated financial rewards for achieving electricity conservation targets. I find that participation in an electricity conservation challenge causes households to reduce their electricity use but reductions rebound close to pre-program levels after participation ends. I find that households' decisions whether to remain in the program are sensitive to their success or failure in a conservation challenge but do not depend on their reductions in electricity use. As a result, households make the opposite decision from what the program incentivizes. This suggests households use simple heuristics in making decisions rather than incorporate detailed information available.

Inge van den Bijgaart, Mauricio Rodriguez Acosta

University of Gothenburg

Renewable Energy Implementation and Fossil Stock Development

We study the anticipated expansion of renewable supply against the backdrop of potential ongoing development of new fossil reserves. We characterize incentives to investment in renewable energy capacity and find that these decline in developed fossil resource stocks. For sufficiently low renewable costs, fossil energy will be fully phased out. Such a phase-out additionally features the abandonment of developed fossil reserves only if renewables costs lie below fossil use cost. Finally we consider optimal investment subsidies in the absence of Pigouvian carbon taxation and establish that subsidies are increasing in developed reserves.

Gemma Delafield

LEEP Institute, University of Exeter

Spatial Optimization of Energy Infrastructure Considering Ecosystem Services

The land use change associated with transitioning to a decentralised low carbon energy system has the potential to result in far-reaching ramifications for the natural environment. Existing energy models are not spatially explicit and therefore are unable to take a whole systems approach to explore the implications of future energy mixes. As part of the ADVENT project, a national-scale spatially disaggregated integrated model has been developed to determine the least cost locations for multiple renewable technologies.

The implications of land use change on ecosystem services is included in the optimization to determine the socially optimal locations for energy infrastructure.

XFi conference room – Climate policy

Chair: David Maddison

Chi Man Yip

University of Calgary

On the Labor Market Adjustments of Environmental Taxes

I exploit British Columbia's carbon tax to study the labor market adjustments. Combining matching with a difference-in-differences approach, I find that carbon taxes could lead to recession-like labor markets. It increases job-separation rates and decreases job-finding rates, both of which are essential in explaining the unemployment effect. The effect is found temporary, easing the public concerns on permanent job losses created from environmental policies. Despite substantially increasing unemployment, the shock increases mainly the number of unemployment spells, not the duration of spells. This paper calls for careful attention to the transitional labor market consequences of environmental policies.

David Maddison, Matthew A. Cole, Liyun Zhang

University of Birmingham

Testing the Emission Reductions Claims of CDM Projects using Benford's Law

Benford's Law suggests that the first digits of numerical data are heavily skewed towards low numbers. Data that fail to conform to Benford's Law when conformity is to be expected may have been manipulated. Using Benford's Law we conduct digital frequency analysis on the emissions reductions claims of Clean Development Mechanism projects. Digital frequency analysis indicates that although emissions reductions claims made in project design documents do not conform to Benford's Law, data on certified emissions reductions do. Benford's Law offers a rapid, low-cost means of identifying possible instances of data manipulation.

Dabo Guan

University of East Anglia

Climate change and international trade

Parallel Session 2

Tuesday 25th June, 1015-1115

| Overview | |
|---|---------------------------------|
| Room | Speakers |
| Henderson lecture theatre <i>Using revealed preferences</i> <i>Chair: Roger von Haefen</i> | Amy Binner Roger von Haefen |
| Bateman lecture theatre <i>Experimenting with auctions</i> <i>Chair: Nick Hanley</i> | Andrew Reeson Nick Hanley |
| Matrix lecture theatre <i>Stated preference studies in practice (2)</i> <i>Chair: Keila Meginnis</i> | Sandra Notaro Keila Meginnis |
| XFi conference room <i>Spatially explicit valuation</i> <i>Chair: Ian Bateman</i> | Phil Platts Ian Bateman |

Henderson lecture theatre – Using revealed preferences

Chair: Roger von Haefen

Amy Binner

LEEP Institute, University of Exeter

How Property Markets Determine Welfare Outcomes: an Equilibrium Sorting Model Analysis of Local Environmental Interventions

Understanding the magnitude and distribution of welfare effects from projects that result in localised environmental change is of central importance in policy appraisal. We develop an equilibrium sorting model with endogenous tenure choice to explore how those welfare effects resolve in the medium-term as households respond by making new location and tenure decisions. Such processes result in significant reallocation of welfare across

socioeconomic groups and between renters and owners. We conclude that the partial measures of welfare change currently used for project appraisal provide highly misleading guidance as to the actual distributional impacts of projects that change local environmental quality.

Roger von Haefen, Eric English, Joseph Herriges, Frank Lupid, Kenneth McConnell

North Carolina State University

A Zonal Travel Cost Approach to Estimating Recreational Damages from the Deepwater Horizon Oil Spill

Leveraging one of the largest and most extensive on-site recreation data set ever collected, we develop and estimate a zonal travel cost, random utility model for coastal recreational activity in the four-state Gulf Coast region of Louisiana, Mississippi, Alabama and Florida. In particular, we use over 120,000 on-site counts to construct estimates of recreation trips to 53 coastal sites from the Louisiana/Texas border to the Florida Keys originating from over 31,000 zip codes in the contiguous US. We then merge these trip estimates with travel costs estimates for all zip code/site pairs and estimate a two-level repeated discrete choice, nested logit model. The estimated model is used to generate natural resource damage estimates for the 2010 Deepwater Horizon Oil Spill, the largest spill in the history of US waters. Interestingly, our per user day damage estimate matches the estimate generated from a separate off-site survey designed for damage assessment. This convergence suggests that our zonal travel cost model based on on-site counts represents a promising approach to economic valuation.

Bateman lecture theatre – *Experimenting with auctions*

Chair: Nick Hanley

Andrew Reeson, Todd Sanderson, Alexander Krumpholz, Philip Kilby
CSIRO, Australia

Testing Auction Mechanisms for Multi-attribute Carbon Markets

Auctions are an efficient means of allocating scarce resources; however, many environmental commodities provide multiple values, limiting fungibility and complicating auction design. For example, carbon sequestration projects

often bring co-benefits such as impacts on biodiversity or landscapes. We develop and experimentally test an auction mechanism which incorporates heterogeneous buyer preferences, facilitating price discovery across multiple attributes. Parallel auctions, in which buyers can make simultaneous bids for different types of carbon, increased the volume of carbon with co-benefits traded, particularly when conditional bidding was allowed. This shows how markets can incorporate multiple values without excessive transaction costs.

Nick Hanley, Simanti Banerjee, Tim Cason, Frans de Vries

University of Glasgow

Incentivising Spatial Coordination in Payment for Ecosystem Service Schemes

Our paper tackles the question of how best to encourage spatial coordination in PES schemes, when such coordination delivers an environmental benefit. We link two mechanisms which could achieve such coordination (an agglomeration bonus and spatially-connected auctions) with the idea of farmers bidding as a group or collective. Individuals can decide whether to bid by themselves or as part of a group. We compare single with multi-round bidding, and evaluate the effects of varying the size of bonus awarded for group bids, and whether neighbouring individual bids receive an agglomeration bonus-type payment.

Matrix lecture theatre – *Stated preference studies in practice (2)*

Chair: Keila Meginnis

Sandra Notaro, Gianluca Grilli

University of Trento

Does Emotion Affect Preferences and Willingness to Pay for the Management and Conservation of Large Carnivores? Evidence from a Discrete Choice Experiment

In the behavioural literature, there is evidence that emotions affect the individual decision-making process. Humans often make irrational decisions, particularly in highly emotional issues such as those concerning human-wildlife interactions. We tested whether emotions had an influence on

preferences and WTP for large carnivores' conservation elicited with a Discrete Choice Experiment. The significant effect of emotions identified suggests that in some cases there is a legitimate concern about context-dependence of preferences. If DCE results are influenced by respondents' emotions, the estimation of environmental benefits might be biased. This is an important issue because reliable DCE results are required to be used in management and decision making, to make environmental decisions that satisfactorily represent public goals and preferences.

Keila Meginnis, Nicholas Hanley, Lucy Pickering, Lazaaro Mujumbusi, Poppy Lamberton

University of Glasgow

Varying the Payment Vehicle in Choice Experiments: Using Non-monetary vs. Monetary Payments in Limited Income Countries

We administer a discrete choice experiment to respondents in rural Uganda. We elicit respondent's willingness to pay versus willingness to work for improved water access and health education in rural Uganda. We find that respondents are willing to work and pay for interventions. However, they are willing to work at rates that exceed the market wage rate, suggesting preference for labour over money payments. The fact that communities have more disposable time than money and are willing to work for new and improved interventions that reduce their risky behaviours, should be utilised in policy recommendations.

XFi conference room – *Spatially explicit valuation*

Chair: Ian Bateman

Marije Schaafsma, Phil Platts, Andrew Balmford

University of York

Unequal Social Welfare Gains from Conservation in a Global Biodiversity Hotspot

We report on the most data-rich and methodologically-detailed account of the costs and benefits of conservation undertaken anywhere in the developing world, addressing three major challenges of ecosystem service

science: accounting for complex interactions among multiple services; including opportunity costs of alternative management regimes; and understanding how welfare gains flow to different sections of society. By simultaneously dealing with each of these through a decade-long study in Tanzania's Eastern Arc Mountains, we uncover net conservation outcomes for different stakeholder groups, under a range of carbon prices and discount rates, and quantify how far these align with priorities for safeguarding biodiversity.

Ian Bateman, Brett Day, Amy Binner, Bridget Emmett, Carlo Fezzi, Silvia Ferrini, Amii Harwood, Jonathan Hillier, Mark Hulme, Andrew Lovett, Robert Matthews, Nathan Owen, Gavin Siriwardena, Greg Smith, Pete Smith, Pat Snowdon, Sylvia Vetter, Shailaja Vinjili
LEEP Institute, University of Exeter

How to Make Decisions: Contrasting Market, Expert Scenario and Natural Capital Approaches to Land Use Policy

How we make decisions affects the decisions we make. To reveal the impact which different approaches can have upon decisions, we consider a single, policy-relevant land use question concerning where to plant new forests. We answer this question using the three most commonly applied approaches to land use policy making: (i) allocation of subsidies using markets which in turn determines land use change; (ii) determining future land use using expert/stakeholder derived scenarios; and (iii) targeting land use change using the natural capital approach (which we define as part of the paper but summarise here as the incorporation of environmental science information within economic analyses). Results reveal very sharp differences in the outcomes arising from the alternative approaches which provide clear guidance for future decision making.

Parallel Session 3
 Tuesday 25th June, 1145-1315

| Overview | |
|--|--|
| Room | Speakers |
| Henderson lecture theatre <i>Stated preference studies in practice (3)</i> <i>Chair: Richard Carson</i> | Ewa Zawojcka Wiktor Budziński Richard Carson |
| Bateman lecture theatre <i>Changing behaviour</i> <i>Chair: Emma Garnett</i> | Valeria Fanghella Cristobal Ruiz-Tagle Emma Garnett |
| Matrix lecture theatre <i>Conserving tropical habitats</i> <i>Chair: Sumeet Gulati</i> | Eleanor Warren-Thomas Sabrina Eisenbarth Sumeet Gulati |
| XFi conference room <i>Understanding outcomes</i> <i>Chair: Céline Nauges</i> | Nikolai Cook Ann-Kathrin Koessler Céline Nauges |

Henderson lecture theatre – Stated preference studies in practice (3)

Chair: Richard Carson

Ewa Zawojcka, Wiktor Budziński, Mikołaj Czajkowski

University of Warsaw

Endogeneity of Self-reported Consequentiality in Stated Preference Studies

Stated preference surveys elicit respondents' perceptions about the survey consequentiality to enhance validity of welfare estimates. One of the main challenges with including self-reported consequentiality in preference modelling is potential endogeneity. Endogeneity can arise because consequentiality responses and stated preferences are likely driven by similar (unobservable) factors. We present and apply an econometric framework, based on an augmented hybrid choice model, that allows for controlling this endogeneity. The model performance is demonstrated with the use of empirical data from large-scale discrete choice experiment studies. To the best of our knowledge, this is the first application of such an econometric approach.

Wiktor Budziński

University of Warsaw

Misspecification of Preference Heterogeneity Structure in Hybrid Choice Models

We conduct several Monte Carlo simulations to identify the consequences of misspecification of preference heterogeneity in hybrid choice models. We focus on both, observed and unobserved heterogeneity. We analyze whether the dependence between welfare measures and latent factors may be wrongly identified when the preference heterogeneity is incorrectly specified. We also investigate whether this misspecification affects mean/median willingness to pay. We find that ignoring unobserved heterogeneity significantly impinge on welfare measures, whereas misspecification of observed heterogeneity does not affect mean/median willingness to pay much, but can still lead to biased estimates of the dependence between welfare measures and latent factors.

Richard Carson

University of California, San Diego

The NOAA Panel's Scope Test Under Consistent Conditions DDT and PCB Contamination Off the Coast of Los Angeles

The NOAA Panel on Contingent Valuation (CV) provided a set of guidelines for CV studies aimed at ensuring reliable results. Most attention from economists focused on the "scope" test. Since then our understanding of scope test related issues has substantially increased. We report on a large-scale CV study involving DDT contamination off the coast of Los Angeles designed to take account of natural linkages in the coastal ecosystem. It controls for potentially confounding conditions to obtain a consistent estimate of the null hypothesis of scope insensitivity. This hypothesis is decisively rejected, suggesting scope insensitivity is a property of individual studies and not CV as a method.

Bateman lecture theatre – Changing behaviour

Chair: Emma Garnett

Valeria Fanghella, Matteo Ploner, Massimo Tavoni

University of Trento

Nudges and Traditional Policies: Experimental Evidence About Substitution Effects in Energy Consumption

Though nudges are gaining attention as complements to traditional energy policies, knowledge on the interplay between these two policy instruments is still lacking. With this work, we argue that not all behavioural traditional mixes are equally effective at promoting sustainable energy consumption, and we test one of these combinations through an online experiment.

Interestingly, we find that combining the two approaches results in a lower effect than the traditional instrument alone. We interpret this result in light of information overload notion: by increasing the amount of information provided, the nudge diverts participants' attention from the traditional policy and reduces its impact.

Cristobal Ruiz-Tagle, Alejandra Schueftan

Environmental Defense Fund, Washington DC, USA

Reducing Air Pollution through Behavioural Change of Wood-Stove Users: Evidence from an RCT in Valdivia, Chile

Ambient air pollution from burning biomass is a serious problem in the developing world. South-central Chile suffers from extremely high particulate pollution from residential wood-stoves usage. Users constrain the air inflow of their wood-stoves to extend burning time and save on wood-fuel expenditures, thus creating a highly polluting combustion process. We designed a behavioural intervention that – by means of a metallic sign that aligns with the wood-stoves' damper lever – provides feedback on their emissions. Results from an RCT show that this information sign induced a behavioural change in wood-stoves' users that translates in a 17.3 percent reduction in pollution emissions.

Emma Garnett, Andrew Balmford, Chris Sandbrook, Mark Pilling, Theresa Marteau

University of Cambridge

Let them Eat Plants: How Can Cafeterias Increase Vegetarian Sales and Reduce Meat Consumption?

Reducing meat consumption in rich countries would mitigate climate change but very few studies have long-term data on which strategies are most effective at changing eating patterns. Using data on over 200,000 main meals purchased in four Cambridge University college cafeterias we tested different approaches to increasing vegetarian sales. Doubling vegetarian availability (from 1 in 4 options to 2 in 4) increased vegetarian sales from 41 to 78%. Placing the vegetarian option (rather than the meat) first had no impact on vegetarian sales in one cafeteria (A), but in another (B) increased vegetarian sales by 25%.

Matrix lecture theatre – *Conserving tropical habitats*

Chair: Sumeet Gulati

Eleanor Warren-Thomas, David P. Edwards, Daniel P. Bebber, Phourin Chhang, Alex N. Diment, Tom D. Evans, Frances H. Lambrick, James F. Maxwell, Menghor Nut, Hannah J. O’Kelly, Ida Theilade, Paul M. Dolman
University of York

Protecting Tropical Forests from the Rapid Expansion of Rubber Using Carbon Payments

Forest conversion to *Hevea brasiliensis* rubber plantations in Southeast Asia causes carbon emissions and biodiversity loss. Carbon finance schemes (e.g. REDD+) could dis-incentivise this process, but only if payments match, or approach, the costs of avoided deforestation. Using a cost-benefit analysis approach, I calculate the breakeven carbon prices needed to protect forest from rubber in Cambodia, under various scenarios. Carbon prices are currently too low to incentivise forest protection: carbon markets and funds pay only \$5-13 per tCO₂, but \$30–\$51 per tCO₂ is needed to break even against costs (lower than the estimated social cost of carbon at \$36 per tCO₂).

Sabrina Eisenbarth, Louis Graham, Anouk S. Rigterink

LEEP Institute, University of Exeter

Can Communal Resource Monitoring Save the Commons? Evidence from Community-managed Forests in Uganda

This study uses a Randomized Controlled Trial to investigate whether deforestation and forest degradation in community-managed forests can be reduced through systematic forest monitoring by community members. The paper combines causal insights with exceptionally detailed data on forest governance, forest use and forest stocks to improve our understanding of successful approaches to management of communal renewable resources. Preliminary results do not suggest that forest monitoring by community members significantly reduced deforestation.

Sumeet Gulati, Krithi Karanth, Nguyet Anh Le, Frederik Noack

The University of British Columbia

The Direct Costs of Living Near Wildlife Reserves in India

In this paper we estimate the cost borne by a farm household on experiencing conflict with a wildlife. This includes a loss of crop, of livestock, and human injury and death. We estimate these costs using data collected by randomly surveying farm households living within a 10 KM buffer around 11 wildlife reserves in India. These reserves include some of the most iconic in India, containing approximately a fourth of all tigers found in India, and a third of its populations of elephants. Our estimates differentiate the cost of conflict by species, and park. Many states in India administer compensation for wildlife damage, however, the limits that govern these payments are not based on empirical evidence, but on guesswork. These estimates can help governments allocate budgets, and create fair limits for compensation from wildlife conflict. They could also be used to inform and implement future non-distortionary conservation policy, such as payments for ecosystem services, or payments for living in the proximity of wildlife.

XFi conference room – *Understanding outcomes*

Chair: Céline Nauges

Nikolai Cook, Anthony Heyes

University of Ottawa

Brain Freeze: Outdoor Cold and Indoor Cognitive Productivity

We present evidence that outdoor cold temperatures negatively impact indoor cognitive performance, using a within-subject design and a large-scale dataset of adults performing in an incentivized setting. The performance decrement is large and sustains despite the subjects working in a fully climate-controlled environment. Secondary data allows us to explore adaptation at organizational, individual and biological levels, finding evidence for partial efficacy at each. The results are interpreted in the context of climate models that predict an increase in the frequency of very cold days in some locations and a decrease in others.

Ann-Kathrin Koessler, Juan Felipe Ortiz-Riomalo, Mathias Janke, and Stefanie Engel

Osnabrück University

Structuring the Talk - Elements of Effective Communication

A robust finding in social dilemma research is that communication increases cooperation. Yet, the knowledge of what type of information needs to be shared to ensure the beneficial effect is still vague. Based on the findings and protocols of previous studies, we identified four cooperation-enhancing elements of communication: (i) problem awareness, (ii) definition of strategies, (iii) coordination and (iv) ratification. In a laboratory experiment, we designed interventions resembling these components and contrast the resulting contributions with the outcomes when only unstructured or no communication was available. The results provide insights into the specific type of information that, when shared, facilitates cooperation. In practice, for example, the findings are of interest for the design of participatory processes which are regularly used (e.g. in natural resource management) to promote collaboration among stakeholders.

Céline Nauges, Christophe Bontemps, Douadia Bougherara

Toulouse School of Economics

Do Risk Preferences Really Matter? The Case of Input Use in Agriculture

Farmers' main reasons for using pesticides are, first, to increase the expected value of crop yields and, second, to insure against the risk of production variability. Using simulated data, we show that, under fairly representative conditions on the technology and risk preferences, the increase in expected yield is the primary driver of pesticide use. For moderate to high risk-averse farmers, only 5 to 15% of the optimal input use is devoted to risk management. This calls for a tax on pesticide to be preferred to insurance premium subsidisation if the aim is to incentivise farmers to reduce pesticide use.

The programme of events is subject to change and in the event that changes are made, these will be communicated on the day.

Posters

(Exhibited in the XFi Atrium)

Posters will be on display throughout the conference in the XFi Atrium and we encourage you to read these during the coffee and lunch breaks. Owing to space constraints, only the presenting author and title are listed here.

Abraha Megos: *Not My Cup of Coffee: Farmers' Preferences for Coffee Variety Traits - Lessons for Crop Breeding in the Age of Climate Change*

Alex Dubgaard: *Using a Spatial MCDA Modal to Identify Sustainable Land Use Alternatives in Denmark*

Alicia Egenes: *How Much is Marine Wildlife Worth? Estimating Preferences of Tourists for Marine Conservation and Tourism Infrastructure in Costa Rica.*

Anders Dugstad: *Can Experts Predict Households' Willingness-to-Pay to Preserve the Amazon Rainforest? Comparing Contingent Valuation, Expert Assessment and Benefit Transfer*

Anya Doherty: *Reducing Environmental Impacts in Cafeterias*

Assia Khenoussi: *Discrete Choice Experiment Models to Analyse the Farmers' Willingness to Accept Soybean Crops in French Centre Region*

Bart Immerzeel: *Valuing and comparing ecosystem service delivery by Nordic river catchments using a discrete choice experiment*

Berit Hasler: *Spatial optimisation of Nitrogen abatement to achieve multiple water quality targets*

Camilla Knudsen: *Do Non-monetary Prices Reduce Hypothetical Bias? A Field Experiment Concerning Fortified Flour in Kenya*

Chandra Sekhar Bahinipati: *Do Resource Efficient Technologies Resolve India's Groundwater Crisis? Evidences from Western India.*

Carlo Fezzi: *The Impact of the EU ETS on CO2 Emissions: A Counterfactual Approach*

Chiara Antonelli: *Crop and Income Diversity as Adaptation Strategies to Cope with Climatic Shocks: Insights from Uganda Panel Data*

Chris Ruebeck: *Effects of Social and Behavioral Norms on Water Quality Trading Participation*

Eleanya Nduka: *Energy Poverty Among Rural Households in Nigeria: What Can be Done?*

Ellen Cunningham: *Wood (2018) Final report to the JNCC: An assessment of the value of natural capital in the protective service against coastal and inland flooding in the UK Overseas Territory of the British Virgin Islands.*

Ganga Shreedhar: *The Effect of Framing Benefits in Terms of Personal or Planetary Wellbeing on Vegetarian Food Preferences*

Georgios Diakoulakis: *Designing Incentives for Promoting Environmental-Friendly Practices: The Role of Ethical Commitment in Organic Farming*

Hendrik Bruns: *Are Vulnerable People More Susceptible to Nudges? An Experiment on the Interaction of Cognitive Scarcity and Defaults in a Public Goods Game*

Ilda Dreoni: *Preferences for Fair Distributions in Resource Management: Are Distributive Justice Concerns Reflected in Values for Forest Ecosystem Services*

Imogen Cripps: *Do Supermarkets have Beef With Lentils? Comparing the Environmental and Monetary Cost of Protein-rich Foods*

Katarzyna Zagórska: *Drivers of Farmers' Willingness to Adopt Extensive Farming Practices in Ecologically Valuable River Valleys – The Case of Biebrza Marshes*

Leonie Ratzke: *Is Bigger Always Better? An Assessment of Cultural Ecosystem Services of Urban Greenspaces in Hamburg*

Lígia Costa Pinto: *Modelling welfare impact of coastal erosion: an application of GMNL with preference heterogeneity*

Lydia Collas: *The Effects of Farmer Attitudes on the Scope for Sharing and Sparing to Deliver Conservation Benefits*

Malte Welling: *Eliciting Consequentiality in Stated Preference Surveys: An Application to Urban Green*

Menuka Udugama: *Understanding Animal Movement Patterns: Implications for Spatial Patterns of Land Management*

Mike Brock: *The Can Challenge: Exploring the Best Way to Economically Incentivise Recycling*

Muniyanidi Balasubramanian: *Economic Valuation of Ecosystem Services: A Case Study on Bhimgad Wildlife Sanctuary in India*

Nicholas Tyack: *Estimating non-market values of fruit tree diversity in the Czech Republic*

Oscar Melo: *International Benefit Transfer Performance in a Developing Country: Water Quality of Lake Villarrica*

Paul Lehmann: *Trade-offs Associated with the Spatial Allocation of Onshore Wind Generation Capacity – A Case Study for Germany*

Ricardo Daziano: *Information Framing and Willingness to Pay for Emission Reductions in New Vehicle Purchases*

Sara Kaffashi Larkin: *Forecasting Mode Choice Behaviour of Car Commuters in Klang Valley, Malaysia*

Shiva Sikdar: *Trade and Collusion: Environmental and Welfare Implications*

Tomas Badura: *Using individualised choice maps to capture the spatial dimensions of value within choice experiments*

Key Information

Contact details for the duration of the conference:

LEEP@exeter.ac.uk

+44 (0)1392 725933

Arrival:

Please report to the Registration Desk, which will be setup in the XFi Atrium, to collect your name badge and goody bag. For those who are presenting a poster, please hand this to a member of staff at the Registration Desk and we will ensure that it is displayed in advance of the first coffee break.

Luggage:

In the event that you need to bring any luggage into the conference venue we are able to store this onsite, but please be advised that items are left at your own risk and the University is unable to accept any liability in the event of any damage/loss.

Accommodation:

For those who have pre-registered for accommodation, this will be located on campus at the below address:

Holland Hall, Clydesdale Road, University of Exeter, Exeter, EX4 4SA

Tel: +44 (0)1392 722330

Please note if using a Sat Nav device then enter the postcode EX4 4QR to lead you to the Streatham Campus and then follow the campus signage to Holland Hall / Mardon Hall.

For further information and directions visit:

<https://www.exeter.ac.uk/eventexeter/accommodation/>

Bookings include a cafeteria-style **breakfast served between 07.30– 09.00**

On the day of arrival, please make your way to the Reception within the building. **Keys can be collected between 15.00 and 23.00.** Reception is open until 23.00. If you are due to arrive after this time, please let us know by contacting LEEP@exeter.ac.uk and upon arrival, you will need to call Estate

Patrol on +44 (0)1392 723999 who will then be able to let you into your room.

On the day of departure, **all rooms must be vacated by 10.00** and all keys returned to reception.

Please note all bedrooms at Holland Hall are **non-smoking**.

Parking:

Please note that we are unable to provide parking on campus.

Travel:

We recommend that you travel via public transport where possible. The nearest train station, Exeter St. David's, is a short walk from the University and a taxi service is available, which operates throughout Exeter.

Exeter Airport is a short drive from the University and a taxi service is available.

Apple Taxis

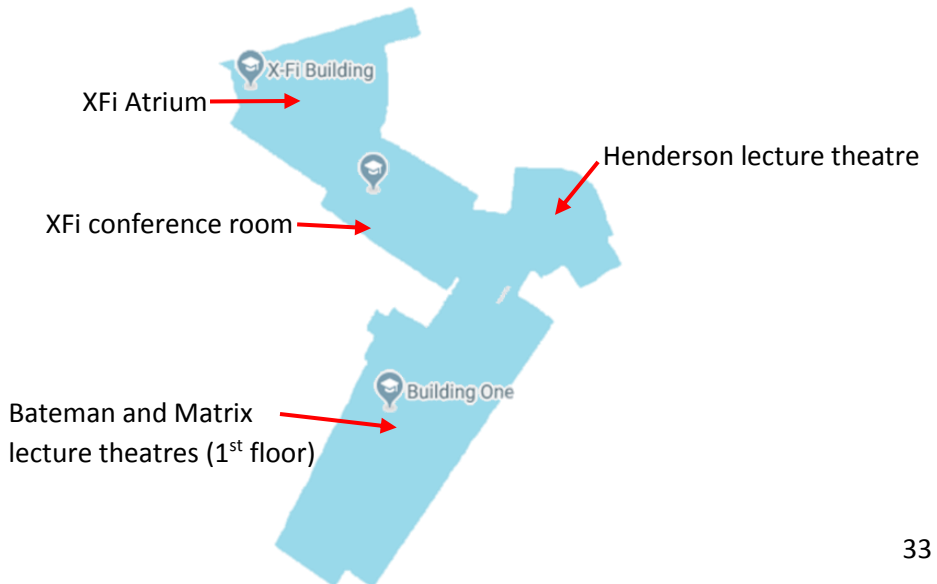
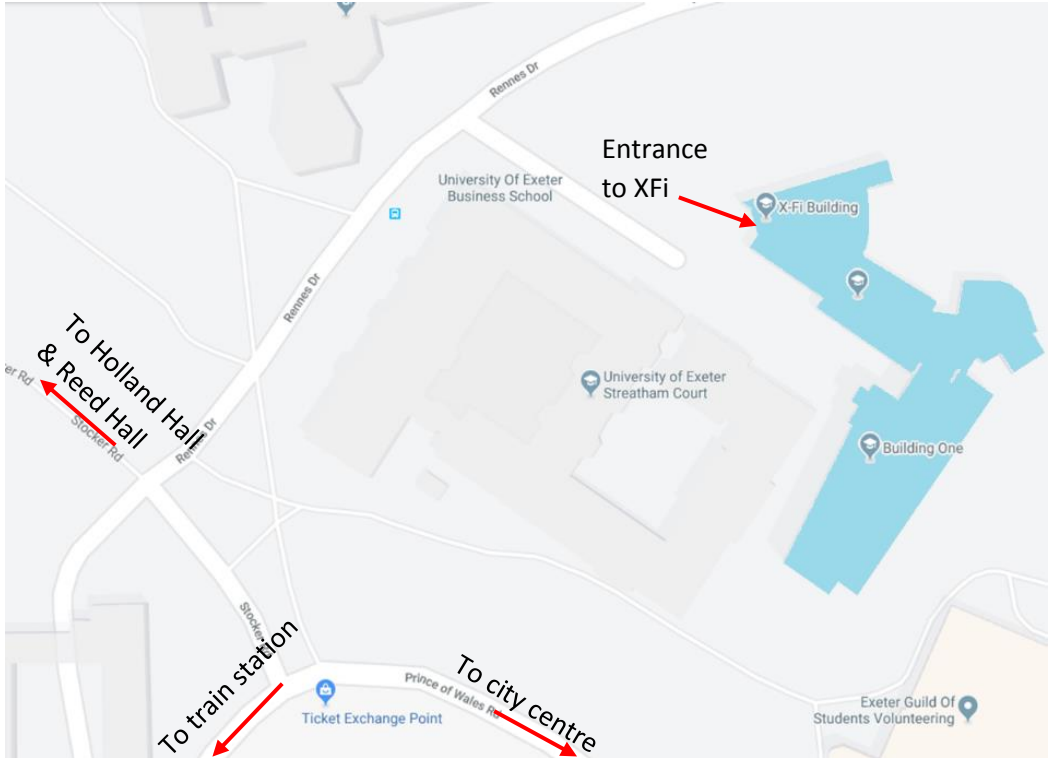
(available at Exeter St. David's station and Exeter Airport)

+44 (0) 1392 666666

Photography:

Please be aware that a photographer will be in attendance at the event. Images may be used by the University of Exeter on their website, social media accounts or in printed materials. If you would prefer not have your image published, please let us know by contacting LEEP@exeter.ac.uk

Map



Thank you!

We are particularly grateful to the fantastic speakers who so willingly participated in the conference, often at considerable personal cost – thank you! We set out to invite the best speakers in the world and they all said yes! We are very grateful to you.

A very warm thank you to everyone that has attended – thank you for your support and we hope that you have had a thoroughly enjoyable experience.

The conference could not have happened without tremendous support from our funders. We asked and they provided (and when asked provided again!) – this was extremely generous – thank you!

Finally, LEEPIn2019 could not have happened without a lot of work from a very large and enthusiastic group of people, including the LEEP team and colleagues within the Business School and wider University teams. You are all superstars. In particular we are deeply grateful to Emily Morris for going very much above and beyond! Without Emily's organisation, planning, and tireless work over the last eight months there simply would have been no conference.

Warmest wishes and we hope to see you all again.



Ben Balmford
LEEPIn2019 Organiser



Ian Bateman
LEEPIn2019 Organiser

LEEPin2019 is extremely grateful to our sponsors:

Professor Janice Kay CBE, Provost - University of Exeter

The BID Cluster, University of Exeter Business School



This conference was organised with the support of **EAERE**



Take the LEEP – Join us!

We are looking to expand our LEEP Institute and want to hire world class academics to help drive and shape the future of the Institute, as well as the Economics Department. We are recruiting for Senior Lecturers, Associate Professors and Full Professors.

The Land, Environment, Economics and Policy Institute (LEEP) aims to develop knowledge and understanding to inform governments, businesses and communities about how natural capital and the environment are managed and used; how policy should be better designed, appraised and evaluated; and consequent impact upon the environment, the economy and people.

The Institute builds upon an established and internationally acclaimed track record of research excellence which has attracted millions of pounds of funding. Together with its international research partners, LEEP unites research leaders and experts from the diversity of economic and natural sciences needed to provide an integrated understanding of the ways in which these complex systems interact.

The incoming academics will contribute to extending the research, learning and teaching, and public profile of the LEEP Institute and the Economics Department, particularly in areas related or complementary to existing work on the application of economic analysis to policy and/or business activity that affects the natural environment and associated applied economics.

These appointments will be for Research and Teaching posts.

For further information, please visit the University of Exeter website or contact us via email - LEEP@exeter.ac.uk

We look forward to hearing from you.