

Hogyeum ‘Evan’ Joo
**Research Statement: Integrating Ecological Mechanisms
and Social Processes in Urban Biodiversity Research**

My research focuses on how socioeconomic and sociocultural processes shape ecological patterns and biodiversity in urban environments. I approach cities as complex and heterogeneous socio-ecological systems, in which human decisions on land use, governance, and access to nature shape ecological dynamics, including species distributions, community assembly, and human-nature interactions. My approach integrates community ecology and urban ecology with quantitative social science, concepts from political ecology, and spatial analysis. By crossing disciplinary boundaries, my work seeks to explain how inequities in urban environments both reflect and contribute to ecological outcomes, and to identify pathways toward more equitable and ecologically resilient cities.

The Urban Landscape: My research focuses on the interactive relationships between people and urban biodiversity, with a particular emphasis on equitable access to and perceptions of nature. Urban landscapes can be defined in many ways, but fundamentally, they are shaped by human needs, values, and decisions. Urbanization is both a result and an ongoing process of society's choices regarding resource use, development priorities, governance, and responses to changing environmental conditions. As a consequence, cities function as complex socio-ecological systems where ecological processes— such as species assembly, disturbance, and adaptation – are deeply intertwined with human decision-making. Understanding urban landscapes, therefore, requires integrating multiple perspectives that recognize cities as venues where ecological dynamics and social, economic, and political forces continuously interact to shape biodiversity patterns.

Connecting Socioeconomic Perspectives to Urban Ecology:

My research integrates socioeconomic perspectives into urban ecology to better understand how environmental change is both produced by and experienced through human systems. This interdisciplinary approach identifies the sources and consequences of ecological change in cities, revealing how planning, management, and policy decisions create uneven ecological conditions across urban landscapes. By combining ecological data with social, economic, and spatial analyses, my work contributes to broader discussions on environmental equity, challenges prevailing definitions of “quality” in urban green spaces, and highlights forms of biodiversity and ecosystem function that are often overlooked in decision-making processes. This research has resulted in two co-authored, peer-reviewed publications in *Nature Cities* and *Landscape and Urban Planning*. Each paper examined national-scale inequities in access to green spaces and disparities in current park-quality assessment practices, demonstrating how social structures systematically shape ecological outcomes and opportunities for human-nature interactions.

Diverse Forms of Human-Nature Interactions:

A core component of my research examines how social, cultural, and environmental contexts shape human engagement with urban nature and access to biodiversity, investigating the human-nature interaction through a multi-scalar approach: personal, neighborhood, and city levels. Using community science data from iNaturalist, I investigate the social and environmental predictors of human-nature interactions in urban green spaces, identifying how neighborhood context, biodiversity attributes, and

access influence participation and observation patterns. This work is published in *Urban Ecosystems*. Complementing this approach, I conducted survey-based research across 17 college campuses to assess how students' academic interests, personal experiences, and sociocultural backgrounds influence their knowledge of protected landscapes on their campuses and their willingness to support environmental conservation. Analyses from this project are currently underway. Finally, I examine whether various biodiversity variables – such as species richness, community composition, and the relative abundance of native and non-native species– are equitably distributed across park-adjacent neighborhoods in New York City using multivariate statistical models. This work, currently a chapter of my dissertation and to be submitted to *People and Nature*, directly links biodiversity quality and access to socioeconomic and cultural gradients, extending my broader research agenda on equity, urban ecology, and human-nature relationships.

Testing Traditional Ecological Theories in Urban Areas: While my research is deeply interdisciplinary, it is fundamentally grounded in ecological theory. Urban environments represent a unique and powerful system for testing classical ecological hypotheses because they exhibit high levels of heterogeneity – sociocultural, environmental, climatic, and others – both within and across cities, and at different spatial scales. One chapter of my dissertation directly examines whether foundational ecological relationships, including the species-area relationship and the Habitat Heterogeneity Hypothesis, hold in urban green spaces. Using urban parks as a study system, this work evaluates how habitat diversity and human management input interact to shape plant community composition in a human-dominated landscape. This project has been supported by the Rutgers Ecology & Evolution Student Grant and the Andrew M. Greller Graduate Research Award for Conservation of Local Flora and Ecosystems, awarded by the Torrey Botanical Society. The resulting manuscript is currently in preparation for submission to the *Journal of Ecology*. Findings from this work were presented at the Ecological Society of America 2025 meeting, where the presentation received an honorable mention for the Joan Ehrenfeld Urban Ecology Presentation Award.

Future Research Plans and Directions

My ultimate goal as a researcher is to advance an integrated understanding of how social, environmental, and management processes jointly shape biodiversity in urban landscapes. Building on my interdisciplinary training and theory-driven research, I aim to develop a cohesive research program that uses urban systems to test ecological mechanisms while accounting for socioeconomic and sociocultural drivers of human-nature interactions. Through interdisciplinary approaches grounded in ecological theory, my work will contribute to a fundamental understanding of ecology and address applied questions in urban biodiversity conservation and sustainability.