

## Kunxin Zhu

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### EDUCATION

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**The Ohio State University, College of Food, Agricultural, and Environmental Science**  
*Ph. D. in Agricultural, Environmental & Development Economics*

Columbus, OH  
Expected: 2020-2025

**Duke University, Nicholas School of the Environment**  
*Master of Environmental Management*  
Specialization: Environmental economics

Durham, NC  
2018-2020

**Nankai University**  
*Bachelor of Science in Physics*

Tianjin, China  
2014-2018

### DISSERTATION

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*Dissertation Committee:* Dr. Sathya Gopalakrishnan (Chair, OSU), Dr. Elena Irwin (OSU), Dr. H. Allen Klaiber (OSU), Dr. Daniela Miteva (OSU), Dr. Martin Smith (Duke University)

*Fields:* Environmental and Resource Economics, Urban Economics, Applied Econometrics

### HONORS AND SCHOLARSHIPS

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Young Scientists Summer Program (Advisor: Dr. Stefan Wrzaczek and Dr. Michael Freiberger)  
*International Institute for Applied Systems Analysis, Austria*

2024

### RESEARCH EXPERIENCE

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Research Assistant to Prof. Sathya Gopalakrishnan  
*Agricultural, Environmental, and Development Economics Department, The Ohio State University, USA*

2022-2023

Research Assistant to Prof. Martin D. Smith  
*Nicholas School of Environment, Duke University, USA*

2019

Research Assistant to Prof. Xiliang Zhang  
*China Automotive Energy Research Center, Tsinghua University, China*

2017-2018

### RESEARCH

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#### PEER-REVIEWED PUBLICATIONS

##### **Under Review**

1. **Zhu, K.,** Gopalakrishnan, S., and Miteva, D. *Mangroves Help Reduce the Impact of Climate-induced Cyclones in India. (Job Market Paper).* In review at the *Journal of Environmental Economics and Management*

Abstract: Mangroves protect coastal economies from natural hazards like cyclones. However, despite the emphasis on these protective benefits in policy debates, the magnitude of benefits remains understudied, especially in India. Using night lights data, we analyze the impact of 27 cyclones along India's eastern coast from 2012 to 2019 to quantify mangrove-driven mitigation effects. We find that each hour of exposure to a category-4 cyclone reduced night light intensity—a proxy for economic activity—by 12% in the average rural village. Using a shift-share instrument based on 1944 mangrove distribution, we estimate that mangroves mitigated 7% of cyclone-induced damage. Our analysis reveals three key insights: (1) mitigation benefits from mangroves can substitute for local private risk investments, such as housing improvements, as wealthier regions experience diminishing marginal benefits from mangrove protection; (2) adjacent villages experience negative spillover effects, indicating that migration to mangrove-protected areas may overstate their protective value; and (3) since mangrove degradation is more likely in poorer regions—those most vulnerable to cyclones—policymakers must carefully balance land-use decisions to avoid exacerbating vulnerability and address environmental justice concerns. Our findings contribute to the growing literature on ecosystem services and offer insights for long-term natural capital investments in the face of climate change.

## Working Papers

### 2. **Zhu, K.** *Waves of Change: Understanding the Impact of Natural Hazards on Housing Market Dynamics*

Abstract: As climate change intensifies, natural hazards are becoming more frequent and severe. Paradoxically, natural hazards can trigger residential redevelopment, expanding the built environment and increasing future exposure to risk. By examining the spillover effects of private renovation investments, this work examines how natural hazards influence durable housing capital investment patterns in coastal areas. Using parcel-level information on property tax assessments and decomposed property values, I find that Hurricane Irma significantly increased low-cost maintenance, with an 80% rise in the annual probability of renovation on main buildings or patios for affected properties. However, I do not find evidence that Hurricane Irma increased the likelihood of post-disaster reconstruction. Using disaster-induced renovations as an instrument, I find that maintenance in the neighborhood increases the likelihood of renovation in neighboring properties not affected by the hurricane. I develop a durable property investment model that allows for both maintenance and replacement, and provides insight into the heterogeneous impacts of natural hazards on renovation and reconstruction decisions. Simulation models suggest that communities facing repetitive flood risks tend to overinvest in low-cost maintenance, which delays reconstruction while improving overall housing quality in natural hazard-prone areas. In all, our results suggest that even minor natural hazard events can drive significant investments in coastal areas, partly due to subsidization policies such as FEMA assistance and NFIP program. As climate risk continues to rise, distortions from such post-disaster assistance can create hotspots where greater investments occur in higher-risk regions.

### 3. **Zhu, K., Gopalakrishnan, S., & Smith, M.** *Disaster-induced Migration Across U.S. States: The Role of Income Heterogeneity.*

Abstract: Climate change is intensifying natural disasters in coastal areas; yet more people continue to move to these regions. These trends are unfolding alongside rising income and wealth inequality in the U.S. Disasters directly impact inequality as low-income households face higher exposure, and indirectly through migration that reshapes community composition. Although the link between climate change and inequality is well-documented, few studies explore disaster-induced migration as a mechanism driving inequality. We analyze the effects of disasters on migration and show an inverted-U relationship between household income and migration: low-income households face financial barriers to relocation, high-income households adapt in place through investments (e.g., elevating homes), and middle-income households are most likely to migrate. We empirically quantify the extent to which migration response is heterogenous across income strata. Using a household-level data from coastal counties in the Atlantic and Gulf coasts of the U.S., we find an inverted-U relationship between household economic resources (income and wealth) and the effect of natural disasters on out-migration decisions. Results suggest that households adopt different adaptation strategies based on economic resources, driving long-term demographic shifts in disaster-prone regions. As middle-income households continue to migrate, coastal areas may see a growing concentration of both low- and high-income households, further deepening income inequality. Our findings add to the literature on climate-induced migration and highlight that equitable “migration as adaptation” outcomes are unlikely in the current political-economic setting.

### 4. **Zhu, K.** and Gopalakrishnan, S. *The Impact of Natural Hazards on Local Communities: Understanding Changes in Homeownership Rate after Floods in Iowa.*

Abstract: Natural disasters are driving significant changes in housing markets. While research acknowledges the heterogenous impact of flooding on homeowners and renters, few studies have analyzed the effect of flooding on homeownership rates. Using a panel fixed effects model to analyze individual migration and tenure choice decisions, we find that flooding events decrease average homeownership rates by 1.2% in Iowa. Using a major flood in 2008 as a natural experiment, we decompose the effect of migration responses to the flood and find that the negative effect on homeownership can be persistent for over 6 years in inundated areas. We also find that the decrease in homeownership rate is driven largely by outmigration of existing owners. Our findings add to the literature on the effect of natural disasters on housing markets and inform policymakers about major channel for this transition.

## Book Chapters

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1. Gopalakrishnan, S., Malik, K., and **Zhu, K.**, "Climate Change and Coupled Human and Natural Systems", Forthcoming in the Routledge Handbook of Climate Change and Society, 2nd Edition.

## Work in Progress

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1. **Zhu, K.** and Zhu, Y. "Building back better? The effect of post disaster assistance on housing development."
2. Miteva, D.A., Cheng, S., Gopalakrishnan, S., Miller, A., **Zhu, K.** "The marginal value of forests in rural India."

## **Conference and Workshop Presentations**

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1. Zhu, K. and Gopalakrishnan, S., and Miteva, D. "Mangroves Help Reduce the Impact of Climate-induced Cyclones in India." Forest and People: from Skyview to Local Dynamics workshop, Paris School of Economics, Assosois, June 2024.
2. Zhu, K. and Zhu, Y. "Building back better? The effect of post disaster assistance on housing development." Selected Paper, MEA Annual Meeting, Chicago, March 2024.
3. Zhu, K. and Gopalakrishnan, S. "The impact of natural hazards on local communities: understanding changes in homeownership rate after floods in Iowa." Heartland Environmental and Resource Economics Workshop, Urbana-Champaign, October 2023.
4. Zhu, K. and Gopalakrishnan, S. "The impact of natural hazards on local communities: understanding changes in homeownership rate after floods in Iowa." Selected Lightning Session, AAEA Annual Meeting, Washinton D.C., July 2023.
5. Zhu, K. and Gopalakrishnan, S., and Miteva, D. "Mangroves Help Reduce the Impact of Climate-induced Cyclones in India." Selected Paper, AAEA Annual Meeting, Washinton D.C., July 2023.
6. Zhu, K., Gopalakrishnan, S., and Miteva, D. "Mangroves Help Reduce the Impact of Climate-induced Cyclones in India." Selected Paper, AERE Annual Meeting, Portland, June 2023.
7. Zhu, K. and Gopalakrishnan, S. "The impact of natural hazards on local communities: understanding changes in homeownership rate after floods in Iowa." Selected Paper, MEA Annual Meeting, Cleveland, March 2023.
8. Zhu, K., Gopalakrishnan, S., and Smith, M. "Disaster-induced Migration Across U.S. States: The role of income heterogeneity." Selected Paper, AAEA Annual Meeting, Anaheim, August 2022.

## **TEACHING EXPERIENCE**

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AEDE 2501 Introduction to Sustainability (TA, 172 students)	Fall 2024
AEDE 6130 Applied Quantitative Methods III (Lab Instructor, 9 students)	Spring 2024
AEDE 4310 Environmental and Natural Resources Economics (Guest lecturer, 70 students)	Fall 2023, 2024
AEDE 4110 Managerial Economics (TA, 11 students)	Spring 2023
AEDE 3680 Regional Economics and Sustainable Growth (TA, 38 students)	Spring 2023
AEDE 5330 Benefit Cost Analysis (TA, 10 students)	Spring 2022

## **PROFESSIONAL SERVICE**

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Peer reviewer:

*Agricultural and Resource Economics Review*

Professional Membership:

*Association of Environmental and Resource Economists (AERE)*

*Agricultural and Applied Economics Association (AAEA)*

## **SOFTWARE**

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STATA, python, Arcgis, Matlab, R, Latex, Julia

**REFERENCES**

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Sathya Gopalakrishnan (gopalakrishnan.27@osu.edu)

Daniela A. Miteva (miteva.2@osu.edu)

Martin D. Smith (martin.smith@duke.edu)