

# **Fourth Year Students Research Challenge 2023-2024 Activities Report The Nexus Between Housing and Transportation in the Inland Empire**

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## 1 Introduction

This activity report, LTC 2023-24 Student Research Challenge provides an overview of our team's journey through various research initiatives and professional engagements. The general research question for this year's research challenge is to understand the nexus between housing and transportation in the Inland Empire of Southern California. We examined this topic through spatial, economic, and social-demographic elements. The following report covers the boot camp experience that included engagement with community experts, and field trips; developing a dashboard based on secondary data, the collection of primary research data presenting our research at several conferences such as the CRB-SEED Symposium, SCAG 2024 General Assembly student showcase, and presenting at the ASCE Conference. Our reasons for being part of this project were to learn, be a part of the solution for comprehensive urban development in the I.E., and positive change, and learn how to increase equity while empowering local communities.

## 2 Boot Camp- June 2 to 28, 2023

Our team received the project scope, timeline, and literature on housing and transportation. We began a boot camp on June 2, diving into project objectives and methodologies. The first week we were focused on research parameters and brainstorming for our August LTC Regional Mobility Dialogue presentation. The discussions during the first week were led by the faculty advisors. The second week entailed presentations by organizations like the Western Riverside Council of Governments (WRCOG) and South Coast Air Quality Management District (SQAQMD), along with a visit to the Southern California Association of Governments (SCAG) facilities, and a tour of LA's Union Station.

### 2.1 Presentations by Faculty Members June 20-21, 2023

Following the initial stages of the boot camp, our team engaged in a series of structured dialogues and presentations via Zoom and in person at the LTC. These sessions provided valuable insights from the faculty members and industry experts. The agenda included informative presentations by our faculty advising team Dr. Robert Stokes and Dr. Yongping Zhang, Dr. Raffi Der Wartanian. In addition, we were followed by an introduction to set the stage for our research parameters and a brainstorming dialogue by Dr. Kimberly Collins. In addition, we had special speakers and field trips.

### 2.2 Presentation by WRCOG and SCAQMD- June 21<sup>st</sup>, 2023

On June 21, experts from WRCOG—Taylor York, Program Manager-Clean Cities, and Casey Dailey, Director of Energy & Environmental Programs gave presentations on key issues surrounding housing and transportation in the I.E. Taylor York discussed the Clean Cities Coalition's transition to zero-emission transportation and its impact on disadvantaged communities. Casey Dailey covered transportation and land use in the Inland Empire, including population



trends, economic dynamics, and educational attainment, providing a basis for our research. Todd Warden, a Senior Public Legislative & Public Affairs Information Specialist at SCAQMD, spoke about hydrogen vehicles and air quality, showing us how a hydrogen car works and air quality monitoring filters. This presentation was held in the CSUSB parking structure near electric vehicle charging ports.

### 2.3 Field Trip to SCAG- June 26, 2023

On Monday, June 26, the LTC team including research student assistants and faculty advisors were invited to attend a field trip to the Southern California Association of Governments (SCAG). We traveled to downtown LA by Metrolink and the LA Metro subway.



#### 2.3.1 Exploring Regional Planning with SCAG Experts

During our visit to SCAG, we engaged with the organization's leadership team, who shared data and studies. We had two sessions: Session 1 covered Transportation, RDP, and Demographics, while Session 2 focused on Modeling, Housing, and Connect SoCal. Our discussions included the politics of regional planning and the complexities of balancing stakeholder interests in shaping Southern California's future. This experience enhanced our understanding of the practical applications of regional planning theories and demonstrated how data-driven decision-making and political considerations are intertwined in the planning process. Engaging with SCAG's leadership provided a deeper appreciation of the intricacies involved in urban and regional planning.

The speakers from SCAG included:

- Kome Ajise, Executive Director
- Sarah Jespon, Planning Director
- Courtney Aguirre, Planning Supervisor, Multi-Modal Integration Unit
- Scott Strelecki, Planning Supervisor, Good Movement Unit
- Jung H. Seo, Planning Supervisor, Data & Visualization
- Tom Vo, Principal Planner, Local Information Services Program
- Kevin Kane, Principal Planner, Regional Demographics & Growth Vision Program
- Ying Zhou, Planning Supervisor, Small Area Forecasting Unit
- His- Hwa Hu, Manager, Modeling & Forecasting Department
- Bayarmaa Aleksandr, Principal Transportation Modeler, Activity-Based Model & Model Data
- Mana Sangkapichai, Principal Transportation Modeler, Air Quality, Heavy Duty Truck & Model Operations
- Sergio Heredia-Melchor, Assistant Regional Planner, Housing Planning Unit
- Anita Au, Planning Supervisor, Performance Assessment, Monitoring & Strategy Unit
- Lyle Janicek, Senior Regional Planner, Regional Demographics & Growth Vision
- Jung H. Seo, Lead Analyst- Jobs Housing Fit Study, Planning Supervisor, Data & Visualization

The field trip to SCAG provided insights into regional planning and transportation initiatives, contributing to our research and professional development for our research. Following this, we toured Union Station-LA Metro.

#### 2.4 Tour of Union Station-LA Metro

LA Metro provided a tour of downtown Los Angeles' Union Station. The group learned about its infrastructure and operations. The tour included the Historic Ticketing Hall and artworks in the Gold Line portal. We explored areas not typically open to the public and gained insights into the station's design and functionality. The guide explained Union Station's role in connecting communities, reducing congestion, and fostering sustainable transportation. The tour concluded with a group photo before departing for San Bernardino Depot.



#### 2.5 Boot Camp Brainstorming Sessions

As the boot camp concluded, the final days were dedicated to debriefing sessions where we brainstormed and refined our research questions. This session marked a transition toward the active phase of our research. We established a bi-weekly presentation schedule to track our progress and showcase our achievements. We decided to focus our research on the nexus between housing and transportation in disadvantaged communities within the Inland Empire, aiming to improve the quality of life and retain professionals in the region. Each presentation demonstrated our evolving understanding and incremental strides toward unraveling the complexities of this intersection.

### 3 Research Deliverables

#### 3.1 Secondary Data Collection

We collected secondary data from various sources, including the U.S. Census Bureau, the Bureau of Transportation Statistics, the California Department of Transportation (Caltrans), and the California Office of Environmental Health Hazard Assessment. Additionally, insights were gained from reports by organizations such as the California Legislature's Nonpartisan Fiscal and Policy Advisor and the Center for Neighborhood Technology (CNT). These sources provided information to analyze the nexus between housing and transportation. Using these data, we developed a dashboard to foster accessibility and promote informed decision-making among residents of the Inland Empire, offering easy access to crucial information about the region's transportation, housing, and demographics.

Using ArcGIS Pro, we visualized the collected data through maps and charts. This provides a tool for researchers, students, and community members, to explore metrics such as housing affordability, underserved community distribution, and demographic profiles including race, age, and income. Our dashboard highlights demographic disparities and socioeconomic challenges, aiming to identify areas needing targeted interventions and support, promoting inclusivity and equity in the region.

### 3.2 Primary Data

The study gathered primary data through a survey of students (upcoming professionals) from California State University, San Bernardino (CSUSB), and the University of California, Riverside (UCR). The “Inland Empire Housing, Transportation & Quality of Life” survey, aimed to gather insights into housing affordability, transportation efficiency, and quality of life in the Inland Empire region. This survey formed part of the methodology designed to examine challenges and opportunities faced by students and residents in the area.

#### 3.2.1 Research Approach and Institutional Review Boards (IRB)

This portion of our work began with preparing the survey instrument. The survey was designed with input from stakeholders, and aimed to understand housing affordability and transportation efficiency’s impact on professionals in the Inland Empire. We tailored the survey to address the I.E., community's unique challenges and opportunities. Institutional Review Board (IRB) approval was obtained to ensure, ethical research conduct. The survey was segmented into sections covering relevant topics on housing, transportation, quality of life perceptions, and demographics. Before implementing the survey tool throughout the community, we conducted a pilot test with thirteen participants which helped refine the study, discard irrelevant questions, and integrate new ones. Sections were reorganized and feedback from our faculty advisory team and the San Bernardino Transportation County Association (SBTCA) prompted adjustments and the integration of two additional questions regarding students’ awareness of public transit incentives.

#### 3.2.2 Research Design, Sampling and Analysis

We interviewed students at the two largest public universities in the Inland Empire to understand how housing and transportation impact quality of life. The two-month process to create the survey was designed with 40 questions in multiple-choice, Likert scale, and open-ended formats. Random sampling ensured diverse representation, with recruitment through emails, associations, social media, and in-person methods. Survey responses were collected and analyzed through Qualtrics, we created crosstab tables to explore and analyze the responses received from upcoming professionals.

## 4 Conferences and Presentations

### 4.1 Introduction

Our team’s involvement in conferences and symposiums showcased our commitment to advancing sustainable solutions. We presented research papers addressing the nexus between housing affordability and transportation efficacy; and showcased projects that tackled sustainability-related planning challenges, such as eco-friendly public transit solutions and building initiatives. Through participation in these events, we engaged in invaluable knowledge and garnered recognition for the quality and relevance of our contributions. The three conferences included one pure academic event; one community-based event; and one mixed academic/government/industry event: the 1<sup>st</sup> Colorado River Basin Symposium on Sustainable Energy, Environment, and Urban Development (CRB-SEED), the Southern California

Association of Governments (SCAG) 2024 General Assembly Student Showcase, and the American Society of Civil Engineers (ASCE) International Conference, respectively.

## 4.2 CRB-SEED Symposium, University of Nevada, Las Vegas -March 14 & 15, 2024

### 4.2.1 Symposium Overview

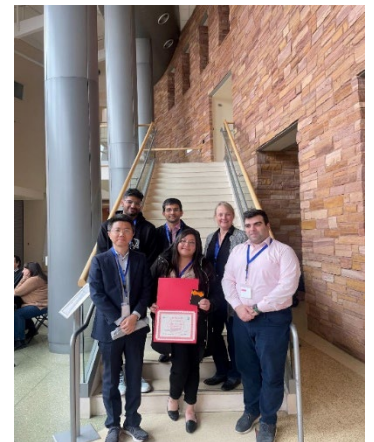
Our team participated in the 1<sup>st</sup> Colorado River Basin Symposium on Sustainable Energy, Environment, and Urban Development (CRB-SEED)) at the University of Nevada, Las Vegas (UNLV) on March 14 & 15, 2024. The symposium aimed to foster collaboration and innovation in sustainable development among students from various disciplines and universities. CRB-SEED provided a platform for STEM researchers from Hispanic Serving Research Universities (HSRUs) and other institutions to exchange ideas and address critical challenges in sustainable energy, environment, and urban development. Key components included paper presentations, keynote speakers, panel discussions on funding opportunities, and facility visits at UNLV. Participants submitted a one-page abstract by January 17, 2023, focusing on water resource management, climate change, sustainable housing, transportation, sustainable environment, and renewable energy.



### 4.2.2 Team Representation

Carolina Carlos represented our team, created the PowerPoint presentation, and presented our findings at the CRB-SEED Symposium with the advisors' assistance.

Our presentation, “Connecting Affordable Housing with Inclusive Transportation Infrastructure,” was part of Session T2 Sustainable Environment. It used visualization techniques, including maps illustrating socio-economic disparities, housing burden, and transportation accessibility scores. Regression analysis provided a basis for policymaking, emphasizing the need for integrated solutions to challenges faced by disadvantaged communities in the Inland Empire. The presentation highlighted future directions, advocating for inclusive development in housing and transportation policy through community engagement.



### 4.2.3 Recognition and Gratitude

Our presentation received a special recognition certificate among thirty-five presentations, standing out in one of the three highly competitive sessions. This reflects the efforts of our team members and advisors. We appreciate the opportunity to contribute to the 1<sup>st</sup> CRB-SEED Symposium.

## 4.3 Invitation to Participate in The Southern California Association of Governments 2024 General Assembly Student Showcase May 2 & 3, 2024

#### 4.3.1 SCAG Overview

Our team participated in the Southern California Association of Governments (SCAG) 2024 Student Showcase during the General Assembly in Palm Desert on May 2-3, 2024. We presented our projects addressing sustainability-related planning issues at local and regional levels.

#### 4.3.2 Team Representation

Carolina represented our team at the conference, presenting our findings on “Housing Affordability and Transportation Efficiency in the Inland Empire”. The presentation included maps on socio-economic inequalities, housing affordability burdens, and transportation accessibility, concluding with future directions for policy advocacy.



The project was presented to elected officials and planning professionals at the 2024 Student Showcase. We engaged in a Q&A session after our presentation. The competition included two Jury and two audience awards, with certificates and cash prizes from the Southern California Association of Governments.

#### 4.3.3 Recognition and Gratitude

Our poster won the Jury Award for Best Poster. This recognition reflects the team’s dedication and the support of our advisors. We are grateful for the opportunity to participate in the 2024 Student Showcase and General Assembly of SCAG.



#### 4.4 American Society of Civil Engineers (ASCE) International Conference on Transportation & Development- June 15<sup>th</sup> to 18<sup>th</sup>, 2024

##### 4.4.1 Introduction

The team participated in the ASCE International Conference on Computing in Civil Engineering in Atlanta, Georgia, from June 15 to 18, 2024. We presented a paper and poster titled “Balancing Housing Affordability and Transportation Efficiency in the Inland Empire” under the Sustainable Transportation and Urban Development track.

##### 4.4.2 Team Representation

Carolina had the opportunity to attend and represent our team at the ASCE International Conference on Transportation and Development (ICTD 2024). The event provided a platform for networking with industry professionals, participating in workshops, and showcasing our poster alongside other student and faculty presentations. This experience facilitated the exchange of ideas and insights on advances in transportation and development, offering valuable feedback and connections for future projects.

## 5 Conclusion

The collaborative efforts of the team, comprising of MPA, MPP, and civil engineering students, have resulted in a number of deliverables that address housing affordability and transportation efficiency in the Inland Empire region. Throughout our journey, from participating in sessions like the boot camp to presentations at conferences like SCAG 2024 General Assembly Student Showcase, we have continuously strived to advance knowledge, promote equity and drive positive change.

Our engagement with organizations such as the American Society of Civil Engineers (ASCE) International Conference, and Southern California Association of Governments (SCAG), and participation in events like the CRB-SEED Symposium has not only provided learning experiences. Still, it has also garnered recognition for our work. At the CRB-SEED Symposium, our presentation received a special recognition certificate, affirming the relevance of our research. Similarly, our poster presentation at the SCAG 2024 Student Showcase was selected as one of the two winners by the jury, affirming the significance of our efforts in addressing sustainability-related planning issues.

## 6 Acknowledgements

We sincerely thank the Leonard Transportation Center at California State University, San Bernardino, the University of California, Riverside, and California Polytechnic State University for their support and resources. Special thanks to Dr. Kimberly Collins, Executive Director, for her leadership and guidance throughout this project. We also acknowledge our faculty advisor's collaborative efforts and guidance: Dr. Raffi Der Wartanian, Mr. Rick Bishop, Dr. Youngping Zhang, and Dr. Robert Stokes. Their mentorship has significantly contributed to our academic and personal growth.