UCSF
University of California
San Francisco

# NIH/NIA Predoctoral (F) and Postdoctoral (K) Grant Application

Sirena Gutierrez, PhD, MPH
October 9, 2024

# *Overview*

- Run-through of F Grant Application
- My timeline
- Lessons learned
- Acknowledgements
- Discussion

# *Research Training And Career Development*

***NRSA Program purpose?***

Ensuring that a diverse pool of highly **trained** scientists is available in adequate numbers and in appropriate research areas to carry out the Nation's biomedical, behavioral, and clinical research agenda.


## Fellowships & Career Awards

**T32 Institutional Training Grants (Predoctoral slots)**
**F30 Pre-doctoral Fellowships (MD/PhD Programs)**
**F31 Pre-doctoral Fellowships (Parent F31)**
**F31 Diversity Pre-doctoral Fellowships**

**T32 Institutional Training Grant (Post-doctoral slots)**
**F32 Individual Post-doctoral Fellowships**

**K22 Career Transition Award (some ICs)**
**K99-R00 Pathway to Independence Award**

**K12 Institutional Career Development Award**

**K01 Mentored Research Scientist Development Award**
**K08 Mentored Clinical Scientist Development Award**
**K23 Mentored Patient-Oriented K Award**
**K25 Mentored Quantitative K Award**

**K02 Independent Scientist Award**
**K24 Mid-career Award in Patient-Oriented Research**

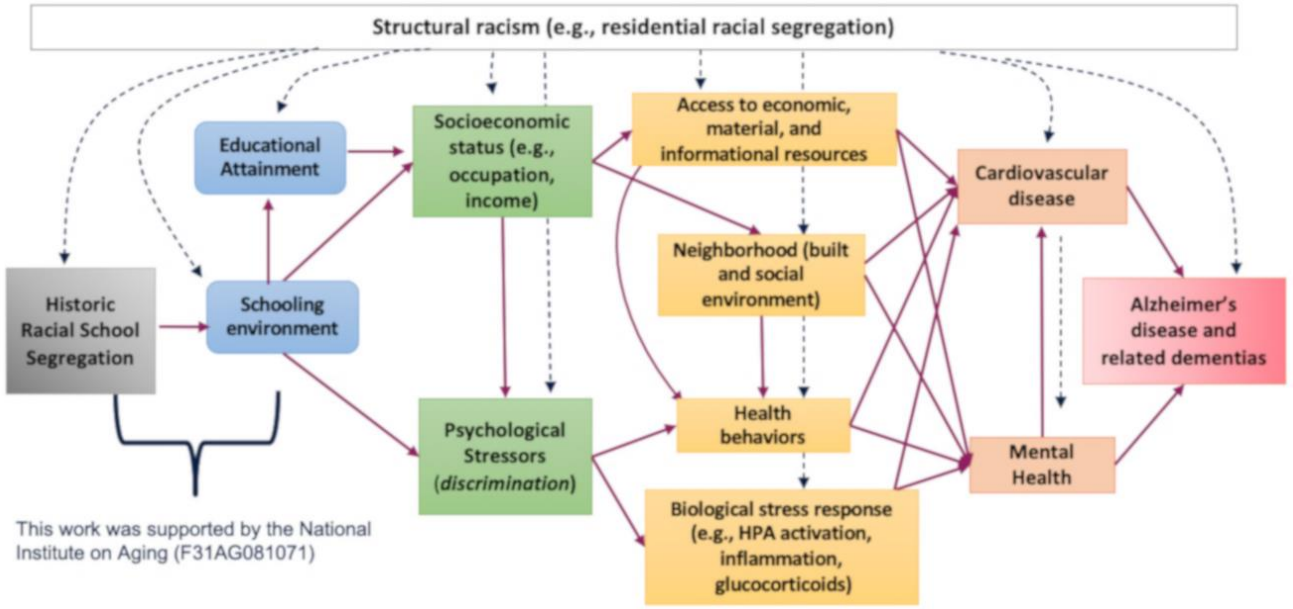
# *Quick run-through of F grant application*

Science (7 pages)

- Specific Aims (1 page)
- Research Strategy (6 pages)

Other (~68+ pages)

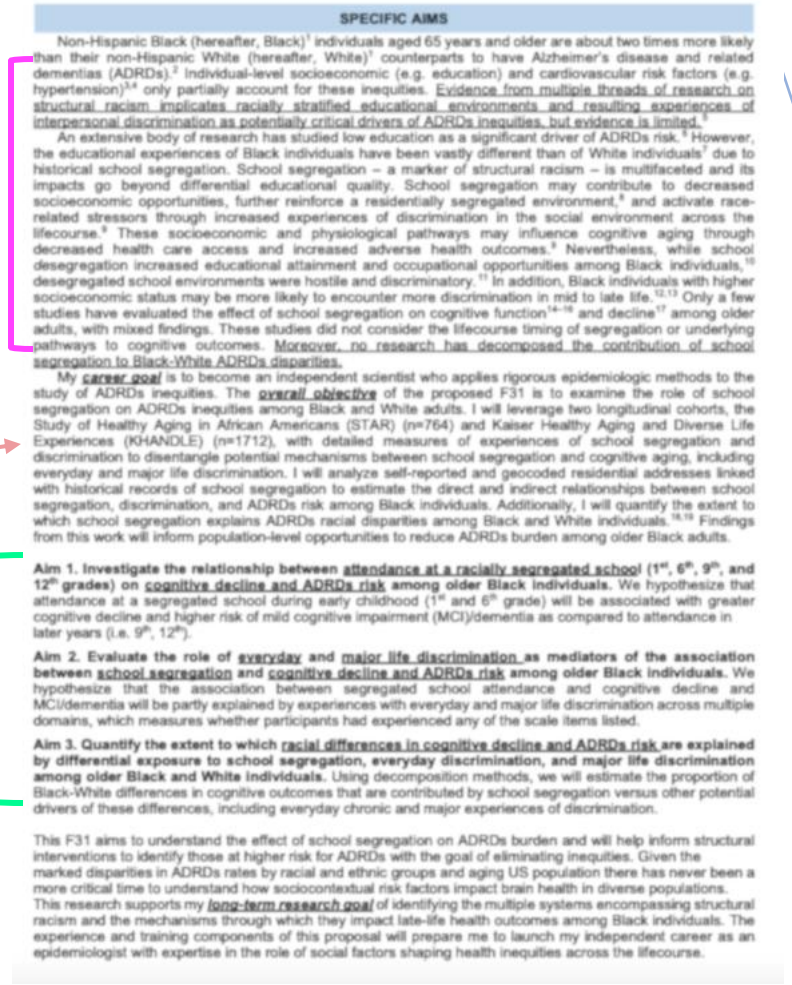
- Background & Goals for Fellowship Training (6 pages)
- Respective contributions (1 page)
- Selection of sponsor and institution (1 page)
- Sponsor and co-sponsor statements (6 pages)
- Letters of support from collaborators (6 pages)
- Institutional environment and commitment to training (2 pages)
- Reference letters (~8 pages)
- Biosketches (~30 pages)
- Cover letter, Abstract, Project Narrative, Facilities and Resources, Equipment, Human Subjects, etc. (~ 7 pages)
- Responsible conduct of research (1 page)




# SOME OF MY RESEARCH

# *Specific Aims!!!*

- Grabs the reviewer's attention immediately (bold/underline)
- Begin with an overall section
  - Burden of disease, research gap
  - Include some key supporting research
- Is roadmap for your application
- Aims are in sequential / logical order
  - Hypothesis
- State long-term objectives of research and expected *impact*



**SPECIFIC AIMS**

Non-Hispanic Black (hereafter, Black)[1] individuals aged 65 years and older are about two times more likely than their non-Hispanic White (hereafter, White)[1] counterparts to have Alzheimer's disease and related dementias (ADRDs).[2] Individual-level socioeconomic (e.g. education) and cardiovascular risk factors (e.g. hypertension)[3,4] only partially account for these inequities. Evidence from multiple threads of research on structural racism implicates racially stratified educational environments and resulting experiences of interpersonal discrimination as potentially critical drivers of ADRDs inequities, but evidence is limited.[5]

An extensive body of research has studied low education as a significant driver of ADRDs risk.[6] However, the educational experiences of Black individuals have been vastly different than of White individuals[7] due to historical school segregation. School segregation – a marker of structural racism – is multifaceted and its impacts go beyond differential educational quality. School segregation may contribute to decreased socioeconomic opportunities, further reinforce a residentially segregated environment,[8] and activate race-related stressors through increased experiences of discrimination in the social environment across the lifecourse.[9] These socioeconomic and physiological pathways may influence cognitive aging through decreased health care access and increased adverse health outcomes.[9] Nevertheless, while school desegregation increased educational attainment and occupational opportunities among Black individuals,[10] desegregated school environments were hostile and discriminatory.[11] In addition, Black individuals with higher socioeconomic status may be more likely to encounter more discrimination in mid to late life.[12,13] Only a few studies have evaluated the effect of school segregation on cognitive function[14–16] and decline[17] among older adults, with mixed findings. These studies did not consider the lifecourse timing of segregation or underlying pathways to cognitive outcomes. Moreover, no research has decomposed the contribution of school segregation to Black-White ADRDs disparities.

My ***career goal*** is to become an independent scientist who applies rigorous epidemiologic methods to the study of ADRDs inequities. The ***overall objective*** of the proposed F31 is to examine the role of school segregation on ADRDs inequities among Black and White adults. I will leverage two longitudinal cohorts, the Study of Healthy Aging in African Americans (STAR) (n=764) and Kaiser Healthy Aging and Diverse Life Experiences (KHANDLE) (n=1712), with detailed measures of experiences of school segregation and discrimination to disentangle potential mechanisms between school segregation and cognitive aging, including everyday and major life discrimination. I will analyze self-reported and geocoded residential addresses linked with historical records of school segregation to estimate the direct and indirect relationships between school segregation, discrimination, and ADRDs risk among Black individuals. Additionally, I will quantify the extent to which school segregation explains ADRDs racial disparities among Black and White individuals.[18,19] Findings from this work will inform population-level opportunities to reduce ADRDs burden among older Black adults.

**Aim 1. Investigate the relationship between attendance at a racially segregated school (1st, 6th, 9th, and 12th grades) on cognitive decline and ADRDs risk among older Black individuals.** We hypothesize that attendance at a segregated school during early childhood (1st and 6th grade) will be associated with greater cognitive decline and higher risk of mild cognitive impairment (MCI)/dementia as compared to attendance in later years (i.e. 9th, 12th).

**Aim 2. Evaluate the role of everyday and major life discrimination as mediators of the association between school segregation and cognitive decline and ADRDs risk among older Black individuals.** We hypothesize that the association between segregated school attendance and cognitive decline and MCI/dementia will be partly explained by experiences with everyday and major life discrimination across multiple domains, which measures whether participants had experienced any of the scale items listed.

**Aim 3. Quantify the extent to which racial differences in cognitive decline and ADRDs risk are explained by differential exposure to school segregation, everyday discrimination, and major life discrimination among older Black and White individuals.** Using decomposition methods, we will estimate the proportion of Black-White differences in cognitive outcomes that are contributed by school segregation versus other potential drivers of these differences, including everyday chronic and major experiences of discrimination.

This F31 aims to understand the effect of school segregation on ADRDs burden and will help inform structural interventions to identify those at higher risk for ADRDs with the goal of eliminating inequities. Given the marked disparities in ADRDs rates by racial and ethnic groups and aging US population there has never been a more critical time to understand how sociocontextual risk factors impact brain health in diverse populations. This research supports my ***long-term research goal*** of identifying the multiple systems encompassing structural racism and the mechanisms through which they impact late-life health outcomes among Black individuals. The experience and training components of this proposal will prepare me to launch my independent career as an epidemiologist with expertise in the role of social factors shaping health inequities across the lifecourse.

# *What To Discuss With Program Officer?*

- Your idea—e.g., provide specific aims page
- Fit—is idea fit for Institute or Center (IC)
- Priority—is idea a research priority for IC

Outlook

**F31 Proposal Advice**

**From** Gutierrez, Sirena <Sirena.Gutierrez@ucsf.edu>
**Date** Wed 2/9/2022 5:39 PM
**To** NIAtraining@nih.gov <NIAtraining@nih.gov>

1 attachments (39 KB)
20220209_Gutierrez_F31SpecificAims.docx;

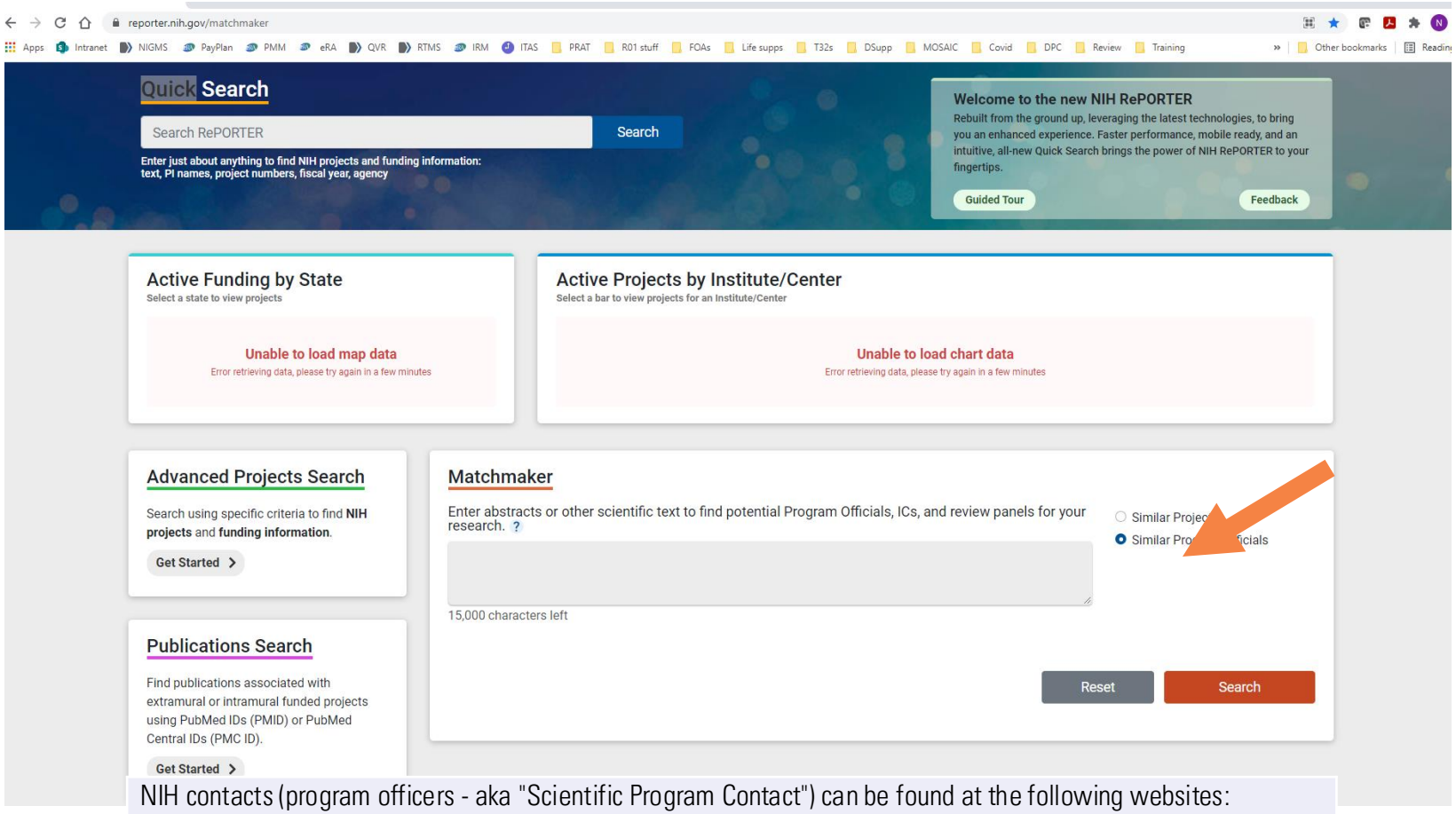
Hello,

I am planning to submit a new F31 application to the NIA for the April 8th deadline and would greatly appreciate your advice regarding whether my aims (attached) are appropriate for this funding mechanism. My background is in social epidemiology and the role of exposures across the lifecourse on late-life cognitive outcomes. My goal during the F31 is to acquire training in the conduct of the biology of Alzheimer's disease and related dementias, upstream structural factors, and using causal inference methodology and analytical techniques to understand racial inequities in cognitive aging. Please let me know if you are available to talk briefly by videocall or phone. Thank you in advance for your time.

Best,
Sirena

--
Sirena Gutierrez, MPH
Graduate Student Researcher
Department of Epidemiology and Biostatistics
University of California, San Francisco
Pronouns: she/her/hers

# Identify program officers in NIH reporter - matchmaker




NIH contacts (program officers - aka "Scientific Program Contact") can be found at the following websites:

F31 (pre-doc) contacts: https://grants.nih.gov/grants/guide/contacts/parent_F31.html
F32 (post-doc) contacts: https://grants.nih.gov/grants/guide/contacts/parent_F32.html
K01 contacts: https://grants.nih.gov/grants/guide/contacts/parent_K01.html
K23 contacts: https://grants.nih.gov/grants/guide/contacts/parent_K23.html

# Research Strategy

- Significance (1 – 1.5 pages)
  - Background (use headers) / conceptual framework
  - Rigor of prior research
- Approach (4.5 – 5 pages)
  - Overall strategy (1 paragraph)
  - Aim 1
    - Hypothesis
    - Rationale
    - Data sources
    - Measures
    - Analysis
  - Same above for Aim 2/3
  - Power calculation
  - Challenges and alternative strategies
  - Timeline
  - Future directions

## RESEARCH STRATEGY

### Significance

**Alzheimer's disease and related dementias (ADRDs) are a leading cause of death[20]; older Black individuals are at higher risk of ADRDs of any racial and ethnic group.**[2] Black individuals are understudied in dementia research, despite having nearly a twofold risk of ADRDs[2,21] and higher rates of cardiovascular risk factors as compared to their White counterparts.[22] Dementia burden is expected to grow, partly due to the projected 80% increase of the Black population 65+ by 2040.[23] There is increasing recognition of the importance of increasing racial and ethnic diversity in ADRDs prevention research. Given that dementia diagnosis is generally preceded by years of subtle cognitive impairment,[24,25] multidimensional data (e.g., biologic, social, environmental) from early- and mid-life are necessary to understand the accumulations of exposures across the lifecourse resulting in observed racial disparities in dementia burden.

**Education is a critical driver of ADRD risk; however, its quality and experience are not equitable.** Historic heterogeneity in school experience and quality by place and race/ethnicity is evident across multiple domains, including reduced funding and shorter term lengths.[26] School segregation, defined as legally imposed racial separation of students, was allowed across the country until the 1954 *Brown v. Board of Education* ruling. Racial and ethnic minorities were also historically excluded from many higher education institutions.[27] Many schools resisted integration, and *de facto* school segregation persists.[28,29]

**Multiple dimensions of racism operating across the lifecourse create health inequities.** Current and historical racism underlie racial health inequities.[30] Structural racism refers to "the totality of ways in which societies foster racial discrimination through mutually reinforcing systems (e.g. housing, education, health care, and criminal justice)".[31] Through exclusionary housing practices, economic and racial residential segregation has allowed *de facto* school segregation to persist.[28,29] This in turn leads to an unequal distribution of resources and reinforces interpersonal racism (e.g. discriminatory beliefs and attitudes between individuals).[32] However, the direct association between structural racism (e.g. school segregation), and its effects on subsequent interpersonal discrimination is understudied, despite historical records of school-based discrimination, coercion, and the loss of identity among Black students in integrated schools.[11,33]

**Historic racial school segregation may impact ADRDs risk among Black individuals via multi-level mechanisms across the lifecourse (Figure 1).** Although desegregated schools may provide students with greater resources,[26] the hostile school environment may offset some of the possible benefits of increased educational quality on cognitive development.[6,11] Experiences of school-based discrimination may trigger immediate physiologic responses related to stress and anger (e.g. cardiovascular reactivity).[34] Race-related stressors can activate the hypothalamic-pituitary-adrenal axis and production of glucocorticoids[35,36], which are associated with poor mental health, neurodegeneration, and cardiovascular disease in later life.[37–39] Furthermore, chronic stress during sensitive periods such as early childhood may have more salient effects on cognitive aging.[40] Evidence suggests greater perceived discrimination leads to impaired decision-making and lower locus of control,[41,42] both of which are associated with unhealthy behaviors (e.g. smoking, alcohol use).[43] Additionally, attending a segregated school is associated with fewer occupational and economic opportunities.[10] This perpetuates the cycle of Black individuals living in residentially segregated environments.[8] Drawing on the fundamental cause theory[44] an individual's educational attainment, may influence cognitive outcomes in later life by providing access to economic, health-related, informational, or other material resources to promote wellbeing. Built environments with concentrated poverty and segregation may impede healthy behaviors (e.g. poor food environment),[31] and increase exposures to toxins and pollutants associated with adverse cognitive outcomes.[45] Conversely, increased social support and group identity found in minoritized communities may ameliorate some of the effects of discrimination.[43,46,47]

*Figure 1. Potential Pathways of Influence between Historic Racial School Segregation and Risk for Alzheimer's Disease and Related Dementias (ADRDs) and Outcomes of ADRDs.*


## Bolded Headers

Burden of dementia and racial inequities

Education a risk factor dementia has different implications across racial and ethnic groups due to varying historical experiences

Structural racism as fundamental cause of health inequities

## Conceptual framework

Linking together my proposed exposure and outcome

# *Background and Goals for Fellowship Training*

A.) Research Experience

- List what your role, what you learned (skills) and tangibles (pubs etc.)
- Important to “tell a story”:
  - Where you’ve been (**demonstrate capacity for research**)
  - Where you’d like to go
  - And how you *cannot* get there without this grant


**Master of Public Health Research Experience**

**Graduate Research Assistant** 2018 – 2020

*University of Texas Medical Branch*

Advisors: Cara Pennel DrPH, Rebeca Wong PhD

As an MPH student, I participated in Dr. Pennel’s community based participatory research group collaborating with stakeholders in Galveston to design a data collection instrument and interview guide tailored to assess the health and experiences of marginalized women who lack permanent housing. I interviewed participants, managed data using REDCap, and analyzed the resulting dataset. Our work resulted in an oral and poster conference presentation and several opportunities to communicate findings to stakeholders (e.g., hospitals, rehabilitation centers, and the board of health) to improve resource and service delivery practices in the community. I pursued my interests in the health of marginalized and minority populations by collaborating with Dr. Wong to examine the association between time use across daily activities and depressive symptomatology among older Mexican adults. I implemented factor analysis and logistic regression models in the Mexican Health and Aging Study (MHAS) data to evaluate the overall association and evaluated gender differences. As we hypothesized there would be different patterns of association between time use activities and depressive symptoms by gender, based on the role of cultural practices and values in Mexico. This project resulted in both oral and poster conference presentations, a first-authored publication, and an ongoing collaboration with Dr. Wong’s research group. My experiences at UTMB provided an invaluable foundation for epidemiologic research while further motivating me to research chronic disease burden in understudied populations with a health equity lens.

# *Training Plan*

1. Advanced training in cognitive aging

2. Theoretical frameworks and methodological approaches for studying health inequities

3. Methods for strengthening causal and causal mediation research for cc

4. Professional development

***Criteria:***

"A fellowship application has a **research project that is integrated with the training plan**. The review will emphasize the candidate's potential for a productive career, the candidate's need for the proposed training, and the degree to which the research project and training plan, the sponsor(s), and the environment will satisfy those needs."

3. **Methods for strengthening causal inference and causal mediation research for cognitive aging.** Through **Years 1** of the fellowship, I will build on the casual inference skillset developed during prior UCSF coursework by taking Advanced Topics in Causal Inference (PB HLTH 252E) at UC Berkeley. This class will allow me to solidify concepts related to parameter estimation using G-computation, inverse probability weights and targeted maximum likelihood approaches. In addition, I will participate in workshops related to causal methodology hosted by the Society for Epidemiologic Research. Historic workshop topics include causal mediation and causal inference for time-varying exposures. Additionally, I will attend the UCSF EpiTools Workshop series, which brings the world's leaders in epidemiology and biostatistics to lead half-day workshops.

Directed readings with Dr. Maria Glymour will explore a) the effects of social conditions during early life on cognitive health outcomes under a causal inference framework, and b) addressing current issues and innovations in methodology. In year 1 of the fellowship, I will meet weekly with Dr. Glymour, to guide the methodology and sensitivity analyses proposed in my aims. I will also attend the on-demand seminar "Causal

# *Activities planned under this award*

- Example of training activities:
  - Courses
  - Workshops and short courses
  - Seminars
  - Guest Lectures
  - Pre-conference workshops
  - Directed readings

**C. Activities Planned Under This Award**

The table below outlines my training and research activities map onto my training goals that will span the next three years of my F-31 award. My training goals include 1) advanced training in cognitive aging, 2) theoretical frameworks and methodological approaches for studying health inequities, 3) methods for strengthening causal inference and causal mediation research for cognitive aging, and 4) professional development.

**Table 1. Activities Planned by Training Area and Award Year.**

| | Goal(s) | Activities during F31 Award | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|---|
| Courses | 1 | PBHLTH 129 (UCB): The Aging Human Brain | x | | |
| | 1 | Brain, Mind, & Behavior Block: UCSF School of Medicine Bridges Curriculum | x | | |
| | 2 | EDUC 201 (Stanford): History of Education in the US | x | | |
| | 2 | EDUC 271 (Stanford): Education Policy in the US | | x | |
| | 3 | PBHLTH 252E (UCB): Advanced topics in causal inference | x | | |
| | 3 | Statistical Horizons: Causal Mediation Analysis Seminar | | Pre-award | |
| | | **Coursework Total Effort (%)** | 45% | 5% | 0% |
| Mentored Study | 1 | Dementia and neuropsychology (Dr. Torres, *directed readings*) | x | | |
| | 1,2 | Cognitive aging in African Americans and measurements (Dr. Barnes) | x | | |
| | 2 | Lifecourse drivers of health inequities (Dr. Gilsanz) | x | | |
| | 3 | Causal inference methods (Dr. Glymour, *directed readings*) | x | | |
| | 3 | 1:1 direct statistical support for analyses used in Aims 1-3 (Dr. Allen) | x | x | x |
| | 1,2,3 | 1:1 direct support with mentorship team to inform analyses for Aim 1-3 | x | x | x |
| | | **Mentored Study Total Effort (%)** | 20% | 20% | 5% |
| Professional Development | 4 | Biweekly Epidemiology PhD Program Seminars | x | x | x |
| | 4 | Annual PhD Seminar Work-in-Progress presentations | x | x | x |
| | 1-4 | Monthly Torres Working Group meetings | x | x | x |
| | 1-4 | Biweekly Glymour Working Group meetings | x | x | x |
| | 1-4 | Biweekly MELODEM Working Group meetings | x | x | x |
| | 1-4 | Monthly Epidemiology Tools Methods Workshops | x | x | x |
| | 3,4 | Society for Epidemiologic Research Annual Meeting | x | x | x |
| | 1,4 | Alzheimer's Association International Conference Annual Meeting | x | x | x |
| | 1-4 | Attend the Science Ethics and Policy Symposium | x | | |
| | 4 | Preparation of F32 and Application for post-doctoral positions | | | x |
| | | **Seminars and Meetings Total Effort (%)** | 5% | 5% | 15% |
| Research | 1-4 | Analysis and manuscript preparation: Aim 1 | x | x | |
| | 1-4 | Analysis and manuscript preparation: Aim 2 | | x | x |
| | 1-4 | Analysis and manuscript preparation: Aim 3 | | x | x |
| | | **Research and Writing Total Effort (%)** | 30% | 65% | 75% |
| Degree | 4 | Required coursework; qualifying exam; dissertation proposal approved | | Pre-award | |
| | 4 | Complete research rotations | | Pre-award | |
| | 4 | Complete teaching assistantships in epidemiology and biostatistics courses | | Pre-award | |
| | 4 | Dissertation/Advisor Committee meetings | x | x | x |
| | 4 | Submit 3 papers for publications to complete dissertation requirement | | | x |
| | 4 | Present dissertation findings; Graduation | | | x |
| | | **Degree Requirements Total Effort (%)** | 0% | 5% | 5% |

# *Biosketch*

Structured, 5 page (max) required component that outlines your unique background and qualifications for the grant

All NIH grants include biosketch (not unique to K series)

Include biosketch for each key personnel on a grant (e.g. primary/secondary mentors too)

Biosketch for *applicant* is especially important for reviewers to evaluate the proposal:

- Often the first thing reviewers will look at
- Tells the reviewers *who you are and what your goals are*
- *Don't let it be an afterthought!*

- In personal statement of biosketch:
  - Mention the type of grant you're applying for and the career and research goals of proposed project
  - Background/education
  - May help to explain any gaps in research productivity, if applicable
  - Briefly describe and justify your need for additional training and how the proposed work will help you achieve your overall career goals
  - Mention major collaborators/mentors

# REVIEW CRITERIA FOR F'S

*Refer to Sec. V of Program Announcement for details (i.e., F31 PA-23-272 or PA-23-271)*

**Scored Review Criteria:**

- Fellowship Applicant
- Sponsor, Collaborators/ Consultants
- Research Training Plan
- Training Potential
- Institutional Environment and Commitment to Training

**Additional Review Criteria:**

- Protection for Human Subjects
- Inclusion of Women, Minorities, and Individuals Across the Lifespan
- Vertebrate Animals
- Biohazards

**Additional Review Considerations:**

- Training in the Responsible Conduct of Research (RCR)
- Select Agents Research
- Resource Sharing Plans
- Budget & Period of Support

# *My F31 Timeline*
## *for April submission*

| | Research | Other |
|---|---|---|
| Dec 2021 | Started thinking about project ideas; skimming around articles | - Schedule meeting with mentor to brainstorm ideas / feasibility etc. |
| Jan 2022 | - Draft and shared aims with primary mentor<br>- Start drafting training goals and collecting other institutional pieces of grant | - Emailed RMS rep with intent to submit F31<br>- Emailed PO at NIA (with specific aims draft) to schedule a call<br>- Contact faculty to create your mentorship team |
| Feb 2022 | - Revise aims<br>- Drafted and shared draft of training goals and research strategy sections with primary mentor | - Requested LOSs / LORs<br>- Had call with PO at the NIA on 2/24 |
| Mar 2022 | - Revise, revise, revise | |
| 4/7/2022 | Application submitted to the NIA | 4/4 – UCSF due date |
| 7/26/2022 | Received score | |
| 12/8/2022 | Received notice of award | |
| 2/1/2023 | F31 award activated | |

# *Lessons Learned*

| "Do's" | "Don'ts" |
| --- | --- |
| • Write AND share your bad drafts<br>• Set up recurring meetings with primary mentor for the duration of the grant writing period<br>• Use your research strategy as a guide for your training section (e.g., method used for A1 reflects one of your training goals)<br>• Contact people early (~ 3 months) for LOR, LOS, and biosketches<br>• Having a timeline with due dates (science vs. admin)<br>• See successful proposals<br>• Support group going through same submission cycle | • Delay working on administrative components from grant<br>• Start from scratch on the administrative components (e.g., institutional environment)<br>• Ask for feedback from too many people*<br>• Ask for feedback too late<br>• Get too caught up in the limitations – we are our own worst critic<br>• Delay on sending multiple reminder/follow up emails if you are not getting the material you need from mentorship team, referees, institution's office of research |

# *Acknowledgements*


- UCSF Grant writing course – Drs. Erin Van Blarigan and Amy Conroy
- Mentors – Drs. Jacqueline Torres, Maria Glymour, Paola Gilsanz
- Grant writing group (i.e., writing, editing, venting, etc.)
- Everyone who shared their past grant writing material


# *More resources…*


https://nexus.od.nih.gov/all/2024/09/26/nih-announces-a-two-part-virtual-event-nih-grants-process-primer-application-to-award-november-13-14-2024/

NIH GRANTS & FUNDING
NIH Central Resource for Grants and Funding Information

Search this Site

eRA | NIH Staff | Glossary | FAQs | Help

HOME | ABOUT GRANTS | FUNDING | POLICY & COMPLIANCE | NEWS & EVENTS | ABOUT OER

Home » About Grants » How to Apply - Application Guide

**GRANTS.NIH.GOV/GRANTS/HOW-TO-APPLY-APPLICATION-GUIDE.HTML**

# How to Apply - Application Guide

Use the application instructions found on this page along with the guidance in the funding opportunity announcement to submit grant applications to NIH, the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Agency for Healthcare Research and Quality.

## Prepare to Apply

- Systems and Roles
- Register
- Understand Funding Opportunities
- Types of Applications
- Submission Options
- Obtain Software

## Write Application

- Write Your Application
- How to Find Forms
- Develop Your Budget
- Format Attachments
- Rules for Text Fields
- Page Limits
- Data Tables
- Reference Letters
- Biosketches

## Submit

- Submit, Track, and View
- How We Check for Completeness
- Changed/Corrected Applications
- Standard Due Dates
- Submission Policies
- Dealing with System Issues


FAQs

# *THANK YOU!*


Sirena.Gutierrez@ucsf.edu

Connect with me via LinkedIn
and Twitter (@SirenaGtz)