

Center for Applied Spatial Analysis

Annual Report: Academic Year 2022 – 2023



California State University Stanislaus

by: Dr. José R. Díaz-Garayúa and Dr. Alison McNally

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Letter from the co-Directors

Colleagues and Friends,

The Center for Applied Spatial Analysis (CASA) has been actively working since 2019. Every year, CASA's board meets to review the achievements led by the co-directors. This brief report provides information about CASA's initiatives and activities for the Academic Year 2022-2023 that have been contributing to Stanislaus State's Mission, Vision & Values.

This report on both physical and applied human geography achievements assures to the Stan State community and its leadership CASA's *raison d'être*:

- Service – providing programs to the university & general community.
- Teaching – as a source of extracurricular workshops.
- Research – producing and publishing project-related work.
- External Funding – attracting revenues to invest in our students.

This academic year CASA has continued working on a series of projects. These projects have been the result of contracts and grants. Also, other projects to be developed with the intention to continue attracting external funds.

Dr. Díaz-Garayúa (PI) continues working with Dr. Song (co-PI) from UC Merced on the tobacco control pipeline, a subvention of around 1.4 million dollars where Stanislaus State has benefited with over one million dollars. This project is being supported by board member Dr. Meggan Jordan (co-I).

In addition, Dr. Díaz-Garayúa (PI) got a subvention of over \$50,000 from Stanislaus County's Health Services Agency to interview park users. This project was supported by Dr. Ryan Logan (co-PI) from Anthropology. The external funds were mostly used to hire student Research Assistants that contributed to this work while gaining applied experience.

Dr. McNally has secured over \$45,000 in funds with Dr. Stephen Drouin from CERC. In addition, she has received a \$2,000 unrestricted gift from her participation in the Google explore CRS program.

All accomplishments are summarized in this report. We profoundly thank the support of our Advisory Board:

- Dr. Peggy Hauselt, Chair of the Department of Anthropology, Geography & Environmental Resources.
- Dr. Meggan Jordan, Associate Professor of Sociology & Representative for the College of the Arts, Humanities, and Social Sciences.
- Dr. Melanie Martin, Professor of Computer Sciences and Representative for the College of Sciences.
- Mr. Darrell Cordova, Manager of Triple C Farms, LLC and a Community Member.

We also want to extend our most sincere gratitude to Norma Cordova. Likewise, we thank Mr. Cameron Pallotta, M.S., who was the Keck Computer Lab Manager until 2022 and has supported CASA's initiatives. Similarly, we thank Mrs. Lori Philips and Ericka Sweitzer Dores for their administrative support, going beyond their basic workload. In addition, we want to recognize with our deepest appreciation the continuous support of Dr. James Tuedio, Dean of the College of the Arts, Humanities, and Social Sciences as well as Provost Ogle and President Ellen Junn.

Best wishes,

José R. Díaz-Garayúa

José R. Díaz-Garayúa, Ph.D.

Associate Professor of Human Geography
Director of Geographic Information Systems
Co-Director of CASA

Alison McNally

Alison McNally, Ph.D.

Associate Professor of Physical Geography
Co-Director of CASA

Mission Statement

The Center for Applied Spatial Analysis (CASA) at California State University, Stanislaus offers geospatial consulting services to the campus and regional community. In this capacity, it also serves as a conduit for outreach to our larger regional community. CASA coordinates internships, facilitates grant development, and conducts projects in partnership with campus and community members. These projects improve student learning by providing applied experiential learning and professional development opportunities.

Purpose of CASA

A) PURPOSE OF THE UNIT:

CASA offers an alternative space, with the potential for self-sustainability, to foster applied spatial analysis in the Central Valley and beyond, stimulates transdisciplinary and collaborative geospatial research among faculty members, research, and professional experience for undergraduate and graduate students, and a venue to attract external funding through grant writing proposals and the offering of professional services for both public and private sectors that are key to the development of student service learning. In addition, CASA will offer support to local community groups who can benefit from geospatial application and analysis.

B) NEED FOR THE UNIT:

Our campus currently lacks a dedicated center for faculty, staff, and students to request research assistance as it relates to geospatial analysis (including maps and other graphic displays of geographic

data). CASA will offer the organizational structure to support such research requests, as well as requests from our six-county service region. CASA will also offer the much-needed flexibility to integrate student Service-Learning opportunities with these research programs, thus strengthening ties with our campus and local community.

C) NATURE AND SCOPE OF ACTIVITIES:

CASA and its partners will work to develop project proposals, workflow activities, and deliverables for each project the Center is involved with. Projects may include any of the following, according to specific needs of the project:

- I. Cartography and Visualization (traditional, internet, etc.): CASA would work with partners to determine appropriate deliverable cartographic products for the proposed project. These products may include traditional paper maps, online or web mapping, animations or 3-D visualization, or other products. CASA will work to ensure that proper cartographic methodologies are adhered to when developing these products and to ensure publication or reproductive suitability.
- II. Remote Sensing Data Preparation and Analysis: Remotely sensed data, including multispectral and hyperspectral satellite data, aerial imagery, LiDAR data, UAV data, and GPS data, is being utilized across disciplines (e.g. geography, agricultural studies, biology, ecology, hydrology, etc.) and for a variety of applications (e.g. land use change, climate studies, urbanization, crop health, irrigation management, etc.). Applications and use of remotely sensed data are expected to increase as larger and more robust remotely sensed data are widely available often times at no cost. Processing of remotely sensed data requires the use of image processing software and a specialized set of training/skills to interpret and produce accurate

results. CASA would provide the skills and training necessary to collect and analyze remotely sensed data.

III. Spatial Statistics and Analysis: Analysis of spatial relationships is a key component of geographical research because it allows for analysis of various phenomena that occur over geographic space and time, and considers how these variables are related. Because variables may be related, a special set of statistical tests are employed to correctly recognize and analyze spatial data. Spatial data are often collected and stored in various formats, which presents a potential problem for data manipulation and exchange. CASA will work with partners to provide the expertise and skills necessary for collection, storage, management, and appropriate analysis of geospatial data.

IV. GIS Database Development and Design: Data involved in geospatial analysis can take many formats, thus the potential for improper data analysis exists. Geospatial data must be managed in a database that has the ability to integrate easily into GIS software. Collection and maintenance of spatial databases requires proficiency with GIS software, and knowledge of how geospatial data is integrated into other software systems. CASA can provide geospatial database support, and/or provide guidance necessary for data acquisition.

V. 3D Visualization and Spatial Modeling: 3D visualizations can play a key role in communicating geospatial data to a varied audience. Spatial modeling applications are increasingly used to explore potential scenarios given a set of particular conditions. Recent applications of 3D visualization and spatial modeling include climate change scenarios, habitat analysis for endangered species, population growth, land use conversion, and changing agricultural cropscales. CASA will work with

partners to develop visualizations and/or modeling tools that allow for analysis of geospatial data.

VI. Preparation and Analysis of Field Data: CASA will assist partners in collection, processing, and/or maintenance of a variety of field data. These field data may include those data collected with GPS and other sensors. CASA can provide skills necessary to integrate these field data into a database suitable for geospatial analysis.

D) CURRICULAR OFFERINGS:

Short Courses and Instructional Modules: CASA recognizes the importance of specialized training, especially on a university campus. CASA will be available to develop custom instructional material for short courses, workshops, and other types of training sessions (see listings below). Curricular offerings will not compete with courses already incorporating geospatial technologies in their curriculum, but rather will serve as an introductory exposure to similar technologies.

1. Short courses/workshops – short courses to inform campus and community members of readily available resources such as open source or proprietary toolkits (ArcGIS Pro, R, etc.), general instructions for using GPS devices and downloading acquired data will be offered. Additionally, short term workshops can be set up to guide the campus community when they are setting up projects that involve geographic research components (concepts, methods, technical application etc.)
2. Studio/seminar courses – formal courses will be structured for current students (as CASA consultants) to share consulting experiences, up-to-date application and education material that could further enrich geographical education and research on campus.

CASA's Achievements

1. PEOPLE SERVED AT WORKSHOPS, SHORT COURSES, OR TRAININGS

Number of students, faculty, and staff served in workshops, short courses, or trainings.

During this Academic Year 2022 – 2023, CASA facilitated **1 workshop**:

- 1) **Dr. McNally** delivered a workshop that engaged students from Stanislaus State, UC Merced, and Merced College. This 2023 workshop was on flood data collection along Bear Creek, Merced.



FIGURE 1. UC DAVIS STUDENT COLLECTING FLOOD DATA IN MERCED

2. NUMBER OF COMMUNITY MEMBERS AND ORGANIZATIONS SERVED AT PROGRAMMATIC EVENTS

Number of community members served through campus programming.

During this Academic Year 2022 – 2023, CASA facilitated **two programmatic events**: 1) *GIS Day* and 2) *GeoWeek*.

1. **GIS Day** was organized by **Dr. Peggy** Hauselt on Tuesday November 15. There were several presentations and the induction ceremony of the Gamma Theta Upsilon.
2. **GeoWeek** event was organized by **Dr. Díaz-Garayúa** with collaboration of College Corps.

These events served around 60 persons in total.



FIGURE 2. INDUCTEES OF THE GAMMA THETA UPSILON AT THE GIS DAY

3. This year's **Science Day** took place on Saturday, March 11, 2023. Science Day, established and principally directed by **Dr. Grobner**, is oriented to expose young students and visitors to a variety of fields in science, especially in STEM. **Dr. McNally** has been the key person working on this event for years and has been able to represent the Geography & Environmental Resources Program as well as CASA. **Dr. McNally** and **Dr. Hauselt** co-led pollinator activities and Pollinarium Tours and served approximately 400 **persons**. Figure 3 shows some of the participants at this activity.



FIGURE 3. SCHOOL STUDENTS FROM STANISLAUS STATE SERVICE AREA WORKING ON A POLLINATOR ACTIVITY

4. **Dr. Díaz-Garayúa's** Smoke and Vape Free Scholars Initiative served several sectors of communities in Turlock and Merced through the recording and cleaning of Tobacco Waste. **Drs. Díaz-Garayúa** and **Jordan** with Stanislaus State and UC Merced students served 4 sectors in three days of work. The impacted areas were Broadway Park and South Downtown Turlock and 11th St bordering Merced County Fair and West Main St Block 400 in Downtown Merced.



FIGURE 4. SMOKE & VAPE FREE SCHOLARS TEAM FROM STANISLAUS STATE AND UC MERCED WORKING ON TOBACCO WASTE RECORDING AND CLEANING AT BROADWAY PARK, TURLOCK

3. NUMBER OF PROJECTS PARTNERSHIPS, GRANTS, & CONTRACTS

Number of projects that included student researchers.

During the Academic Year 2022 – 2023, CASA has secured a **contract** with the Stanislaus County Health Service Agency and has been working on **two CASA projects** for Research Development.

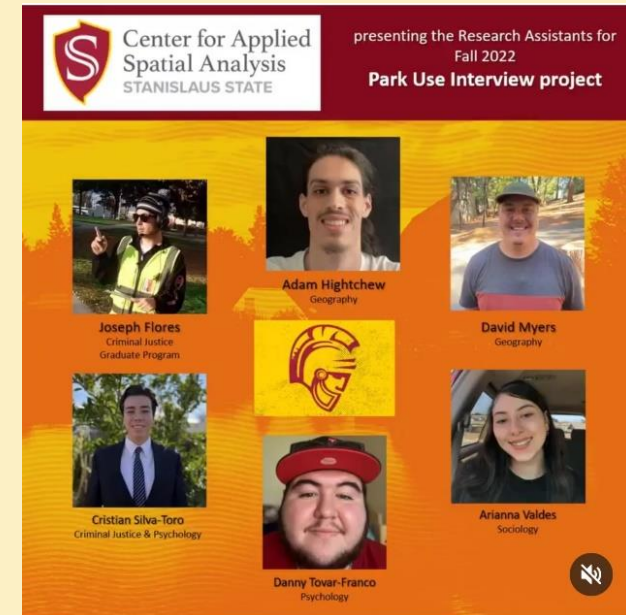
1. The Stanislaus County Health Services Agency commissioned **two works** on Park Use. These Applied Human Geography projects consisted of the digitalization of parks, interviews and others to assess of park use. This project, led by **Dr. Díaz-Garayúa (PI)** and **Dr. Ryan I. Logan (co-PI)**, with **6 (paid) Research Assistants**.

- 📍 Joseph Flores, Criminal Justice (**Research Assistant**), Fall 2022
- 📍 Adam Hightchew, Geography (**Research Assistant**), Fall 2022
- 📍 David Myers, Geography (**Research Assistant**), Fall 2022
- 📍 Cristian Silva-Toro, Psychology (**Research Assistant**), Fall 2022
- 📍 Danny Tovar-Franco, Psychology (**Research Assistant**), Fall 2022
- 📍 Arianna Valdes, Sociology (**Research Assistant**), Fall 2022

2. The Front Yard Project is an ongoing pilot study that continue its developing with collaboration of College Corps. College Corps has provided a subvention for 5 research assistants. This Applied Human-Environment project is led by **Dr. Díaz-Garayúa (PI)**. The research assistants for this academic year are:

- 📍 Ariana Carlos, Biology (**Research Assistant**), 2022-2023
- 📍 Moriah Do, Business Administration (**Research Assistant**), 2022-2023
- 📍 Patrick Ejinaka, Criminal Justice (**Research Assistant**), 2022-2023
- 📍 Andrea Schoepf, Geography (**Research Assistant**), 2022-2023
- 📍 Amelia Velazquez, Computer Science (**Research Assistant**), 2022-2023

FIGURE 5. CASA'S PROMOTION OF RESEARCH ASSISTANTS WORKING ON THE PARK USE PROJECT



3. A Spanish Captioning Project, led by **Dr. Díaz-Garayúa**, looks to support Stanislaus State, a Hispanic Service Institution, by captioning, in English and Spanish, Guest Lectures that were videorecorded during GeoWeek and GIS Day.

This will benefit the deaf and hearing impaired as well as the Spanish speaking community. Specifically, with this project CASA attempts to lead by example on what ought to be a Hispanic Service Institution. The Research Assistant was:

- 📍 Vanessa Negrete, Psychology (**Research Assistant**), 2022-2023

5. **Dr. Mirta Maldona Valentín** (English) and **Dr. Díaz-Garayúa** will explore the Linguistic Landscape of selected areas in the Central Valley. This is a product of common interests explored during the 2022 GeoWeek's lecture of Dr. Jhonni Carr and the 2022 LanguageScape Workshop (See 2021-2022 Annual Report).
6. **Dr. McNally** continues her work with Project Orca and water quality along the Tuolumne River through Service Learning and College Corps. College Corp is funding three interns:
- 📍 Skyler Davis (Geography & Environmental Resources) (**Research Assistant**), 2022-2023
 - 📍 Cassandra Moya (Spanish) (**Research Assistant**), 2022-2023
 - 📍 Riley Pukey (English) (**Research Assistant**), 2022-2023
7. A collaboration between the Community Equity Research Center (CERC) and the Center for Applied Spatial Analysis (CASA) is being led by **Dr. McNally** for the development of a Community Equity Index Dashboard (CEID). The funds have been recently awarded providing a subvention for one graduate or two undergraduate students to work on CEID under **Dr. McNally's** supervision.
8. **Dr. McNally** and **Dr. Hauselt** are Co-PIs on a College Corps project developing a pollinator garden on campus. The pollinator garden is an extension of work completed by the Restorative Human Ecology course, co taught by Drs. McNally and Hauselt. This work provides students an opportunity to gain valuable research experience while giving back to the campus community.
- 📍 Vivian Marquez (Sociology) (**Research Assistant**), 2022-2023
 - 📍 Jessica Pacheco Cordova (Biology) (**Research Assistant**), 2022-2023
4. **Dr. Díaz-Garayúa** continues his Smoke and Vape Free Scholars Initiative (SVFSI) grant. As Stanislaus State Co-PI, **Dr. Meggan Jordan** has been providing vital support for the first cohort. Our Scholars for this first cohort are:
- 📍 Lara Al-Jaser, Sociology (**Scholar**), (2022-2023)
 - 📍 Gianna Nunes Kinesiology (**Scholar**), (2022-2023)
 - 📍 Monica Montenegro, Psychology (**Scholar**), (2022-2023)
 - 📍 Asha Nair, Sociology (**Scholar**), (2022-2023)
 - 📍 Jacqueline Villaseñor, Kinesiology (**Scholar**), (2022-2023)



FIGURE 6. CASA'S PROMOTION OF THE FIRST COHORT OF THE SMOKE & VAPE FREE SCHOLARS

4. EXTERNAL & INTERNAL FUNDING

Number of grants, contracts, and fundraising.

CASA has attracted and secured funds until 2025. However, during the Academic Year 2022 – 2023, CASA brought another contract from the Stanislaus County’s Health Service Agency. This was a subvention of over \$50,000. In addition, an IRA grant was awarded, and it will be used as research seed money and for other CASA’s activities and events. Figure 4 shows the amount of dollars previously estimated (grey) and achieved (red) for 2023 received in funds just for Applied Human Geography initiatives.

Although CASA was successful in 2 out of 3 initiatives, these efforts brought an addition of almost \$60,000 more to subsidize experiential learning for more than a dozen students (see Page 7, Project 1 for student’s names).

1. 2022 – 2023, Contract, Stanislaus County Health Services Agency, **Dr. Díaz-Garayúa (PI) & Dr. Logan I. Ryan (co-PI)**.
Amount: **\$50,256.03 (granted)**
2. 2022 – 2023, internal grant, PCDI, **Dr. Díaz-Garayúa (PI)**.
Amount: **\$7,520.40 (not granted)**
3. 2022- 2023, internal grant, IRA Funds, **Dr. Díaz-Garayúa (PI)**.
Amount: **\$8,242.68 (granted)**

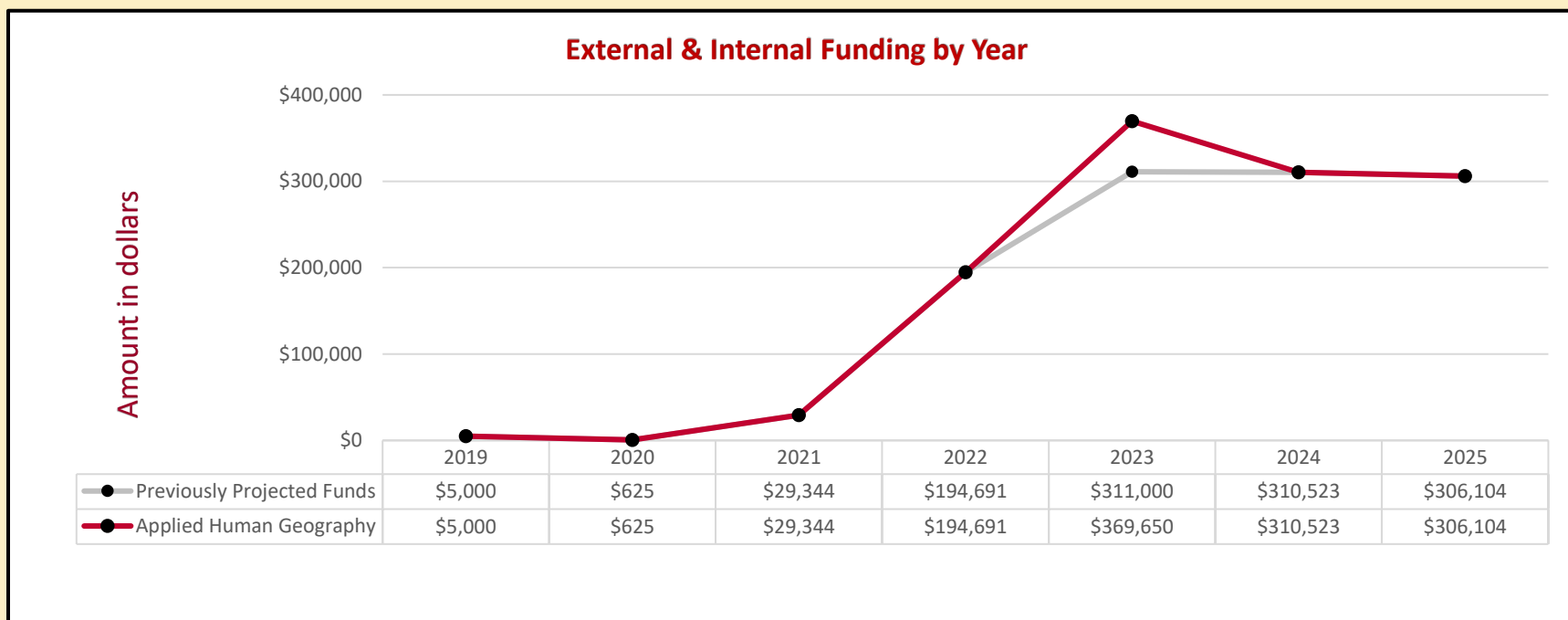












FIGURE 7. EXTERNAL & INTERNAL FUNDING: APPLIED HUMAN GEOGRAPHY

4. 2022 – 2023, external grant, CERC and CASA, **Drs. McNally and Drouin (Co-PIs)**
Amount: **\$59,267 – funded (\$45,599 to CASA)**
5. 2022- 2023, Google exploreCSR program, Dr. Ayat Hatem PI (CSU Stanislaus Computer Science); Dr. McNally Co-PI; Dr. Santosh Chandrasekhar Co-PI (UC Merced Computer Science); Professor Kathy Kanemoto Co-PI (Merced College Computer Science)
Amount: **\$32,000 (funded, \$2,000 to Dr. McNally)**
6. 2022- 2023, Department of Education Basic Needs Grant Project, Dr. John Wittman PI (English); Dr. Yamini Bellare Co-PI (Psychology)
Amount: **\$938,088 (under review)**
Dr. McNally Asset Mapping Project Lead (\$34,165)
7. 2022- 2023, USDA From Learning to Leading; Cultivating the Next Generation of Diverse Food and Agricultural Professionals **Dr. McNally** as PI; **Dr. Peggy Hauselt** and **Dr. Austin Awwunudiogba** Co-PIs (Geography & Environmental Resources); Dr. Matthew Cover Co-PI (Biology); Dr. Tyler Schafer Co-PI (Sociology)
Amount: **\$4,908,459 for 5 years (not granted)**

5. OTHER ACCOMPLISHMENTS

Other accomplishments include but are not limit to Networking, Service Learning, Community Service, Professional Development, etc.

CASA's work is not limited to the previous four categories. CASA extends it work according to its capacity. Below is list of other achievements that have permitted the development of professors, students, and the Geography & Environmental Resources Program while serving at local, regional, national, and international levels.

1. **Dr. Díaz-Garayúa** | Collaboration with **Rafael Espinosa**.
 -  Acquisition of two (2) computers for CASA
 - Processor: i7-10700 2.9 GHz
 - RAM: 32 GB
2. **Drs. Hauselt and McNally** | Collaboration with College Corps.
 -  Stanislaus State Pollinator
 -  Internships Opportunities
3. **Dr. Díaz-Garayúa** | Collaboration with College Corps.
 -  Front Yard Research Project
 -  Internships Opportunities
 -  Research Development
4. **Dr. Díaz-Garayúa** | Collaboration with the California Spanish Working Group.
 Faculty Lead: **Covadonga Lamar Prieto**, UC Riverside
 Objective: to create a series of methodologies and pedagogical approaches that can be applied to the sociolinguistic mapping of California Spanish.
 Participants:
 -  UCR, UCB, UCSD, and UCLA
 -  CSU, San Marcos, Pomona, SDSU, CSUN, Stanislaus & Bakersfield
 -  Loyola Marymount
 -  El Camino College, and Universidad Autónoma de Baja California



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