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Talk and Speed Talk Abstracts

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James Arrigoni

State University of New York, Syracuse, NY, USA

Conservation value of constructed vernal pool wetlands

Conservation problem or question: Seasonally inundated freshwater wetlands of northeastern USA, commonly called vernal pools, are increasingly recognized as unique habitats that support several poorly known and imperiled species. Construction of vernal pools has been proposed to compensate for historic and contemporary losses, but the extent to which constructed pools can reliably achieve the habitat values of naturally occurring pools remains inconclusive and controversial.

Research methods: Using an array of 71 vernal pools constructed at the SUNY-ESF Heiberg Research Forest in central New York, I am comparing amphibian production and macroinvertebrate taxa richness with that of nearby existing vernal pools. I am assessing specific construction methods at the pool-level (e.g., basin dimensions, organic matter amendments) and landscape-level (e.g., pool cluster density, distance from nearest wetland).

Relevance to conservation: If shown to be effective at replicating the habitat values of naturally occurring vernal pools, constructed vernal pools offer the potential to reverse the extensive historic losses of this unique wetland type.

Conservationists seeking to reverse declines to species that depend on or benefit from vernal pools will have an additional means by which to actively improve critical habitats.

Jessica Blickley

University of California Davis, Davis, CA, USA

Impacts of Energy Development Noise on Lekking Sage-Grouse

Conservation problem or question: Human development has caused dramatic increases in noise across the landscape, but the consequences for wildlife are unknown. We investigated the impacts of energy development noise on greater sage-grouse (*Centrocercus urophasianus*), a species of management concern across western North America. Sagegrouse are declining in areas of energy development and circumstantial evidence suggests that noise is a contributing to these declines.

Research methods: To test the hypothesis that noise is contributing to sage-grouse declines, we conducted a playback experiment in a wild population. We monitored sagegrouse attendance at control leks and leks with experimentally-introduced energy development noise for three seasons. Introduced drilling and road noise resulted in immediate, sustained declines on experimental leks relative to control leks.

Relevance to conservation: The results suggest that sage-grouse avoid noisy lek sites and that noise mitigation efforts could reduce the impact of energy development on sensitive populations. This is the first long-term playback experiment investigating the chronic impacts of noise on any wild population, offering an opportunity to experimentally address noise impacts on avian behavior while informing conservation efforts for this species.

Steven Brady

Yale University, New Haven, CT, USA

Consequences of Roads and Runoff on Wetland Amphibians

Conservation problem or question: Road presence and maintenance contribute a suite of ecological effects that negatively impact adjacent aquatic habitat. Runoff can dramatically alter chemical characteristics of ephemeral pools, posing population level consequences for the species relying on these habitats. Yet, our understanding of this phenomenon is nascent, and hampered by a body of literature that ignores variation at the local population level.

Research methods: I conducted field transplant and laboratory exposure experiments to investigate the effects of road proximity and road salt, respectively, on the performance of embryos and larvae of two wetland amphibian species: the wood frog (*Rana sylvatica*) and spotted salamander (*Ambystoma maculatum*). I evaluated growth, development, and survival for each of ten local populations (five road-adjacent and five road-distal).

Relevance to conservation: I found that proximity and exposure consequences are substantial, and most severe for road-adjacent amphibian populations. While the ultimate fate of road-adjacent communities remains unknown, my research indicates that such populations inherit increased susceptibility and endure more severe effects than woodland counterparts. The ever-growing road network demands that long-term understanding of this phenomenon becomes a conservation imperative.



Brooke Cowley

University of Toronto, Toronto, Ontario, Canada

Mass Extinction, Habitat Loss, and Lemur Persistence

Conservation problem or question: Lemurs are an ecologically-crucial part of Madagascar's faunal diversity. In the last 2000 years, at least 17 species have become extinct and the future of the remaining taxa is uncertain. Competitive release may have allowed extant taxa to fill niches vacated by extinct species. Alternatively, surviving lemurs may have shifted to new niches in response to anthropogenic or climate impacts.

Research methods: I use stable carbon and nitrogen isotope ratios in lemur bone to identify habitat and dietary preferences of extinct and extant lemurs, and to examine shifts in the isotopic niches of extant species through time. I compare the modern isotopic niches of three extant species in southwestern Madagascar to those before and after the decline of the extinct species.

Relevance to conservation: The majority of reserves dedicated lemur conservation in southwestern Madagascar are riparian habitat, yet growing evidence suggests that lemurs living in riparian reserves experience health problems. My results indicate that lemurs used to frequent arid habitats such as dry forest and spiny scrub. These arid habitats are underprotected, and what little remains is disturbed and severely fragmented.

Leo Douglas

American Museum of Natural History, New York, NY, USA

Flagship Species and the Conservation Value of their Congeners

Conservation problem or question: Flagship species are important parts conservation efforts that involve engaging public support for species and habitat protection, and for fund-raising. This paper will discuss whether the use of conservation flagship species can negatively influence the willingness of stakeholders to conserve other species within an ecosystem.

Research methods: I triangulate three social science research methods: (1) two semistructured questionnaires; (2) a quantitative content analysis of 31 years of the island's longest running newspaper; (3) and visual photographic data to understand what meaning, knowledge, and relative value the stakeholders of parrot conservation on the island hold towards two globally threatened endemic parrot species within the genus *Amazona*.

Relevance to conservation: The study illuminates the power of successfully developing species as iconic conservation flagships. It also appears to highlight a potential pitfall and unexpected product of the use of flagship species. Specifically, it suggests that the development of a successful flagship may marginalize other species, and that this may be particularly important when human-wildlife conflicts are involved.

Stephanie Eby

Syracuse University, Syracuse, NY, USA

Fire as a Management Tool: Impacts on Mammalian Herbivores

Conservation problem or question: Fire is used extensively as a management tool in protected African ecosystems, making it ideally suited to be utilized as a tool for conservation, but also meaning that understanding its influence on ecosystem processes is imperative. This talk discusses the short and long term impacts that fire has on mammalian herbivores through changes to vegetation characteristics and predator hunting success.

Research methods: Herbivore species were counted twice a month for a year on fourteen paired, burned on one side unburned on the other, road transects in Serengeti National Park, Tanzania. Species distributions were compared to vegetation height, leaf nutrients, and biomass to determine which factor best explained the observed patterns. Additionally, lion distributions in relation to burned and unburned areas were determined.

Relevance to conservation: The results from this study may allow managers throughout protected areas in Africa, and possibly the world, make more informed decisions about their fire management plans. While smaller sized herbivores are attracted to burned areas and gain benefits through increased leaf nutrients and decreased predation, these benefits only last six months. Conversely, frequent burning leads to reductions in leaf nutrients.

Ian Edwards

University of Oregon, Eugene, OR, USA

Negotiated Wildlife in Mali, West Africa

Conservation problem or question: My research focuses on the commodification of wildlife in two markets in Mali: one for tourist goods, and another for traditional medicine. I explore the social networks, cultural practices and values surrounding



wildlife use in each market. Actors in both markets negotiate a myriad of values as well as mediate political and economic pressures by selling wildlife for profit.

Research methods: “Thick” ethnographic and qualitative data, gathered through participant observation and interviews, were organized around local practices, the roles and positions of key actors within a given market, and their relationship with others. Spot surveys provided quantifiable data on 493 wild species sold in the two markets, recording their representative form and function as well as their economic value.

Relevance to conservation: Investigating the social networks, practices and values surrounding wildlife commodification lends insight into human agency, rural-urban, and local-global processes. Exploring these networks and interactions allows for a better conceptualization of a unique and highly dynamic wildlife extraction regime where wildlife is brokered to serve both local and global desires. Only by understanding such practices can appropriate conservation policy be developed.

Daniel Evans

University of Washington, Seattle, WA, USA

The Utility of Conservation Corridors for Seed Dispersal

Conservation problem or question: In fragmented landscapes, plant population persistence can depend upon long distance seed dispersal between habitat patches. Habitat corridors have been shown to promote long distance seed dispersal by birds, but this “corridor effect” may vary seasonally with changes in bird behavior. I test the hypothesis that corridors increase seed dispersal by birds during winter but not during summer.

Research methods: I conducted this study in six 54-hectare experimentally fragmented forest landscapes. Each has one central habitat patch and four equidistant peripheral patches, with one peripheral patch connected to the central patch by a corridor. During summer and winter of 2009, I installed fruiting *Solanum americanum* plants in each central patch and seed traps on bird perch poles in every patch.

Relevance to conservation: Corridors increased seed dispersal by birds during winter but not during summer (likelihood ratio test, $p < 0.01$). Establishing observation corridors is a widespread strategy for mitigating against fragmentation. The utility of corridors for promoting long distance seed dispersal and increasing plant population persistence may be determined largely by plant reproductive timing and seasonal bird behavior.

Victor Manuel Frankel

Mcgill University, Montreal, Quebec, Canada

Invasive Snails Bring Parasites to the Panama Canal

Conservation problem or question: Invasive species are imminent threats to global biodiversity because of their ability to out-compete native species and transmit parasites and pathogens to novel ranges. Understanding the factors that underpin the establishment of invasive species, especially those that are vectors for disease transmission, is critical for efforts working to prevent or manage the introduction of invasive species and parasitic diseases.

Research methods: As mechanisms underlying the demographic success of exotic species are not necessarily mutually exclusive, integrating invasion mechanisms may help to better understand the complexity of biological invasions. Using field surveys, laboratory experiments and genetic analysis, I explore ecological and evolutionary interactions that facilitate the spread of invasive species and the parasites they transmit in the Panama Canal.

Relevance to conservation: An invasive snail, *Melanooides tuberculata*, is an intermediate host for parasitic diseases that are pertinent to public health and conservation. My results identify interactions of this snail and one of its parasites, *Centrocestus formosanus*, with other invasive species in the Panama Canal and elucidate ecological and evolutionary factors that facilitate the transmission of parasitic diseases by this invasive snail.

Andrés Gómez

American Museum of Natural History, New York, NY, USA

Health, Environment, and Biodiversity: Conservation Implications of a Complex Relationship

Although the biomedical sciences have long had a part in conservation practice (e.g., providing medical care to captive populations), for roughly a decade more integrated approaches linking health, disease, and conservation have become increasingly relevant. These approaches are helping us understand the role of wildlife species in the transmission of emerging pathogens, the effects of disease on conservation efforts, and the importance of land use change in an increasingly epidemiologically-homogenized world. But as we gain a more detailed understanding of biodiversity, other connections become apparent. For example, recent research has begun to uncover the numerical and functional importance of parasite



biodiversity—which creates the need to develop innovative strategies for its conservation— and parasite species are providing tools to acquire critical information with which to inform conservation strategies for their hosts. This kind of integrative, systemic understanding of biodiversity shows significant promise in the development of new multidisciplinary conservation strategies.

Carolina Gomez-Posada

University of Washington, Sammamish, WA, USA

Howler Monkey in Forest Fragments in Colombian Coffee Region

Conservation problem or question: I evaluated how howler populations respond to loss and fragmentation of habitat in Colombian coffee region (with high human density settlements and agricultural production) with the goal to influence measures to prevent further losses. I determined population status, troop size and composition, examined responses to biogeographical variables and anthropogenic vegetation, and explored opportunities for conservation in private lands using agroecosystems.

Research methods: In both private and protected remnants, howlers density and abundance were estimated using censuses by linear transects or, if in small fragments, individual direct counts. I determined troop size and composition through direct observations of howler groups, vegetation variables using plots (50m x 4m), and biogeography variables using remote sensors. I interviewed forest owners to analyze agroecosystem as conservation opportunities.

Relevance to conservation: Howlers have been able to survive in this fragmented landscape, but their populations may be highly vulnerable, especially in small, elongated and isolated forest. The results were used to develop, with local people participation, the conservation strategy for howlers in that region, focused in explore management options that would allow the landowners to use their land without affecting the monkeys.

James Gibbs

State University of New York, Syracuse, NY, USA

Staying Relevant as a Conservation Biologist

Conservation biology is the applied science of maintaining Earth's biological diversity. Being effective as a conservation biologist thus means not just being good at the science part but also being able to apply that knowledge. It also means having an experiential familiarity with the diverse life forms that we study. The good news is that our science is stellar these days, with ever improving techniques of analysis and vast and growing datasets at our disposal. But here's the rub: virtually no "managers" read science journals anymore and most primary literature is an impenetrable thicket of statistics and bad writing. How do we actually connect our science with that mythical "manager" that we all mention in our published articles and theses, so that we can see our hard-earned knowledge put into practice? One solution is recognizing that our highly competitive, publication-crazy and credit-craven field is a culture at odds with that in which most conservation solutions are achieved: solutions come from basic team-work, coalitions, communication, and the generous sharing of time, resources, and innovative ideas. We also need to recognize that nature deficit disorder doesn't only apply to children but to us as well... busy juggling electronic communications we rarely venture outdoors anymore. Most "managers" put a premium on credibility as emblemized by deep personal knowledge of and attachment to the species and ecosystems of concern, yet many conservation scientists are now so beholden to abstract representations of nature that they do not know basic natural history. Biodiversity is a real phenomenon studded with both warts and gems and elaborated across space and time in complicated ways inconvenient to us. Tremendous synergies arise from working as scientist, mentor, teacher, advisor, and advocate and developing the practical skills and fortitude to go out and meet biodiversity on its own terms. My presentation will focus on sharing a series of case studies from my own work as a conservation scientist struggling to remain relevant.

Martha Groom

University of Washington, Bothell, WA, USA; University of Washington, Seattle, WA, USA

Toward Conservation Solutions: Enhancing Interdisciplinary Partnerships

How do we best create solutions to our myriad conservation problems? Increasingly, interdisciplinary partnerships play a central role in creating conservation solutions on the ground, yet the bulk of our training in conservation still focuses on biological issues alone. I feel we need to make conservation far more compelling to a far broader array of people. Our focus on biodiversity crises overwhelms, and we need to shift attention to the opportunities in solution formation. Building productive partnerships comes through exploring the connections and tensions between biodiversity conservation and human welfare, creating a culture of interdependence among approaches to solutions, and demonstrating the potential



for strengthening multiple goals through such partnerships. We need to better motivate and retain individuals with a wide diversity of goals and approaches to partner in attaining conservation solutions for our future.

Ingrid Haeckel

The University of Texas at Austin, Austin, TX, USA

Sustaining the Religious Bromeliad Harvest in Central Mexico

Conservation problem or question: My research addresses the sustainability of traditional plant harvesting practices for religious customs in central Mexico and seeks to understand the challenges to endangered species conservation in a sensitive cultural context. It is the first study to empirically assess the impacts of harvesting on epiphytic bromeliads, a valuable ornamental plant group.

Research methods: Ecological and ethnographic methods were used to assess the sustainability of bromeliad harvesting and to analyze the social context. Two years of demographic data for the species *Tillandsia imperialis* were utilized to construct Lefkovich matrix models to simulate harvest impacts. A one-year inventory of bromeliad use was carried out in addition to participant observation in harvests and informal interviews.

Relevance to conservation: My research reveals the dilemma of conserving species of important religious value where the societal significance of continued use trumps consciousness of species declines and hinders enforcement of environmental regulations. Documented bromeliad use is high and models indicate it is unsustainable, confirming local observations. This case demonstrates the need for alternative conservation approaches for culturally valuable species.

Ratsimbazafy Hajaniaina Andriavalonarivo

Blue Ventures Conservation, London, UK

Participatory Biological Study of Seasonal Octopus Reserves

Conservation problem or question: What are the long-term effects of seasonal octopus reserves on the recovery of octopus population? Also, how community management efforts (compliance with rules) effects reserve production.

Research methods: Daily sampling of octopus catch per group of fishermen (individual weight and sex of octopus, fishing method, time spent, fishing site) and daily total catch per village, involving the local community. Participatory mapping of the fishing sites using GPS, satellite photography and community-drawn maps. Data analysis using Microsoft Access and R.

Relevance to conservation: The success of the Octopus seasonal reserves is a positive example of the heightened productivity of conservation when created with a primary focus on community participation. The Octopus seasonal reserves are effective ecosystem management tools for the sustainability of both the Octopus population and expansion of community participation conservation efforts.

Adriana Humanes Schumann

Universidad Simón Bolívar, Caracas, Venezuela

Coral Reefs Conservation: Where Should Efforts be Focus?

Conservation problem or question: In coral reefs, settlement and post-settlement survival are among the main processes determining the community structure. We assessed the spatial and temporal variation of these processes in corals from Los Roques National Park at two spatial scales (up to tens of Km) during two seasons (one in which mass coral spawning occurs and one in that this does not happen).

Research methods: 30 terracotta tiles were installed in four reefs per season. Monthly, the tiles were inspected with an optical microscope to quantify and identify hard coral settlers. Monthly settlement and survival rates were calculated. Analysis of variance based on permutations was used to determine the spatial and temporal scale on which these rates showed more variability.

Relevance to conservation: High settlement rates were obtained (661 ± 1132 settlers \cdot m $^{-2}$ \cdot month $^{-1}$), being 23 times higher than reports for other Caribbean localities, suggesting a regional importance of LRNP. We didn't find any temporal and spatial differences in settlement rates. However, post-settlement survival rates showed spatial differences matching adult coral cover, indicating that this is a key process in the determination of reef structure.



Meha Jain

Columbia University, New York, NY, USA

Agricultural Adaptation to Climate Change: Farmer Responses to a Variable Monsoon

Conservation problem or question: My research examines how farmers are adapting their cropping strategies to climate variability in order to reduce the depletion of water resources while maximizing agricultural income. This research is important because most previous research examining adaptation to climate change has been theoretical in nature. My research attempts to quantify agricultural adaptation and its effects on yields and water use.

Research methods: I used both remote sensing as well as local surveys to examine how local people adapt to climate variability. Specifically, I analyzed satellite measures of vegetation to determine if farmers change the number of times that they crop in a given year based on rainfall patterns. In addition, I conducted surveys in Gujarat, India to determine which farmers adapt and why, and the effects of this adaptation on yields and water use.

Relevance to conservation: This work is important for conservation because it examines how climate change may impact water use in a semi-arid region with depleted groundwater resources. Specifically, the groundwater level in my study sites was 700 - 800 feet deep. Researchers must understand how farmers alter their use of groundwater based on climate variability, to determine how climate change may affect the availability of water resources in the future.

Nikolay Kazakov

University of Florida, Gainesville, FL, USA

Structure of Community Capacity for Conservation Action

Conservation problem or question: Though local capacity-building became an integral part of worldwide practiced community-based approach to conservation, its conceptual framework is still poorly developed. This hampers the effectiveness of local capacity-building interventions and community-based conservation. The research identifies factors influencing local capacity for community conservation action (LCCCA), their importance, and interactions allowing for developing a definition, conceptual model, and measurable indicators for LCCCA.

Research methods: To identify and measure factors affecting local capacity for conservation community action four community concessions were studied within Maya Biosphere Reserve, Guatemala. The research used a comparative case study design, grounded theory methodology, survey method, and index, anchored vignette and structured and semistructured interview instruments to collect data from 257 local community members, and 26 outside of community key informants.

Relevance to conservation: Sustainable community-based conservation requires adequate levels of local capacity to successfully participate in the process. Effective local capacity building interventions necessitate an understanding of this social complex phenomenon influenced by a number of different factors. A better understanding of local community capacity will allow conducting quality needs assessments, better focus intervention planning, and results measurements, thus improving effectiveness of community-based conservation.

Kristof Kelemen

Eötvös Loránd University, Budapest, Hungary

Ancient-Forest Herbs are Missing from Secondary Forests

Conservation problem or question: European forests have been under heavy management for long centuries. Herbaceous vegetation was adapted to natural disturbance regimes that changed radically with the introduction of age class forestry. Intermittent agricultural use creates even more unfavorable conditions. Dispersal limitation and limiting abiotic conditions both hinder recolonization. Which herbs are the most vulnerable in managed landscapes?

Research methods: Herbaceous vegetation was surveyed twice in 2009 in old primary, old secondary and young primary forest stands in Hungary, Central Europe. Differences in species richness and composition were tested using nonparametric and multivariate statistics. Ecological traits were compiled from several databases and species were classified into groups based on their characteristics. Abundance of species groups was compared amongst the categories.

Relevance to conservation: Species dispersed by ants, amongst others, were severely affected by land-use history. They include common species thought not to be endangered. Conservation efforts should therefore focus on natural processes, while restoration is also necessary. Trait-based analysis of herbaceous vegetation helps us identify most affected species groups serving as basis in conservation planning for multipurpose forest management.



Ishbel Kerkez

University of Queensland, St. Lucia, QLD, Australia; Stanford University, Pacific Grove, CA, USA

De Facto Marine Reserves as a Conservation Management Tool

Conservation problem or question: Efficacy of protection in de facto reserves (DFMRs), areas of the marine environment where access is restricted for reasons other than conservation, will be evaluated with an inventory of DFMRs for central California and an analysis reporting size of these areas, habitat representation therein as well as anthropogenic threats impacting them, before comparing these characteristics with those of marine reserves.

Research methods: To measure the potential of this novel conservation management tool, representation and area of coastal habitats in reserves and DFMRs were assessed and compared. Data were obtained from diverse sources and included assessors parcels, coastal habitat types and anthropogenic impacts and were overlaid in a series of maps for Central California using the software ArcGIS.

Relevance to conservation: DFMRs represent an opportunity to expand upon our current model of protected areas (<1% worldwide) and to improve representation of different habitat types in protection. Also, there is increasing pressure to open DFMRs to the public yet without policies in place, risks unintended impacts to communities. Results of this work include maps that will benefit conservation managers and policy makers.

Aimee Kessler

Arizona State University, Tempe, AZ, USA

Community-Based Research Enhances Management of Poached Bird

Conservation problem or question: The Great Bustard, the heaviest bird capable of flight, is endangered in Mongolia with 1500 individuals remaining. My research has revealed poaching as a major cause of its declines in this region. Anti-poaching laws are difficult to enforce, given the low numbers of this mobile species and Mongolia's poor infrastructure, low human population density, and limited budget.

Research methods: Under these conditions, I find the most effective way to reduce hunting pressure is to change the attitudes of local people. I have assembled a local team to determine the conservation needs of the Great Bustard using state-of-the-art research techniques, including satellite telemetry, remote sensing, and population genetics, while engaging local schoolchildren, students, and adults at all levels of research.

Relevance to conservation: Our collaboration with local communities has facilitated the research process as information is shared between local observers and the research group. We have developed more effective conservation plans by incorporating needs and desires of local people. Further, building scientific capacity and interest in this species makes an impact in the community which is long-lasting.

Petch Manopawitr

University of Victoria, Victoria, BC, Canada

Designing Resilient MPA Networks in Thailand's Andaman Sea

Conservation problem or question: Climate change will cause significant impacts to coral reefs, associated species and ecosystems world wide. My talk outlines how to design more resilient Marine Protected Area (MPA) networks to future climate change impacts using Thailand's Andaman coast as an example. 3.5

Research methods: This multi-method project uses techniques ranging from GIS for network design through to coral transect studies to establish optimal monitoring programs. Social methods are also used to gain greater perspective on community resilience and planning for future livelihoods.

Relevance to conservation: My goal is to help Thailand develop appropriate strategies for marine conservation under changing climate. My results will help reveal how climate change affects Thailand's coral reef and associate marine ecosystems, the management options for MPAs to address climate change impacts and effective mitigation and adaptation strategies. The results will provide insights for coral reef and marine conservation elsewhere.

Kellen Marshall

University of Illinois-Chicago, Chicago, IL, USA

A Framework for Social Justice & Sustainability

Conservation problem or question: 1) evaluating the relationship between conservation and environmental justice; 2) supporting interdisciplinary approaches for ecological applications; 3) providing a framework for social justice and sustainability and 4) development of methods for analyzing broader impacts of ecological and conservation actions



Research methods: Using Chicago Wilderness alliance members and Illinois Advisory EJ group spatial autocorrelation analysis through GIS software will be applied to detect patterns of clustering, random and dispersed distribution of conservation and environmental justice landscapes. Furthermore social network analysis will be conducted based on archival information and member listings found online and visualized through Pajec software.

Relevance to conservation: Conservation in cities directly and indirectly benefits humans. The field can benefit through understanding how to maximize urban conservation goals while addressing social justice issues. Patterns of practice will enlighten professionals on possible ways to encourage relationships as well as highlighting areas of conservation concern where there is optimal use of resources and benefits for humans and nature.

Joie Dicar Matillano

State University of New York, Syracuse, NY, USA

Conservation Status of Cyprinids from Palawan Philippines

Conservation problem or question: My talk will focus on the conservation status of the endemic cyprinid populations of Northern Palawan, Philippines. Specifically, I will focus on taxonomy, biogeography, and threatened status of this particular taxon. It is my objective to determine how diverse the cyprinid life in Palawan is, what is their biogeographic distribution, and how threatened they are based on IUCN criteria.

Research methods: I am using morphometric and meristic characterization for my taxonomic studies while for biogeography, I used GIS tools to map out the extent of occurrence and area of occupancy of cyprinids. For conservation status, I am assessing habitat quality and the impacts of exotic species on the endemics, vis-a-vis the criteria set by International Union for Conservation of Nature.

Relevance to conservation: This research will highlight the needs for conservation of the endemic cyprinid life in Palawan. It is also the most comprehensive study on cyprinids of Palawan since the 1920s. To date, freshwater wetlands in Palawan are still unprotected and results of this study can serve as a basis for declaring wetlands as local protected areas for cyprinid life.

Megan McSherry

Syracuse University, Syracuse, NY, USA

Livestock vs. Wildlife: A Comparison of Grazing Systems

Conservation problem or question: Human and livestock populations adjacent to protected areas are increasing, making it necessary to understand impacts of livestock and wildlife grazing in the wider context of the combined human-natural system within which they both reside. My research asks how impacts of grazing on vegetation and soils differ between livestock-dominated and wildlife-dominated systems and how these differences are related to management.

Research methods: Working in the Serengeti Ecosystem of Tanzania, I am using a combination of ecological and social science methods including exclosures to measure grazing impacts on productivity, plant species composition, and soil nutrients, and social surveys to understand how these differences are related to human management. Additionally, I am using remote sensing and GIS to detect differences at a landscape scale.

Relevance to conservation: Competition for resources occurs wherever the requirements of human and wildlife populations overlap, carrying negative impacts for both. Growing human and livestock populations means a greater risk of competition for grazing resources and habitat degradation through overgrazing. Thus, it is imperative to understand how native and domestic herbivores impact ecosystem properties, if differences exist, and how differences relate to management.

Lindsey Roland Nieratka

Florida International University, Fort Lauderdale, FL, USA

Poverty, Social Capital And Pes In Mexican Community Forests

Conservation problem or question: This talk will address the Mexican Payments for Hydrological Services program (PSA-H) within six organized community forests in Oaxaca, Mexico. I will address the role the PSA-H has played in alleviating poverty within the communities, strengthening social capital and organization and increasing the communities' ability and willingness to conserve the managed forests.

Research methods: The main research methods will consist of social surveys within a study site of six indigenous community forests which have joined together to form a committee for the protection of natural resources. Informal and Semi structured surveys will be conducted with community leaders, past and present. At the household level, structured surveys will be used.

Relevance to conservation: Payments for Environmental Services is an increasingly popular conservation tool. A large body of literature exists discussing the tool in theory and practice. This study investigates PES in a common property setting.



The relevance of the study to the field of conservation is that it adds more evidence of the importance of payments for environmental services as a conservation tool.

Johan Oldekop

The University of Manchester, Manchester, UK

Biodiversity and Land-Use in Ecuadorian Indigenous Communities

Conservation problem or question: The lack of instances where conservation and development have been successfully merged has strengthened arguments for strict exclusionist conservation policies. It is still unknown however, which strategies yield better conservation outcomes. We contribute to the debate by comparing biodiversity inside a protected area with that of neighbouring indigenous communities in the Ecuadorian Amazon and linking biodiversity to current land-use patterns.

Research methods: We use an interdisciplinary approach to assess biodiversity and land-use in four indigenous communities in the Sumaco Biosphere Reserve. Communities varied in their population density, territory and market access. We use biodiversity indicators and remote-sensing to compare inhabited and uninhabited forest plots in the communities and in the national park, and use household surveys to link biodiversity to land-use patterns.

Relevance to conservation: We contribute to the current protectionist debate by comparing biodiversity inside a protected area with that of adjacent indigenous communities. We further our understanding about the relative efficacy of protected areas and use an interdisciplinary approach to assess the potential of local communities to be involved in conservation efforts. Our research is of importance to both conservation practice and policy.

Nicholas Polato

Penn State, University Park, PA, USA

The Effect of Stress on the Endangered Elkhorn Coral

Conservation problem or question: Reef-building corals face a multitude of environmental stressors and Caribbean populations have declined precipitously as a consequence. Still, it is expected that standing genetic variation includes genotypes pre-adapted to stressful conditions, specifically increased sea surface temperatures. The identification of location specific variation to thermal stress in this important foundation species has implications for conservation and restoration efforts throughout the Caribbean.

Research methods: Expressed sequence tag libraries provide a first glimpse of the transcriptional response of corals to temperature stress. Using the recently sequenced transcriptome of the Elkhorn coral (*Acropora palmata*) we are using microarray technology to identify particular genes of interest and assess variation in gene expression profiles of genotypes and populations of Elkhorn coral larvae reared at stressful and non-stressful temperatures.

Relevance to conservation: The identification of locally adapted genotypes that perform differently to thermal stress will provide a valuable resource that will enhance conservation and restoration efforts by allowing managers to consider geographic variation in traits of importance to coral survival. In particular, this information is critical to maximize the effectiveness of programs aimed at conserving this important Caribbean species.

Sadie Jane Ryan

University of California, Santa Barbara, CA, USA

Politics to Parasites: Health in African Park Landscapes

Conservation problem or question: This talk addresses the need for whole landscape approaches to 'health' in African park landscapes. We examine the issues of anthropogenic change (fragmentation, land conversion), climate change (impacts on both parks and people), the relationship between local and national policies regarding land use and conservation, and the implications for health, both as biodiversity conservation, and as human and wildlife health.

Research methods: This project combines remote sensing methods (landcover change, vegetation indices), quantification of local climate (precipitation, seasonality), surveys of local landholders and politicians, field parasitology surveys, retrospective ecological data sets and modeling, both theoretical population and disease dynamics and process-based model building to test hypothesized drivers against available data. We bring together information from different disciplines to understand the whole system.

Relevance to conservation: In Africa, many parks were set up to the exclusion of local people, leading to "fortress conservation." These parks are often surrounded by dense human populations whose livelihoods depend on local natural



resources. The fates of parks are entwined with the populations surrounding them, so a whole landscape approach to management is needed, addressing sustainable livelihoods and park health simultaneously.

Jessica Stanton

Stony Brook University, Stony Brook, NY, USA

Estimating Area of Occupancy Across Spatial Scales

Conservation problem or question: A species' area of occupancy (AOO) is typically measured by overlaying a grid map on locations of known occurrence and summing the area of occupied grid cells. For IUCN Red List assessment, a 4 square kilometer grid is recommended. Converting AOO measures to the recommended scale can involve some guesswork, particularly when the data was collected at a coarser resolution.

Research methods: I present a relatively simple mathematical framework for estimating an AOO scale correction factor to downscale occupancy data collected at a coarse resolution to a finer resolution. I developed the model using artificial species data in order to evaluate results against a known distribution. The model uses occupancy at the coarse resolution combined with environmental predictors at the target resolution.

Relevance to conservation: This framework is potentially useful to anyone using the IUCN Red List assessment criteria to evaluate threat status or risk of extinction based on distribution data, particularly when fine resolution data on the species being evaluated is not available. This approach could also be useful for species distribution modeling across spatial scales.

Jamie Sziklay

NOAA, Vancouver, BC, Canada

Predicting Where and When Coral Disease Outbreaks Will Occur

Conservation problem or question: Coral reefs are among the most productive ecosystems in the world, yet the emergence of coral diseases threaten their survival. Increasing water temperatures lead to increased pathogen range and virulence. We are examining the relationship among coral disease outbreaks through in situ surveys and temperature anomalies derived from satellite data to forecast when and where coral disease outbreaks will occur.

Research methods: I am analyzing data collected from over 600 field observation surveys in the Hawaiian Islands from 2004-2009 with temperature metrics created from NOAA satellite data retrospectively. I am looking at interactions among three genera of corals and four inflicting diseases statistically, graphically and spatio-temporally to enhance the range of predictability of a decision tree created for the Great Barrier Reef (GBR).

Relevance to conservation: This data enhances the decision tree created for the GBR to become applicable for a larger range of areas and host corals and diseases. This satellitederived system can send out warnings around the world to help coral reef managers prepare and respond to future outbreaks in ear-real time, which will become increasingly important as the climate continues to change.

Christian Torres-Santana

University of Hawai'i at Manoa, Honolulu, HI, USA

Pollination of the Endangered *Kadua coriacea* (Rubiaceae)

Conservation problem or question: *Kadua coriacea* is a small shrub endemic to the Hawaiian Islands. The main threats for the conservation of this species include habitat destruction, military activities, fire, stochastic events (e.g. volcanism), invasive plants, and loss of native pollinators. The objective of this study is to obtain data on the pollination biology of *K. coriacea* to provide conservation recommendations for the species.

Research methods: To study the pollination biology of *K. coriacea*, a flowering phenology study was conducted from January to June 2009 and flower visitation was recorded using video cameras and field observations. I also performed hand-pollination treatments to assess the breeding mechanisms operating in the species. Fruit set resulting from the crosses was counted and seeds germinated, and monitored for four months.

Relevance to conservation: Although the white, fragrant, and heterostylous flowers of *K. coriacea* suggests an insect pollination syndrome, I found that native vectors have little impact on the species' pollination. Most of the recorded fruits were obtained through autogamy, which can lead to inbreeding depression. To understand the breeding system of *K. coriacea* will help uncover its reproductive barriers and promote its recovery.



Ursula Valdez

University of Washington, Seattle, WA, USA

Habitat Use of Forest-Falcons in the SE Peruvian Amazon

Conservation problem or question: Understanding the mechanisms that allow species to coexist, particularly in terms of differential habitat use is a central subject in ecology. I monitored five species of secretive forest-falcons in protected and modified habitats of lowland Amazonian rainforest of SE Peru (Los Amigos river basin) to determine their patterns of habitat use, activity ranges and the degree of overlap among these.

Research methods: A total of 24 individuals of *Micrastur ruficollis*, *M. gilvicollis*, *M. semitorquatus*, *M. mirandollei*, and *M. buckleyi* were captured using balchatri traps and fitted with radio transmitters. I monitored the birds' movements in the forest from the ground and the canopy. Activity ranges and utilization distributions were obtained for 10 birds using fixed-
Kernel estimators

Relevance to conservation: Forest-falcons used all habitats in the area, with different intensity. *M. ruficollis* used terrace forest and palm swamps, *M. gilvicollis* used floodplain more heavily. *M. mirandollei* used only terrace forest, while *M. buckleyi* showed affinity for floodplains. Considering that floodplains are highly threatened habitats, and forest degradation is increasing in this region, learning habitat use patterns for avian predators is crucial for their conservation.



Dalal Al-Abdulrazzak

University of British Columbia, Vancouver, BC, Canada

Historical Change in Marine Ecosystems of the Persian Gulf

Conservation problem or question: My work within historical marine ecology aims to integrate historical data into traditional ecological analyses in order to better understand the long-term trajectories of ecosystem change and human activity in the Persian Gulf.

Research methods: I will be compiling data from historical narratives and archaeological records on the location and abundances of key organisms (sharks, marine mammals, pearl oysters). I will then use this data to create an Ecopath model to assess various management strategies over time. I hope to create dynamic maps to show historical ranges of organisms and a contraction through time.

Relevance to conservation: Historical data are essential in fisheries management and conservation, especially for species which suffered significant population declines prior to ecological data collection. Shifting ecological baselines have resulted in lowered expectations for natural abundances of marine animals and ecosystem services. By integrating historical data with ecological analysis, I will assess recovery and conservation targets for marine organisms in the Persian Gulf.

Jennifer Arnold

University of Florida, Melrose, FL, USA

Managing the Social Side of Coupled Human-Ecological Systems

Conservation problem or question: Conservation practice requires integration of an ecological understanding of natural systems and a social understanding of how stakeholders interact to influence that system. With a focus on social learning and conflict management, this research critically examines how stakeholders on a National Forest in the southwestern US engage with each other to understand the ecology and sustainable management of riparian systems.

Research methods: A series of multi-stakeholder workshops were held to encourage dialog on riparian ecology and management. Workshops transcripts were analyzed using critical discourse analysis, examining how language was used to manage conflicting perspectives. I analyzed how language was used by facilitators to create spaces for dialog and how participants used language to engage with each other or avoid engagement.

Relevance to conservation: Conservation almost always requires collaboration with multiple stakeholders, and yet many “feel good” collaborative efforts do not yield expected outcomes for learning, relationship building, or decision-making. This research is designed to look critically at collaboration and stakeholder participation to give clearer direction for how conservation professionals can lead effective collaborative processes, even when working with contentious issues.

Phan Thi Bao Chi

University of Science, Ho Chi Minh City, Vietnam

Participatory Wetland Conservation in Yokdon National Park

Conservation problem or question: Wetland resources in Dipterocarp forest ecosystem play an integral role not only in biodiversity but also in ethnic minority communities. Therefore, these wetlands have been under high anthropogenic disturbance from the local minority people. My research in YokDon National Park asks how to solve the conflict between wetland conservation and the livelihood of the ethnic minorities.

Research methods: The participation of farmers is to find out their demand on the wetlands, the participatory field survey based on indigenous knowledge is to determine diversity of species; multiple regression is applied to identify factors causing of their dependence on the wetland resources and participatory workshop is hold to get solution to balance between wetland conservation and their livelihood in sustainability.

Relevance to conservation: This research seeks to preserve the biological diversity that is linked to wetland ecosystems in YokDon National Park by conserving and restoring natural wetlands, linking wetland use and conservation by local human communities living in or near wetlands, and by expanding the capacity of local wetland conservationists to effectively work within the area.

Mary Blair

Columbia University, New York, NY, USA

Landscape Genetics, Biological Corridors in *Saimiri oerstedii*

Conservation problem or question: Central American Squirrel Monkeys (*Saimiri oerstedii*; listed as endangered since 1996) are

restricted to a fragmented, heterogeneous landscape in Costa Rica. Different landscape features can promote or inhibit gene flow between populations, thus influencing population persistence. Does landscape heterogeneity affect gene flow in this species? Where and how could biological corridors be constructed to minimize isolation among populations?

Research methods: Landscape genetics, an emerging analytical approach that combines population genetics and landscape ecology, measures the effects of landscape features on gene flow using spatially explicit models. The landscape genetics approach attempts to detect genetic discontinuities and correlate them with landscape features, identifying barriers to gene flow and areas of increased or diminished permeability.

Relevance to conservation: Our landscape genetics analyses show that palm plantations are costly to dispersal, but are not impassable. Dispersal might be facilitated by planting fruiting trees along a corridor within a palm plantation. Our results stress that conservation practitioners should be aware of the potential effects of landscape heterogeneity outside of protected areas and national parks to the long-term persistence of populations.

Joel Boehm

City University of New York, New York, NY, USA

Syngnathidae Species Trade in U.S. Traditional Medicine

Conservation problem or question: Much of the world's fisheries are overexploited, but relatively little attention has been paid to the trade of non-food fisheries. By using molecular techniques to infer the point-of-origin and identification of specimens, our research will contribute necessary baseline information regarding the import of Syngnathidae species to traditional Chinese medicine (TCM) markets in the Northeastern United States.

Research methods: My research uses molecular sequence "barcoding" to help identify species collected in U.S. TCM end-markets. This data will be used to infer the geographic range of Syngnathidae fisheries, along with species being sold. Of the species identified I will examine trade documentation and specific life history traits (reproductive size, fecundity, etc.) to characterize the potential threat to specific populations.

Relevance to conservation: Millions of Syngnathidae (seahorses, pegasid fishes, pipefishes and pipehorses) specimens are traded annually. Preliminary results have identified six species from the genus *Hippocampus*; four Indo-Pacific, one Western Pacific and one putative Western Atlantic species. This supports the geographical expansion of these fisheries, the population decline in traditional fisheries regions, and is consistent with growing global demands.

Abraham Borker

University of California, Santa Cruz, CA, USA

Using Acoustic Sensors to Monitor Colonial Seabirds

Conservation problem or question: Seabirds are ecologically important and face conservation threats in marine and terrestrial ecosystems. Monitoring programs to assess seabird populations and measure the success of conservation actions are hampered by the remoteness of many seabird colonies and the global scale of the problem. Seabird restoration methods can be effective, but monitoring conservation outcomes is needed to identify successful and flawed approaches.

Research methods: Automated acoustic sensors offer a low-cost, low-impact method for monitoring seabirds at scale. Here we test the efficacy of acoustic sensors to measure relative seabird abundance at colonies. We deployed acoustic sensors at Forster's Tern (*Sterna forsteri*) breeding colonies and used spectrogram cross-correlation to calculate mean calling rates and compared these to nest counts at colonies.

Relevance to conservation: This research examines the quantitative basis of acoustic abundance monitoring, and finds a relationship between detectable acoustic activity and abundance. This is a foundation for a scalable, low-cost and robust seabird monitoring system, which can be applied to threatened seabirds and other vocalizing wildlife. The conservation community currently lacks low-cost monitoring techniques that can evaluate conservation outcomes at large scales.

Jorge Celi

Michigan State University, Lansing, MI, USA

Andean Floodplain Rivers: Ecohydrology and Conservation

Conservation problem or question: The Napo River, an Andean tributary of the Amazon, is being considered for waterway development. Its transformation into an industrial barge channel would require substantial interventions to increase and stabilize channel depth, with negative impacts on biodiversity and people. The main objective of this research is to investigate the ecological- hydrological relationships between the Napo River and its associated floodplain wetlands.

Research methods: The water sources and regimes of flooding across floodplains along the Napo River are being assessed using networks of data loggers and remote water samplers. Remote sensing will be employed to classify wetlands and



assess their extent in the region. Hydrological modeling will be performed to identify the impacts of the development of an industrial waterway in the Napo.

Relevance to conservation: This study will identify the spatiotemporal variability of water levels in the region, assess wetland's extent and diversity, and determine how changes in the water level of the Napo River would affect biodiversity and ecosystem services of wetlands. These outcomes will improve the understanding of floodplain-river interactions, influence decisions on the aforementioned development project, and support conservation of biodiversity.

Andres Cisneros-Montemayor

The University of British Columbia, Vancouver, BC, Canada

The Global Potential for Whale Watching

Conservation problem or question: This work addresses the issue of whale watching in the current context of the whaling-whale conservation debate within and outside of the International Whaling Commission. The focus is specifically on the potential socio-economic benefits of whale watching for countries which have to date not entered this market, and their role in conservation.

Research methods: Using country-specific data on marine mammal distribution and abundance, a binomial generalized linear model is used to predict the proportion of total tourist arrivals that might go whale watching in a given country. Socio-economic information is then used to estimate the impacts these whale watchers could have in terms of employment and revenue.

Relevance to conservation: The global debate on whales and whaling has gone on for quite some time. Meanwhile, the results of this work suggest that whale watching could generate 800 million USD and 11,000 jobs in countries that have not entered this market, bringing total benefits from this alternative use of whales to 3 billion USD and 24,000 jobs around the world.

Michael Cove

University of Central Missouri, Warrensburg, MS, USA

Assessing Rarity in Mammals of a Central American Corridor

Conservation problem or question: In an effort to maintain connectivity among fragmented forest habitats many Central American countries have established biological corridors. These corridors are used by many medium and large mammals which are often considered to be keystone species. By estimating the occupancy status of these species, we can assess habitat suitability and community structure within the biological corridor.

Research methods: I am using camera traps to monitor medium and large mammals in the San Juan – La Selva Biological Corridor, Costa Rica. I am using an occupancy modeling approach to account for detectability issues associated these elusive species. This approach also allows me to input habitat variables to determine habitat preference and predict habitat suitability among sites within the corridor.

Relevance to conservation: My research can be used by researchers to better plan camera trap surveys for mammals in the neotropics. It is also important to understand the factors that affect mammalian distribution in biological corridors now because there are several additional compounding factors, such as climate change, deforestation, and an increasing human population that will affect biological communities in the future.

Brian Gerber

Virginia Tech University, Blacksburg, VA, USA

Conserving Madagascar's Rainforest Carnivores

Conservation problem or question: Despite significant efforts to conserve Madagascar's unique biodiversity, relatively little is known about the island's carnivores. We address this serious gap in knowledge by investigating how forest logging and fragmentation affect Malagasy carnivore density and occupancy. These data are important to direct conservation action, as carnivores can be effective focal species for conservation planning and indicators of habitat disturbance.

Research methods: We sampled four rainforest sites across a gradient of increasing anthropogenic disturbance. We deployed >26 camera-stations at each forest site to noninvasively sample carnivores. By identifying Fossa (*Cryptoprocta ferox*) and Malagasy Civet (*Fossa fossana*) individuals by their unique pelage patterns, we were able to estimate density using a spatially-explicit-capture-recapture model. We also investigate habitat-use patterns of carnivores using occupancy analyses.

Relevance to conservation: We found variation in carnivore composition, density, and occupancy among rainforest sites. These data are essential to Madagascar's nationwide conservation biodiversity planning (The Durban Vision) to establish protected areas that can maintain viable carnivore populations. We suggest habitat adjacent to established protected areas



be prioritized with linkages among protected areas to connect isolated populations.

Daniel Gurdak

State University of New York, Syracuse, NY, USA

Butterflies and Conservation in Assam, India

Conservation problem or question: Global conservation funding largely focuses on vertebrates, and invertebrate groups are often underrepresented. This work presents baseline data regarding regional butterfly distribution across various human landscapes and the value of various habitat types for sustaining butterfly diversity and their ecosystem function. It also addresses the potential of using butterflies as flagships for invertebrate conservation based on local people's attitudes.

Research methods: Research was conducted during the dry season of 2009 to gather interdisciplinary information regarding butterflies in Assam India. First, a baseline assessment of wet season butterfly diversity was conducted through repeated sampling along line transects in six habitat types across an agro-forestry landscape. In addition, interviews of local people were used to assess knowledge of and attitudes toward butterflies.

Relevance to conservation: Results are relevant because they provide a baseline for monitoring programs and can be used to inform conservation and management practices and multiple socio-political levels, ranging from protected areas managers, to tea plantation proprietors, to homeowners. To better implement conservation efforts, the potential of using butterflies as flagships for invertebrate conservation is explored.

Kealohanuiopuna Kinney

California State University, Fullerton, CA, USA

Remote Sensing of Potential Restoration in a Dry Forest

Conservation problem or question: We used airborne imaging spectroscopy and LiDAR to quantify the structure and condition of tropical dry forest in Hawaii dominated by the endemic tree species *Myoporum sandwicense* and *Sophora chrysophylla* (MSDF). The study site provides critical habitat to the endangered Hawaiian honeycreeper *Loxoides bailleui*, but little information is available on the extent or condition of MSDF at regional scales.

Research methods: By quantifying functional plant traits using remotely sensed data, and modeling potential evaporative demands using three-dimensional measurements from LiDAR, we show that the lateral distribution of photosynthetic and non-photosynthetic vegetation varies strongly across this dry forest landscape.

Relevance to conservation: Most differences were expressions of elevation and volcanic substrate age. Predicted solar insolation produced distinct patterns that were associated with the composition of understory vegetation, suggesting that C₄ grasses preferentially occupy areas of reduced evaporative demand. These findings contribute to ongoing management of MSDF in Hawaii, and generate opportunities for adaptive management and restoration of threatened Hawaiian dryland ecosystems.

Sheng Li

Peking University, Beijing, China

Defining Attributes of Large Mammal Corridors in China

Conservation problem or question: The principle and design of wildlife corridors is a critical issue in ecological study and landscape conservation planning. Establishing corridors is considered effective to improve connectivity and maintain endangered species population. Though various corridor principles have been proposed, it's hard to be examined by largescale field research and our knowledge on the variables determining the corridor effectiveness is limited.

Research methods: We used camera-trapping associated with sign transects to detect the presence of large mammals within a large-scale forest corridor in China, an ongoing study initiated in 2010. Occupancy modeling was used to estimate animal occupancy rate associated with habitat and detection variables. We examined the relationship between occupancy rates and potential variables from corridor structure and animal ecological characteristics.

Relevance to conservation: The result will improve our understanding of forest corridor suitability and the utility of these corridors, allow us to predict wildlife usage and effectiveness of new proposed corridors and provide scientific guidance to future government habitat restoration plans. This study involves multiple nature reserves and government agencies, and will also promote the capability building for local reserve staff.



Jessica Long

University of Wisconsin-Madison, Madison, WI, USA

Making Ends Meet: Conservation and Forest Dependency in Peru

Conservation problem or question: I want to learn how the range of livelihood strategies within indigenous communities in Amazonian Peru may impact the kinds of conservation projects that are effective. In light of proposed Payments for Ecosystem Service projects, I want to explore how income from forest resources varies when forest dependency differs by household but land is held communally.

Research methods: I am using a combination of household surveys, focus groups, interviews, and participatory mapping to describe the links between wealth and the use of forest resources across households in a case study community. I am also using remote sensing to explore forest cover change at different scales in my study area.

Relevance to conservation: As development becomes more intertwined with conservation, it's important to understand the relationship between human welfare and conservation goals. The work thus far on the forest-poverty link has emphasized the complexity and contextually-dependent nature of the relationship. Understanding variation in forest dependency in the Nanay region will aid the design of more sensitive conservation development projects in this and similar areas.

Robin Martino

Antioch University New England, Rehoboth, MA, USA

Does Matrix Type Influence Tropical Forest Regeneration?

Conservation problem or question: My research investigates whether different matrix types that represent different degrees of contrast with the adjacent forest impact seed dispersal and the regeneration of large-seeded tree species at the forest edge. I focus on dispersal and early establishment, and explore if one, both, or neither of these mechanisms limit the long-term maintenance of large-seeded canopy trees at the forest edge.

Research methods: Focal tree watches to assess richness and density of seed dispersal assemblage and examine the frequency of disperser visitation and removal of two different large-seeded tree species. Seed, seedling and sapling counts in wedge shaped transects under focal tree crowns examines density dependent mortality. Seed placement experiments evaluate seed predation, germination and one-year seedling survival. Microclimate measurements for abiotic conditions.

Relevance to conservation: Loss of habitat key to large-bodied avian dispersers, and changes in the conditions important to seed and seedling establishment can impact the recruitment of large-seeded shade tolerant trees in the tropics.

Understanding how different land-use types influence these processes at the forest edge will contribute to the management and conservation of the biological diversity in fragmented landscapes.

Tsitsi McPherson

University of Connecticut, Storrs, CT, USA

Conservation Planning Using Spatially Clustered Data

Conservation problem or question: My research focuses on the challenges of biodiversity-rich but monetary and human capacity poor countries working towards conservation action plans. The project uses herbarium and museum data, free modelling software, and has limited financial requirements at the planning stage. Furthermore, it considers present and future economic development and anthropogenic modifications of the landscape to formulate a developing world-centric conservation framework.

Research methods: Research methodology focused on three areas (i) development a conservation database; (ii) address the bias of collections data; and (iii) model species at the taxa level. Multivariate statistics were used to extract taxa specific explanatory variables for subsequent species distribution modelling; the outputs were summed per taxa. Assessment of known biodiversity in the study area was also evaluated.

Relevance to conservation: For developing countries my results suggest (i) that the biased, spatially clustered data of museum and herbarium can provide insight into underlying patterns of taxa diversity to aid conservation; (ii) data from neighbouring areas/countries can enhance biodiversity knowledge in otherwise poorly sampled locations; and (iii) limited human capacity is not a hindrance to conservation.

Jennie Miller

Yale University, New Haven, CT, USA

Hot, Dry & Hungry: Impact Of Drought On Tiger Prey Selection

Conservation problem or question: Climate change is affecting ecosystems and species interactions throughout the world,



yet few studies have explored its impacts on species in South Asia. My dissertation examines the impacts of drought and land-use on interactions between tigers, prey species and human communities in India. This information addresses how increases in drought may influence future human-wildlife conflicts such as livestock depredation.

Research methods: I plan to track tiger dietary preferences in several protected areas across a gradient of human influence and rainfall. To evaluate tiger predation in the past, I will compare historical records of species counts, livestock compensation and scat analyses to rainfall patterns. I plan to generate bioclimatic niche models to predict how species interactions change with different climate change scenarios.

Relevance to conservation: Climate change will affect numerous factors that influence tiger survivorship, including forest type, ungulate populations and human development. Novel interactions between tigers and prey may alter trophic cascades and increase the frequency of human-wildlife conflict through changes to crop raiding and livestock depredation. My research is the first to consider how tigers and ungulates may respond to the changing climate.

Elizabeth Nichols

Columbia University, New York, NY, USA

Species Traits and Dung Beetle Response to Transitioning Tropical Forest

Conservation problem or question: A central premise of conservation science is that patterns in species abundances in response to human activity can be used to predict the biodiversity outcomes of future environmental changes. The mechanistic basis for this assumption is that certain species traits can be linked to response to environmental change. Scarabaeinae dung beetles are a functionally critical component of tropical forest systems, and are highly sensitive to changes in forest structure. This study seeks to document which species traits are associated with dung beetle extinction risk in tropical forest transitions.

Research methods: We compiled a pantropical dataset of 24 individual studies comparing dung beetle abundance in 'intact' (pre-transition) and modified (post-transition) moist tropical rainforest. We used three species traits (diel activity, nesting guild and biomass), as well as pre-transition abundance and modified habitat type as fixed effects in linear and generalized linear mixed effect models, estimating the abundance and probability of local extinction of over 1,200 dung beetle species following a forest transition to secondary forest, forested agriculture, or agriculture without a forest canopy.

Relevance to conservation: Identifying those species traits correlated with extinction proneness will improve our ability to make conservation recommendations for individual dung species in transitioning tropical forest areas, as well as better understand the functional implications of dung beetle biodiversity decline. Large body size is both a response and effect trait for dung beetles, suggesting that even initial stages of beetle biodiversity loss will lead to sharp impairment of their ecological functions.

Ari Novy

Rutgers University, New Brunswick, NJ, USA

Importance of Plant Genetic Variation in Marsh Restoration

Conservation problem or question: Restoration of degraded habitats is an important element of biodiversity conservation. The specific genotypic variation of keystone plant species used in restorations can have a profound effect on the restored habitat's ability to support species of conservation concern. This presentation discusses the importance of plant propagule selection and demonstrates a methodology for determining best management practices when restoring marshes.

Research methods: We quantified the genetic population structure of *Spartina alterniflora*, a keystone marsh grass, in the New York area using microsatellite genotyping followed by calculation of population structure and diversity metrics (AMOVA, PCA, H_e , H_o , etc.). This regional analysis was combined with other recent studies of *S. alterniflora* ecology to advise the U.S. Army Corps of Engineers in restoration practices.

Relevance to conservation: We recommend that *S. alterniflora* propagules originate from within the same region as (but from no farther than 300 km from) the marsh targeted for restoration, and be propagated via wild-collected seed. Our findings highlight the need to evaluate propagule genetic variation when planting keystone species, both to ensure ecosystem function and to provide habitat for species of conservation concern.

Paige Olmsted

Columbia University, New York, NY, USA

Simple Models to Visualize Ecosystem Service Relationships

Conservation problem or question: Small holder farmers in the developing world collectively manage vast tracts of land and lie at the forefront of the conservation/development interface. This talk will discuss ongoing development of tools for small



holders to assist land management decision making, with particular emphasis on addressing the imbalance of scales where decisions are made and benefits from conservation are accrued.

Research methods: The millennium village project collects a range of demographic, environmental, and social data representing 10 ecozones and 500,000 people in Sub-Saharan Africa. These data along with multiple ecosystem service models and personal interviews are helping shape tools and materials in an iterative fashion. A nitrogen tool will be discussed.

Relevance to conservation: Biodiversity conservation is critical to the pursuit of sustainable development, yet many organizations relegate environmental priorities in the name of economic development. Models and tools enabling visualization and understanding of the relationship between management activities and economic and environmental costs (and benefits) of certain practices may contribute to improved management. Such tools are valuable to conservation agencies on the ground.

Katrina Phillips

University of Miami, Miami, FL, USA

Protecting Loggerhead Turtle Habitats: An Inconvenient Truth

Conservation problem or question: Conservation efforts often target the portion of a species' life history when it is most accessible for monitoring – this is especially true in the marine environment. However this approach may neglect critical habitats utilized by the species simply because they have not yet been described. This study identifies foraging grounds used by migratory loggerhead sea turtles between observed nesting seasons.

Research methods: Satellite telemetry is used to locate shared post-nesting foraging areas used by loggerheads nesting in southwest Florida and evaluate foraging site selection and fidelity. Analysis of a long-term double tagging dataset is used to examine trends in nesting remigration rates and investigate possible fluctuations in foraging habitat quality. These data provide insight into decreasing nest counts beyond assumed population decline.

Relevance to conservation: Species conservation is not successful if essential habitats are ignored while more convenient habitats are protected. The foraging ground fidelity displayed by loggerhead sea turtles allows for the development of management strategies that target the vital adult life stage and highlights the need for international collaboration for effective conservation of highly migratory species.

Shahriar Caesar Rahman

City University of New York, Flushing, NY, USA

Evaluating Nest Protectors for Turtle Conservation

Conservation problem or question: Nest protectors are probably the most common and widely used tools for turtle conservation. However, there are potentially negative impacts of nest protectors. Embryonic developments in turtles are profoundly influenced by environmental temperature. Therefore, even a subtle change in incubation temperature caused by nest protectors can affect the sex ratio, growth, development, behavior and fitness of turtle hatchlings.

Research methods: Last summer I conducted an experiment at Jamaica Bay, New York, evaluating nest protectors of three different designs using 48 diamondback terrapin nests. In each pair one nest was protected and other was left uncovered. Miniature temperature loggers were placed in all of the nests to record temperature for every hour throughout the nesting season from June to August.

Relevance to conservation: Nest protectors are probably the most widely used tools for turtle conservation. However, their potential negative effects are very poorly studied. My on going research is the first large-scale evaluation of nest protectors for turtle conservation. The result will significantly help researchers and conservation agencies to implement proper conservation techniques world-wide.

Katy Richards-Hrdlicka

Yale University, New Haven, CT, USA

The Amphibian Chytrid Fungus in New England

Conservation problem or question: Amphibian populations are declining worldwide. Amphibians in New England are presumed tolerant to infection by *Batrachochytrium dendrobatidis* (Bd), the deadly amphibian chytrid fungus. Bd is supposedly ubiquitous in New England. My talk will describe an interstate survey of both contemporary and historic populations for Bd and will compare the genetic variation of this pathogen through time.



Research methods: Amphibians from the field are swabbed with a toothpick. DNA extracted from the toothpick is subjected to a Bd specific quantitative-PCR. Contemporary infections are geographically matched to preserved amphibians stored in museum collections. The preserved specimens are similarly analyzed for Bd. Microsatellites from both historic and contemporary infections will help determine if Bd has changed through time.

Relevance to conservation: This work will help uncover when Bd arrived in New England and whether it changed over time, perhaps becoming more lethal to its hosts. This work could describe strain differences, which may explain the difference between infected, decline sites (i.e., Panama) and infected, stable sites (i.e., New England). Lastly, New England is one suspected site of Bd's global emergence.

Meredith Root-Bernstein

Universidad Católica de Chile, Santiago, Chile

Design Solutions to Coastal Human-Wildlife Conflicts

Conservation problem or question: Coastal areas can be a challenge for conservation due to multiple competing land uses including development, tourism, and extractive resource use. These multiple land uses often lead to human-wildlife conflicts. Here we propose that collaboration with industrial designers and architects has the potential to generate innovative and effective solutions to coastal human-wildlife conflicts.

Research methods: Many products for modifying animal behavior are already used by conservationists, such as barriers, corridors, and model predators. We propose that their overall value can be improved through collaboration with designers and architects. We illustrate this approach with a case study in which we generate designs for human-sea lion interactions in public parks and the fish market in Valdivia, Chile.

Relevance to conservation: We produced images of seven proposed products which vary in scale and facilitate a range of alternative sea lion- human interactions. Such collaborations can be useful for developing products that reduce human-wildlife conflicts and align conservation and management with local values. Sharing design proposals and tests of existing conservation products will improve conservation design practice around the world.

Gail Rosen

Brown University, Providence, RI, USA

Scope And Scale Of The Illegal Wildlife Trade

Conservation problem or question: Little is known with certainty about the scale of the illegal trade in wildlife and wildlife products, but it is hypothesized that this trade, valued between US\$5 billion and US\$20 billion/year, is among the world's largest illegitimate businesses, after narcotics. The scope and scale of the illegal wildlife trade are the focus of this report.

Research methods: We compiled all reports on illegal wildlife trade seizures from TRAFFIC Bulletins spanning the period 07/1996-10/2008. Generally, seizure reports contain information on species confiscated, # individuals/shipment, whether alive, dead, or in product form, country of origin/seizure, intended use, etc. Report data was organized into a categorical database and analyzed. Categories were selected to encompass a breadth of potential information.

Relevance to conservation: The global trade in illegal wildlife has myriad implications for environmental, human and animal health. Evasion of restrictions protecting endangered species puts pressure on wild populations. Un-inspected, un-quarantined live animals and animal products may carry diseases like heartwater and monkeypox that threaten livestock and public health through "pathogen pollution." My later work has investigated disease spread through legal aquarium trade.

Maria Jose Ruiz Lopez¹, Donald Evenson², Gerardo Espeso³, Eduardo Roldan⁴, Montserrat Gomendio⁴

¹University of Missouri, Columbia, MS, USA; ²South Dakota State University, Brookings, SD, USA; ³Estacio ´n Experimental de Zonas Aridas, Almeria, Spain; ⁴Museo Nacional de Ciencias Naturales, Madrid, Spain

Importance of Sperm DNA Integrity Among Endangered Species

Conservation problem or question: The aim of the study was to investigate whether high levels of inbreeding among endangered species influence sperm DNA integrity. In addition, since mammalian males only contribute the haploid genome to their offspring, we analyzed the relative role of sperm DNA fragmentation in influencing offspring mortality when compared with other factors known to have a major impact.

Research methods: We studied three species of endangered gazelles which have different levels of inbreeding (*Gazella cuvieri*, *G. dama mhorh* and *G. dorcas neglecta*). Life-history, reproductive, and pedigree data for calculating inbreeding were obtained from the population studbooks. Ejaculates were obtained from reproductively mature males during the breeding



season, and sperm DNA integrity was analysed using the sperm chromatin structure assay (SCSA).

Relevance to conservation: Sperm DNA damage increased with inbreeding and was associated with reduced semen quality. Levels of sperm DNA fragmentation had larger impact on offspring mortality rates than any other factor considered. This suggests that the integrity of the male genome probably plays a major role in the recovery of endangered species through its effects on male fertility and offspring survival.

Santiago Salinas

Stony Brook University, Stony Brook, NY, USA

Climate Change, Metabolism, and the Future of Life Histories

Conservation problem or question: Temperature-driven changes in life history characters at small spatial scales are expected in the future. Included among these are growth rate, development time and lifespan, which are major determinants of the resilience of a population. There is a clear need for robust predictions of the effects of climate change on critical life history traits in local populations.

Research methods: We develop a general, quantitative framework to predict the effects of warming on key life-history traits of ectotherms. We first validate the method using life history data of populations along temperature clines. Then, we use the model to predict changes in individual and population growth rates, development time, and lifespan of ectotherms, in a spatially explicit fashion, in 50 years.

Relevance to conservation: We find that growth rates will be greatly increased in much of the world, averaging 15.9-24.9% more in 50 years. Development time and lifespan, on the other hand, are expected to decrease by a global average of 12.5-17.5%. This dramatic increase in the pace of ectotherm life is expected to have important consequences to ecosystem stability and human-ectotherm interactions.

Mellie Samson Junior

Wildlife Conservation Society-Papua New Guinea Programme, Goroka, Eastern Highlands, Papua New Guinea

Village-Based REDD+ Projects in Papua New Guinea

Conservation problem or question: What mechanism is viable for the equitable distribution of benefits from Reduced Emissions from Deforestation and forest Degradation (REDD+) activities in Papua New Guinea (PNG)? Indigenous people have secure tenure of forests in PNG - 97% of land is under customary ownership; the challenge now is to develop a REDD+ mechanism that operates at culturally appropriate scales and minimizes conflict.

Research methods: The research was multi-disciplinary involving over 600 interviews (with indigenous peoples, community leaders, government officials), reviews (of anthropological literature, legal issues, dispute resolution mechanisms), and field research into potential cobenefits of REDD (e.g. food security, conservation). After feedback from all groups on a draft, the concept was presented to Government of PNG in March 2010 for use in policy development.

Relevance to conservation: Rainforests are being deforested at unsustainable rates with biodiversity lost. The emerging REDD+ mechanism presents a new opportunity to address the dichotomy of a rural poor with a wealth of forest resources; REDD+ can bring sustainable development to rural people while reducing carbon emissions and improving food security. The Village-REDD+ concept contributes to developing policy on REDD+ and promotes conservation.

Tim Schikora

Biodiversity and Climate Research Centre, Frankfurt, Germany

What Does the Past Show us About the Future?

Conservation problem or question: The reconstruction of the phylogeny and evolution of African Bovidae (Antelopes, Buffaloes and relatives) will show us when and under what climatic and ecological conditions members of this family evolved. Is there a correlation between changing climates - be it aridification, cooling, warming, etc - and the diversity within the most diverse herbivores in the last 20 million years?

Research methods: By comparison of DNA sequences of all 87 African species and further non-african bovinds the phylogeny will be reconstructed and the time of origin of the extant species estimated by molecular clocking techniques. The embedding of extinct species using fossil data into the pedigree leads to an overall overview of species diversity without anthropogenic influence in geological time scales.

Relevance to conservation: Bovidae are the most important mammals in ecological and economic terms in Africa, therefore conservation of these animals is in the interest of biologists and even governments. But few is known about the reaction on changing environments driven by climate change. The results will provide predictions of increasing or decreasing diversity



and species abundances of bovids in a continental context.

Xing Shuang

Beijing Forestry University, Beijing, China

Bird Community Reconstruction in Beijing Olympic Forest Park

Conservation problem or question: Beijing Olympic Forest Park is the newest and biggest urban park in Beijing. The landscape here is almost entirely re-created but has been designed especially for ecological protection. This talk will address the effects the artificial landscape has on the bird community and how different groups of birds have changed in the community and in abundance in this urban park.

Research methods: Each week we chose 2 to 4 transect lines from the total 6 lines we designed using land transects method, observing birds once to twice a week, and picked 50 points for point counts in the breeding and wintering seasons. We conducted vegetation survey and biodiversity awareness questionnaire simultaneously. The data collected were compared with other urban parks for reference.

Relevance to conservation: By investigating the relationship between the bird diversity and the landscape of the newly-built park, we offer some practical suggestions to the park administrators, helping them make more bird-friendly decisions. In this way, we can protect or even improve the bird diversity in this particular park, and similar ones in Beijing and other cities.

Tara Whitty

University of California, San Diego, La Jolla, CA, USA

Impacts of Artisanal Fisheries on Irrawaddy Dolphins

Conservation problem or question: I am studying the interactions between artisanal fisheries and populations of Irrawaddy dolphin (*Orcaella brevirostris*) in Southeast Asia, focusing on the issue of accidental capture of dolphins in fishing gear. I am exploring (1) how the habitat use of these dolphins brings them into contact with fishing gear, and (2) the socioeconomic drivers of artisanal fisheries.

Research methods: To assess habitat use of Irrawaddy dolphins, I will be conducting fieldwork from a small boat, using photo-identification techniques, measuring habitat parameters (sea surface temperature, salinity, turbidity), and mapping their range using GPS. I will also map fishing grounds. Additionally, I will interview artisanal fishers to collect information on bycatch rates, socioeconomic drivers of local fisheries, and perceptions of conservation.

Relevance to conservation: Understanding and mitigating bycatch of cetaceans in artisanal fisheries is a major priority for cetacean conservation. By examining the proximate and ultimate factors influencing bycatch, this thesis will yield valuable information on how to use the tenets of ecosystem-based management to address bycatch (and other) threats to marine megafauna in the context of artisanal fisheries management in developing countries.

Shane Vatland

Montana State University, Bozeman, MT, USA

Applied Research for Fluvial Arctic Grayling Conservation

Conservation problem or question: Freshwater biodiversity is imperiled worldwide. Consequently, both scientists and managers face a significant challenge in unraveling and remedying the many factors threatening the persistence of native stream fish. In this study, we evaluated how changes in climate, instream habitat, and non-native fish species distributions may independently and concomitantly affect the persistence of a native fluvial Arctic grayling population.

Research methods: We conducted a hierarchical assessment of stream habitat conditions to provide a multiscale spatial context for evaluating ecological processes affecting native and nonnative fish populations. To evaluate the biological importance of this physical template, we assessed the relative abundance, distribution, and movement patterns of stream fish through time using a combination of passive and active mark-recapture techniques.

Relevance to conservation: We address a significant gap in understanding the interplay between climate change and ongoing threats to biodiversity. Patterns in fish-habitat relationships indicate coldwater thermal refugia provide critical habitat for both native and nonnative cold-water fish species. Landuse and climate change will likely reduce the availability of refugia, potentially increasing negative interactions between native and nonnative species.



Liu Xi

Peking University, Beijing, China

Analysis of Forest Change in Last 40 Years in Sichuan, China

Conservation problem or question: The change of forest cover is an important index of monitoring the health of terrestrial ecosystems and reflects the intensity of human and natural disturbance. We analyze effects of different types of disturbance on the change of forest distribution in north Sichuan province China, which are greatly affected by fast economic and social development, forestry policy, earthquakes and other factors.

Research methods: We use satellite image interpretation to extract information of forest cover in 1970- 010 (~10 years time interval). While we collect reference points using GPS or data derived from nature reserves to improve and evaluate the forest cover map. Then we collect data such as map of road and resident points to use geographic analyzing tools and do the correlation analysis etc.

Relevance to conservation: Our research area is surrounded by three major panda habitats with high biodiversity. The analysis shows Wenchuan earthquake causes similar deforestation rate as a ten-year forest harvesting, but with different spatial distribution of forest loss and subsequent reforestation process, when analyzed with data from Songping earthquake and reforestation. Therefore, we need corresponding conservation strategies when discussing different types of disturbance.

Na Xu

Yale University, New Haven, CT, USA

Land Use Control on Soil-Carbon Leaching and Bioavailability

Conservation problem or question: My presentation will address the effects of land use and agricultural management practices on release of soil dissolved organic matter (DOM) and its bioavailability. Natural DOM is a complex of organic compounds with differing reactivity and ecological roles.

Research methods: We have collected soils from forest, agriculture and grassland systems. The agricultural soils are further differentiated on the basis of management practices, including crop rotations and crop production systems (organic versus conventional farming). DOM was mobilized from these soils in leaching experiments and examined for the quantity, structural properties, and bioavailability of DOM.

Relevance to conservation: In aquatic ecosystems DOM plays a critical role by affecting nutrient cycling, metal mobility and toxicity, heterotrophic production, and drinking water quality. This research provides insights on how agricultural management practices may influence the export of DOM from terrestrial system and helps us make better farm management decisions that will increase the retention of nutrients and organic matter within soil.