YALE INSTITUTE FOR BIOSPHERIC STUDIES

NEWSLETTER FALL 2022

IN THIS ISSUE

A newsletter by the Yale Institute for Biospheric Studies.

For more information, please contact us at yibs@yale.edu or call 203-436-2301 fax 203-432-9927

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Yale

FROM THE DIRECTORS

Welcome back for the fall semester! We hope everyone had a good summer. We're thrilled to welcome four new Donnelley postdocs and five new Hutchinson postdocs across two new clusters. We're also excited to host four Bass Distinguished Environmental scholars this year. Join us to hear about their research during our seminar series this Fall and into the Spring!

We've hugely enjoyed our first year as YIBS directors. We've identified education and diversity as foci and have made progress towards those goals. We're especially proud to have successfully piloted a new internship program this summer, aiming to expand access to research opportunities at YIBS. The program brought four undergraduates to Yale for lab and field research with YIBS affiliates. We're also happy to announce a new Diversity and Inclusion statement (p. 2). This statement reflects our collaboration with a special committee of YIBS staff, postdocs, and graduate students, with additional feedback from our steering committee.

Eric Sargis and Carla Staver

Director Eric Sargis.
MARA LAVITT

Associate Director Carla Staver at Boabeng Fiema Sanctuary, Ghana.
MOHAMMED ARMANI

DIVERSITY AND INCLUSION AT YIBS

YIBS is a cross-disciplinary organization with a mission to enable research, training, and collaboration in the environmental sciences at Yale. The work that we do depends on participation by diverse voices and perspectives, which in turn positively impacts the quality of work and public engagement with the environmental sciences. We recognize that our disciplines have not welcomed diverse voices in the past and that scientists from historically excluded backgrounds continue to experience systemic barriers to participation.

We are committed to improving participation by scientists and colleagues from diverse backgrounds, including but not limited to diverse races, genders, and identities. We aim to improve participation and equity by combatting marginalization, explicit and implicit biases, as well as systemic barriers to inclusion. This commitment extends to all YIBS activities, including funding opportunities and events.

Open and collegial communication is key to maintaining diverse communities and to cross-disciplinary science alike. Fostering communication depends on creating a safe and inclusive environment that recognizes that power hierarchies exist and can impact people from historically excluded backgrounds differently. All YIBS affiliates, postdocs, students, and staff are responsible for creating a respectful and collegial institutional climate and have the right to expect the respect of their colleagues in return. These responsibilities extend beyond the Yale campus to the field, where we expect our community to respectfully engage in collaboration with local colleagues.

This message represents a statement of our vision for YIBS and for our science, but it also represents a set of guiding principles for ongoing action. For example:

- YIBS fellowship proposals now include evaluation criteria for actions to improve diversity and inclusion in research and outreach activities. This includes the Donnelley and Hutchinson fellowships and any occasional requests for proposals.
- Access to paid early-career research opportunities is a major barrier to pursuing a career in the environmental sciences. The YIBS Summer Undergraduate Research in the Environmental Sciences (SURES) program aims to remedy this by facilitating research opportunities for rising juniors and seniors from HBCUs, HSIs, and TCUs with YIBS-affiliated faculty.
- Development of evidence-based evaluations of the effectiveness of these activities in improving diversity and inclusion in the environmental sciences are ongoing.

YIBS DEI committee: Carla Staver (Chair), Arielle Biro, Jonathan Rohner, Judith Rosentreter, Timothy Sandrey, Eric Sargis, and Xin Sun; and thanks to Rick Bribiescas, Craig Brodersen, Pincelli Hull, Jordan Peccia, and David Vasseur for their helpful feedback on this statement.

INCOMING DONNELLEY POSTDOCS

The Donnelley Postdoctoral Fellowship supports research in biodiversity or a combination of biodiversity with conservation and public policy. The Fellowship was created to honor the memory of Mr. Gaylord Donnelley, Yale College Class of 1931, a conservationist dedicated to advances in research and education. The Fellowship, which was established by Mr. Donnelley's widow Dorothy and son Strachan, is funded by an endowment from the Gaylord and Dorothy Donnelley Foundation and the Donnelley Family and is administered by YIBS.

Nohemi Huanca-Nuñez

YSE

Appointment:
Aug. 2022–July 2024

Advisor:
Liza Comita

Nohemi's research focuses on plant ecology, plant-animal interactions, and the understanding of mechanisms driving species diversity, distribution, and forest regeneration after natural and human disturbances. At Yale, Nohemi will be focused on the interaction between above-ground and below-ground functionality and the role of root traits in shaping composition in tree communities recovering from human disturbance.

Armita Manafzadeh

EPS (primary), SEAS

Appointment:
July 2022–June 2024

Advisors:
Bhart-Anjan Bhullar & Madhusudhan Venkadesan

Armita is interested in the evolution and development of vertebrate animal form and function. She integrates approaches from biomechanics, paleontology, computer animation, and experimental biology to better understand how synovial joints (like hips and knees) work. At Yale, Armita will be exploring how her research can interface with ecology by studying ecomorphological diversification through a joint-focused lens.

Cesar Martinez-Alvarez

YSE

Appointment:
Aug. 2022–July 2024

Advisor:
Luke Sanford

Cesar is an environmental social scientist interested in combining quantitative methods and qualitative sources to understand the political economy of deforestation. His doctoral research employed satellite imagery, administrative data, archival sources, and quasi-experimental empirical designs to study the drivers of community-based ecosystem stewardship in Mexco. He also studies the politics of governmental climate action in a comparative perspective, particularly surrounding fossil fuel subsidies.

Sina Rometsch

EEB

Appointment:
Nov. 2022 - Oct. 2024

Advisor:
Martha Muñoz

Sina is interested in understanding the dynamics of reproductive isolation in adaptive radiations. At YIBS, her research will focus on elucidating the environmental drivers of speciation in a radiation of anole lizards from the island of Hispaniola. Connecting species' ecology with population genomic, behavioral, and developmental approaches, she aims to determine how environmental gradients affect population divergence and the progression towards complete reproductive isolation.

DEEP LEARNING AND IMAGE PROCESSING FOR TRANSFORMATIONAL ENVIRONMENTAL SCIENCE

This cluster focuses on the application of Image Processing and Machine Learning to a range of problems in Environmental/Ecological Sciences. High-resolution imaging sensing has enabled the production of huge amounts of data that are informationally-dense and relatively easy to share. A number of promising opportunities exist to leverage these. Using traditional image processing techniques such as object detection and segmentation, for example, a wide range of modelling activities can be performed in order to quantify various aspects of plants and animals such as for phenotyping or other classification activities. Furthermore, with the increased proliferation of high quality and inexpensive sensors comes a proportional increase in the amount of data from them that must be analyzed. There are a number of directions at the intersection of machine learning and signal processing that are very promising, allowing functions such as automatically "filtering" datasets (e.g., to remove uninteresting clips), processing for automatic ID of animals, and many more.

Quentin Bateux

SEAS

Appointment:
July 2022–June 2024

Advisor:
Aaron Dollar

Quentin is interested in applying computer vision to the analysis of herbarium images at a large scale, in order to automatically extract meaningful features that can be related to phenotypic characteristics that can be exploited by ecologists.

Nadia Zikiou

CPSC

Appointment:
July 2022–June 2024

Advisor:
Holly Rushmeier

The main mission of Nadia's work remains the study of environmental changes and land use/land cover. This work is based on Sparse Representation methods, Machine Learning (Support Vector Machine and Convolutional Neural Network), and high-resolution image analysis.

TROPHIC ECOLOGY OF AFRICAN SAVANNAS

African savanna ecosystems are at the brink of an ecological transformation. Woody plants are encroaching due to changes in fire management, atmospheric CO_2, and misguided afforestation schemes. Fire—an integral part of grassy systems, often conceptualized as another 'consumer' of productivity—is decreasing in extent. Wild megafauna faces increasing pressures from fragmentation, hunting, and infectious disease, threatening the last extant community of large herbivores on Earth. Meanwhile, proponents of natural climate solutions increasingly identify these diverse and ancient savanna ecosystems as 'degraded' and have targeted them for afforestation and transformation (billed as 'restoration'), accelerating threats from global change and agricultural transformation. These proposals have gained traction, just as they have marginalized local communities and scientists. This cluster aims to create a community of ecologists at Yale specializing in Africa, bringing together three research groups interested in trophic interactions in African savanna ecosystems and recruiting postdocs to create a cluster for the study of African savanna ecology.

Mohammed Armani

EEB

Appointment:
Jan. 2023–Dec. 2024

Advisor:
Carla Staver

Armani's research will focus on elucidating the trajectories of change across distinct biomes (forest, thicket, and savanna) in the forest—savanna boundary of West Africa under recent climate change—land use change interactions.

Yen-Hua Huang

EEB

Appointment:
Aug. 2022–July 2024

Advisor:
Vanessa Ezenwa

Yen-Hua's research focuses on interactions among diseases, hosts, and the environment. He has examined how the environment drives diseases through host ecology. He plans to evaluate the potential influence of diseases on the environment via host responses.

Nicholas O'Mara

YSE

Appointment:
Sept. 2022–Aug. 2024

Advisor:
Jennifer Marlon

Nick uses molecular and isotopic indicators of past environmental conditions preserved in sedimentary archives to try to better understand the interactions between climate, vegetation, and wildfires in African savanna ecosystems.

INCOMING YIBS SCHOLARS

The Edward P. Bass Distinguished Visiting Environmental Scholars Program was created with a generous gift by Edward P. Bass to YIBS. This program brings premier scholars in any field dealing with the study of the environment—past or present—to Yale for an extended period of time. The scholars are nominated by the YIBS Faculty Affiliates, and while in residence at Yale, scholars present seminars, interact with faculty, students, and research groups, and participate in the life of one or more academic units.

Rees Kassen
Professor
University of Ottawa
Fall 2022

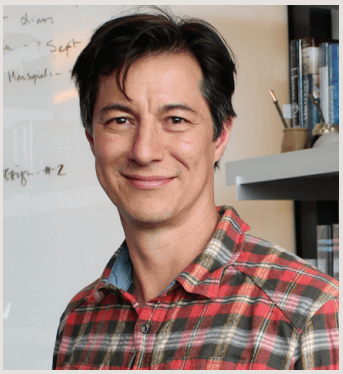
Rees Kassen tests foundational theories in evolution directly through experiments using microbial populations as experimental models. In other words, asking big questions with really little things. His group also combines this approach with genomic analyses and microbial genetics to investigate the evolutionary processes underlying the management of pathogenic microbes, including those that cause chronic infections of the cystic fibrosis lung, the spread of antimicrobial resistance, and the evolution of SARS-CoV-2, the virus that causes COVID-19.

Cheryl Knott
Professor
Boston University
Fall 2022

Cheryl Knott is a biological anthropologist studying critically endangered wild orangutans in Indonesia. She seeks to understand how extreme fluctuations in rainforest fruit production lead to unique orangutan adaptations like the longest mammalian inter-birth interval and the evolution of two adult male morphs. Recently, she expanded her research into degraded and secondary forests to examine how orangutan physiology and behavior are affected by anthropogenic influences. She also directs a community-based conservation program to protect wild orangutans and their habitat.

Erin Saupe
Associate Professor
University of Oxford
Spring 2023

Erin Saupe is a paleobiologist working to investigate interactions between life and environments over geological time scales. Her work addresses questions on the origin, maintenance, and conservation of biological diversity, with a focus on community and species' responses to environmental change. Work in her group also focuses on the emerging field of conservation paleobiology, which applies information from the past to species' conservation today. The goal of this approach is to better anticipate how current and future climate change will impact Earth's biodiversity.

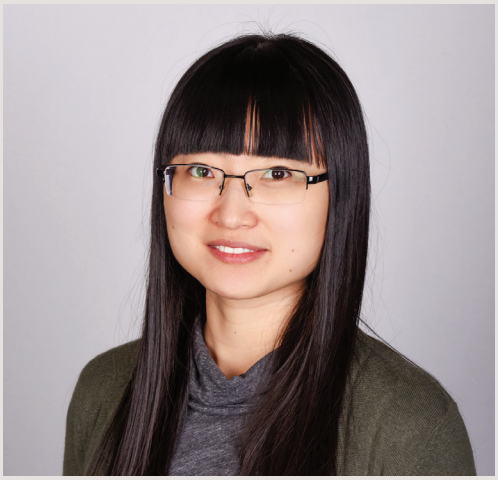


Greg Wilson Mantilla
Professor
University of Washington
Spring 2023

Greg Wilson Mantilla is a paleobiologist who aims to understand critical transitions in the deep time history of life. One of the most captivating of these transitions is the early radiation of mammals, which ultimately led to their striking diversity today from the tiny flying bumblebee bat to the titanic, fully aquatic blue whale. His research is collaborative and combines fieldwork to collect new fossils and associated geological data, systematic study of fossil specimens, and quantitative analysis of morphology, function, and ecology of extant and extinct taxa and communities.

POSTDOC FEATURES

Several YIBS postdoctoral associates receive job offers every year, and here we highlight two of them. Congratulations to these Hutchinson fellows on their next positions!



Xin Sun

G. Evelyn Hutchinson Postdoctoral Fellow
(Theme II-Climate and Greenhouse Gases), EEB

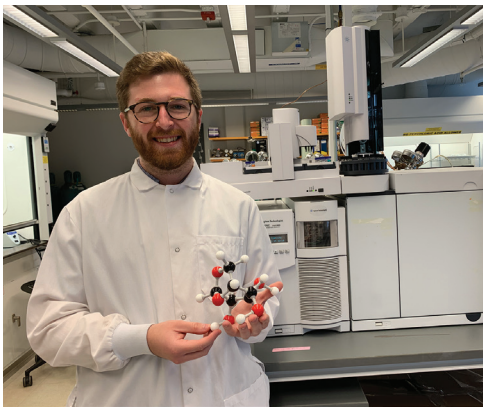
Xin Sun is an environmental microbiologist and biogeochemist fascinated by how tiny microbes drive global biogeochemical cycles. Her research integrates biogeochemical field studies, metagenomics, microbial ecology experiments, models, and theories to quantitatively characterize and predict microbial community assembly and nitrogen and carbon cycles in a changing environment. Xin was recently hired as a Simons Postdoctoral Fellow in Marine Microbial Ecology by the Simons Foundation. She will study the dynamics of marine microbial communities and the nitrogen cycle in a changing environment. Xin Sun began her fellowhip in July 2022 in Dr. Emily Zakem's lab at the Carnegie Institution for Science, Department of Global Ecology, in Stanford, CA. Xin will explore the predictability of microbial diversity under different nitrogen conditions and establish a theoretical framework to explain and predict new aspects of the global-scale marine nitrogen cycle and greenhouse gas nitrous oxide using microbial metabolisms and interactions based on findings from experiments and meta-omics. This three-year fellowship will allow Xin to combine her previous, ongoing, and proposed research to better illuminate microbial 'black boxes' and improve predictions of marine biogeochemical cycles.

Yong Zhou

G. Evelyn Hutchinson Postdoctoral Fellow
(Theme II-Climate and Greenhouse Gases), EEB

Yong Zhou joined the YIBS community in September 2020 as a Hutchinson Postdoctoral Fellow working with Carla Staver in the Department of Ecology and Evolutionary Biology. At YIBS, he combined field work and remote sensing to estimate changes in woody cover and their influence on whole-ecosystem carbon storage in African savannas. He also worked with other theme II postdocs to study the uncertainties associated with the global methane cycle via an expert elicitation survey and was involved in the Regional Carbon Cycle Assessment and Processes Project to synthesize regional data on greenhouse gas emissions for the African continent. Yong started a tenure-track assistant professor position in the Department of Wildland Resources at Utah State University this fall. His research at USU will primarily focus on how ecosystems are functioning under global change from a biogeochemical perspective. He will leverage his experience studying fundamental questions of ecosystem dynamics while also informing best practices for ecosystem management.

Armita Manafzadeh: X-ray reconstructed hindlimb skeleton of a walking bird.
ARMITA MANAFZADEH



Nicholas O'Mara displaying a levoglucosan molecular model next to the Lamont-Doherty Earth Observatory Organic Geochemistry Lab gas chromatograph mass spectrometer (GC-MS).
MARIA KUZINA

Sina Rometsch: *Anolis cybotes*.
MIGUEL A. LANDESTOY

YIBS FRIDAY SEMINAR SERIES FALL 2022, 3 PM (EASTERN)

For seminar location details and Zoom/Panopto links, more information about YIBS lectures and events, or to join our mailing list, visit yibs.yale.edu/seminars-lectures

September

9 Cheryl Knott, Professor Anthropology, Boston University & YIBS Bass Scholar
Orangutans: Adaptive resilience to environmental and anthropogenic change

16 Simon Queenborough, Senior Lecturer and Research Scientist, YSE; Musser Director, Tropical Resources Institute
Life-history strategies in tropical forest trees: trade-offs in reproduction and defense

23 Armita Manafzadeh, Donnelley Postdoctoral Associate, EPS and SEAS
Joint mobility as a bridge between form and function

30 Rees Kassen, Professor of Biology, University of Ottawa & YIBS Bass Scholar
From so simple a beginning: adaptation and diversification in microbial populations

October

7 Jeremy Cohen, Postdoctoral Associate, EEB
Responses of North American birds to climate change across temporal scales

14 Nicholas O'Mara, Hutchinson Postdoctoral Associate, YSE
A biomarker approach to reconstructing paleofires in African savannas

28 Cesar Martinez Alvarez, Donnelley Postdoctoral Associate, YSE
The impacts of the super-commodity boom on rural communities: evidence from Mexico, 1990-2018

November

4 Nohemi Huanca-Nuñez, Donnelley Postdoctoral Associate, YSE
The role of below-ground traits in shaping regenerating tropical forests

18 Sina Rometsch, Donnelley Postdoctoral Associate, EEB
Evolutionary dynamics of reproductive isolation in adaptive radiations

December

2 Yen-Hua Huang, Hutchinson Postdoctoral Associate, EEB
The role of herbivore behavior in trophic interactions with parasites