CASA's Annual Report: Academic Years 2019 – 2021

CALIFORNIA STATE UNIVERSITY Stanislaus | CASA

Center for Applied Spatial Analysis

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Front cover
Photo: Drs. Díaz-Garayúa and McNally at CASA
Credit: California State University, Stanislaus

Photo: Warrior Lake
Credit: California State University, Stanislaus

Welcome Message from the Co-Directors

Colleagues and Friends,

We are glad to report on the Center for Applied Spatial Analysis' (CASA) achievements since its opening during November 2019. This brief report provides information about CASA's initiatives and activities that have contributed not just to this center's but also Stanislaus State's Mission, Vision & Values.

CASA, a concept thought of and developed by several geography faculty members, and spearheaded by Dr. Alison McNally, took its physical form after a donation by Triple C Farms. This generous contribution made possible the establishment of this research center on university grounds on the Turlock campus and has contributed, since its first day, to the development of students, faculty, and community.

CASA's Open House took place on Wednesday, November 13, 2019 during the GIS Day organized by Dr. José R. Díaz-Garayúa with a grant from the California Humanities, which included a GIS workshop led by colleagues from ESRI. The GIS Day presented a speaker's series that included geographers, a planner, public health professionals, and a filmmaker (www.csustan.edu/geography/gis-day). During the open house, Dr. McNally addressed the guests about the importance of CASA. Dr. Ellen Junn, President of California State University, Stanislaus, also spoke in support of this endeavor. We were happy to welcome colleagues and friends that stopped by to express their support and request information about collaborations.

This is an important step for the advancement of the Geography Program and we take this opportunity to profoundly thank our Advisory Board:

- Dr. Peggy Hauselt, Director of Geography and Chair of the Department of Anthropology, Geography, and Ethnic Studies.
- Dr. Melanie Martin, Professor of Computer Sciences and Representative for the College of Sciences.
- Dr. Julia Sankey, Professor of Geology and Representative for the College of Sciences.
- Mr. Darrell Cordova, Manager or Triple C Farms, LLC and a Community Member.

We also want to extend our most sincere gratitude to Norma Cordova, of Triple C Farms, LLC. Likewise, we thank Mr. Cameron Pallotta, M.S., who is the Keck Computer Lab Manager and has selflessly supported the GIS Instructional Laboratory and CASA's initiatives. 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 Kimberly Greer and President Ellen Junn.

Best wishes,

José Díaz-Garayúa

José R. Díaz-Garayúa, Ph.D.
Associate Professor of Geography
Director of GIS
Co-Director of CASA

Alison McNally

Alison McNally, Ph.D.
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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, in particular, must be managed in a database that has the ability to integrate easily into GIS software. Collection and maintenance of spatial databases requires a 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 *cropscapes*. 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 setup 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

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

CASA envisioned to achieve, during its first three years, hosting one workshop or training session per academic year serving at least 20 students, faculty, or staff.

Summary:

A **workshop** that serve around 30 faculty members was organized as part of the **2019 GIS Day**.

1. The workshop was led by Michael Contreras, M.S. who is a Product Engineer at ESRI. ESRI (Environmental Systems Research Institute) created the *ArcGIS Pro* software we use in our courses and research. This workshop was delivered in LX2, the GIS Instructional Research Laboratory space on campus. This workshop served **20 faculty members** who participated and around **10** more attended.

   Unfortunately, due to the pandemic, CASA has postponed workshops and other in-person activities. Therefore, CASA does not expect to deliver another workshop in the GIS Instructional Research Laboratory (LX2) during the near future due to the pandemic.

2. Community & Organizations Served

Number of community members and organizations who benefitted from campus programming

Summary:

CASA has served over **435** community members and organizations since 2019.

1. Dr. McNally has been organizing geography-related activities during Science Day. Last year, her activity reached around **125 persons**. In addition, Dr. McNally has prepared a video on geocaching for the **2021 Science Day**. This video will serve the community not just during these difficult times but also afterward.

2. CASA has benefitted the campus community, the general public, and several organizations through the GIS Day programming. The **2019 GIS Day** brought not just the ArcGIS Pro workshop but also a program with speakers. This was made possible with the support of a small grant from California Humanities that permitted to bring together a Project Director, Dr. José R. Díaz-Garayúa (Geography), two humanities experts, Dr. Shannon Stevens (communication studies) and Dr. Brenda L. Ortiz Loyola (Modern Languages), and organize an eight speaker series: Michael Contreras, M.S.; Kevin Butler, Ph.D.; Gene Barrera, MCRP; Victoria Martínez, B.A. (Geography Alumna); Vanessa López-Asaah, MSW; Analisa Zamora, MPH; Sophia Garcia, B.A.; and Michelle Aguilar, M.A. This program, Geography meets the Humanities: A Focus on Social Justice, served over **170 persons** from students and faculty to community members and organizations.

3. Programming during 2020 was changed due to the pandemic. Nevertheless, the **2020 GIS Day** was a successful activity as well. During this program, we highlighted a product of CASA's first contract: Racially Restrictive Covenants in Modesto. This project was generously supported by community members who were also the citizen researchers and speakers at GIS Day. This program included Mrs. Sharon Froba, B.A. and Mr. David Froba, J.D. while Cameron Pallotta, M.S. and Dr. Díaz-Garayúa were moderators.

   This one-hour program attracted around **140 viewers** that had the opportunity to ask questions. This program was accessed by viewers from at least 24 cities including an out-state viewer from Newman, Georgia. The viewers were a diverse group such as state, county, and city employees as well as students and people from the private and non-profit sector.

   In California, this event reached as far as Humboldt in the north and Los Angeles in the south with many more viewers from Sacramento, San Joaquín, Stanislaus, and Merced counties (Figure 1). Equally important is to mention that this program served people representing different organizations: Stanislaus County, Turlock High, MJC, NAACP, California Rural Legal Assistance, California Global Education Project as well as students, faculty, and staff from CSU, Stanislaus, among others. The 2019 and 2020 GIS Days are archived and accessible in English with subtitles in English and Spanish through www.csustan.edu/geography/gis-day.

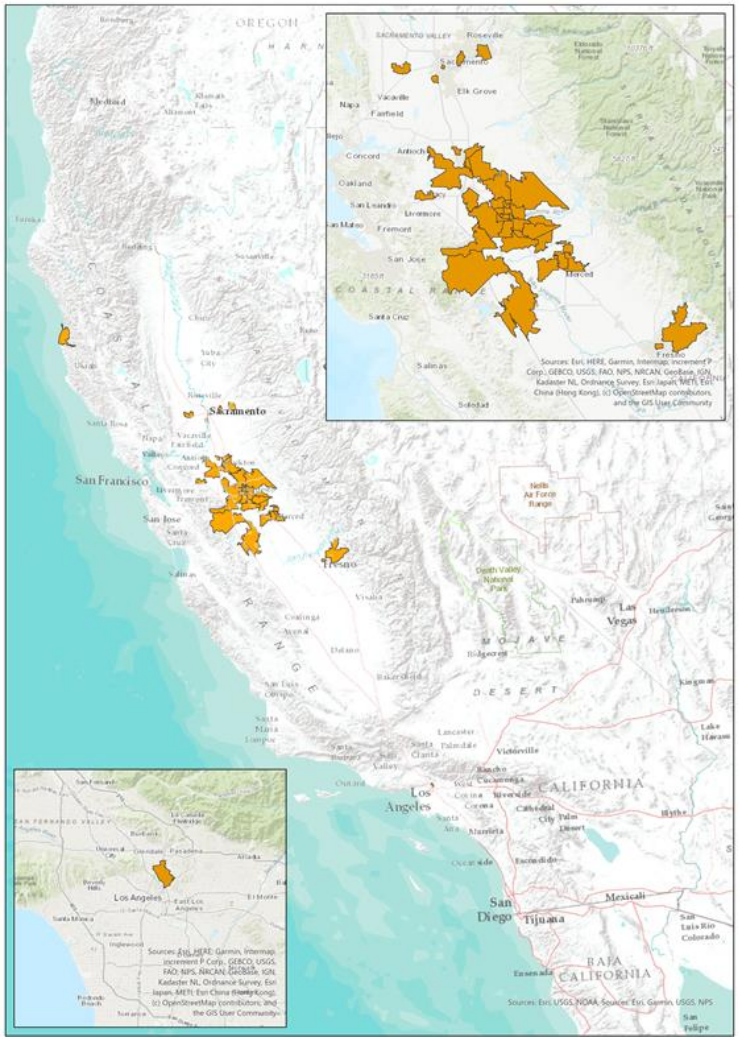

Figure 1. 2020 GIS Day program viewers from California.

3. Projects & Partnerships

Number of projects that include student researchers.

CASA envisioned developing at least one academic research project that includes student research.

Summary:

Unfortunately, the first contract in 2020 for the project on Racially Restrictive Covenants in Modesto could not bring students on board due to the pandemic.

Notwithstanding, several opportunities has been created for our students during Spring 2021.

1. 2021 has permitted us to resume field research. Dr. Díaz-Garayúa, in collaboration with the Regional Director of the California Global Education Project, Maureen McCorry, has initiated one project on Food Accessibility with 3 interns through the Office of Service Learning.
2. Dr. McNally has a partnership with the non-profit Wild Orca, in Washington. This partnership has permitted, through a Service Learning activity, to include 12 students from the Advanced GIS course.

4. External Funding

Number of grants, contracts, or fundraising.

CASA envisioned to obtain one source of external funding during its first three years.

Summary:

Below CASA enumerates the grants and contracts that were funded, not funded, and under review since 2019:

1. 2019, Grant – California Humanities, PI José Díaz-Garayúa, $5,000 (project funded).
2. 2020, Contract – Racially Restrictive Covenants Project, Digital Team: José Díaz-Garayúa & Cameron Pallotta, $605 (project funded).
3. 2020, Grant – National Endowment for the Humanities, PI José Díaz-Garayúa & Co-PI Steve Arounsack, $100,000 (project not funded).
4. 2021, Grant – Spencer Education, PI Devon Graves & Co-PI José Díaz-Garayúa, $49,984 (*under review*).
5. 2021, Grant – 100,000 Strong in America, PI Jennifer Helzer, $26,175 (*under review*).
6. 2021, Contract – Stanislaus Health Services Agency, PI José Díaz-Garayúa & Co-PI Ryan Logan, $76,270.13 (*under review*).

5. Other Achievements

CASA is not limited to the previous 4 categories. CASA extends it work according to its capacity. Below is a list of other achievements that have permitted the development of professors, students, and the Geography Program while serving at local, regional, national, and international level.

1. 2020, Networking with the City of Turlock
   - Internship prospects
     - Toby Wells, P.E., City of Turlock
     - Dr. Alison McNally, CASA, CSU Stanislaus
     - Dr. José Díaz-Garayúa, CASA, CSU Stanislaus
2. 2020, Networking with Stanislaus County
   - Internship prospects
     - Patricia Ortega-Ruiz, Software & Service Manager, Stanislaus County
     - Dr. José Díaz-Garayúa, CASA, CSU Stanislaus
     - Dr. Alison McNally, CASA, CSU Stanislaus
     - Dr. Peggy Hauselt, Director of Geography

   Kaley Lopez, geography major, applied and was accepted as a GIS intern in Stanislaus County in 2021. It is important to mention this is a paid internship position.

3. 2021, Service Learning

   - Wild Orca, Outreach material aimed at education, research, funding, and web mapping
     - Dr. Deborah Giles, Wild Orca
     - Dr. Alison McNally, CASA, CSU Stanislaus

4. 2021, Collaborative Research Project

   - Covid-19 in Mexico, Web Mapping Application
     - Dr. Oscar Hernández, Instituto de Investigaciones Sociales, UABC
     - Dr. José Díaz-Garayúa, CASA, CSU Stanislaus
     - Dr. Kevin Butler, ESRI

5. 2021, Collaborative Research Project

   - Food Accessibility, Web Mapping Application
     - Maureen McCorry, California Global Education Project, CSU Stanislaus
     - Dr. José Díaz-Garayúa, CASA, CSU Stanislaus

   Figure 2 shows the smartphone application that Dr. Díaz-Garayúa and Honors students have been using to gather data.

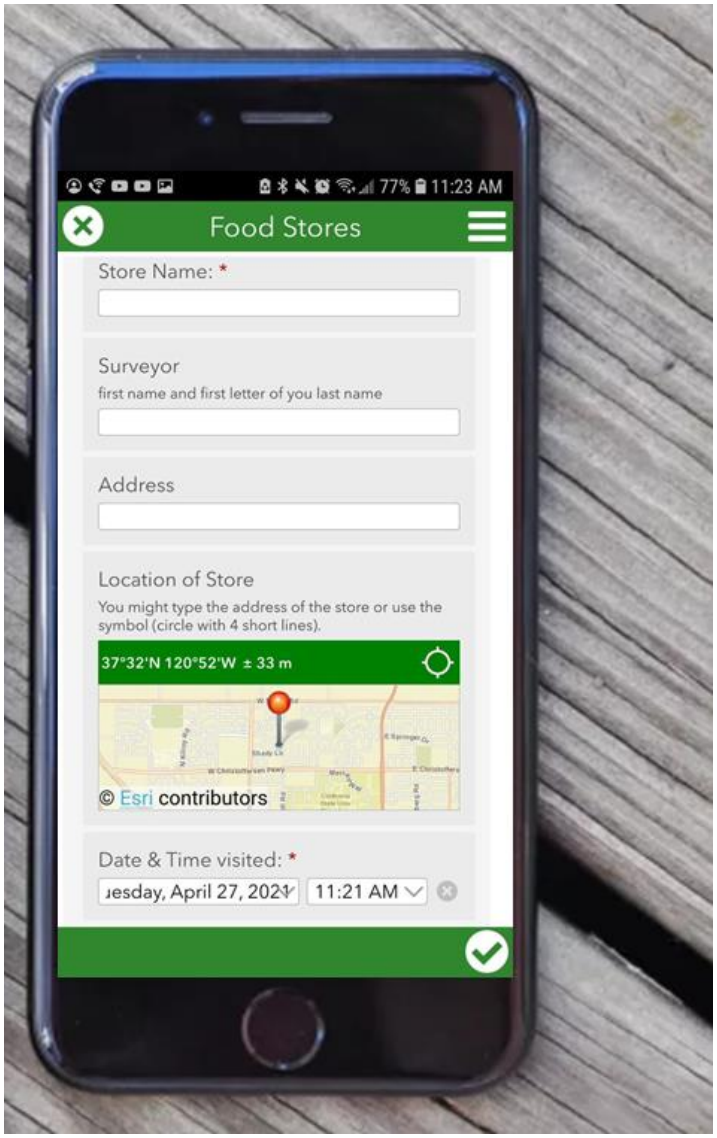

Figure 2. Survey 123, a smartphone application that have substituted the use of clipboards, permits to record latitude and longitude of the surveyed site, gather data (including photos, audio, and video), and upload it to the cloud with the press of a button.

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