CSU BUILD Alliance: Building and Sustaining Diversity in the Biomedical Research Workforce

Moderated by:
Dr. Frank A. Gomez
Executive Director, STEM-NET
Office of the Chancellor

NIH-BUILD

2019 Awardees:

Leticia Marquez-Magana, Kirsten Bibbins-Domingo and Tung Nguyen, San Francisco State University

Chi-Ah Chun, Jesse Dillon, Simon Kim, Panadda Marayong and Kim-Phuong Vu, CSU Long Beach

Carrie Saetermoe, Gabriela Chavira, Crist Khachikian and Patchareeya Kwan, CSU Northridge

The California State University
OFFICE OF THE CHANCELLOR

Speakers
Sue V. Rosser, CSU Office of the Chancellor
Building and Sustaining Diversity in the Biomedical* Research Workforce

Leticia Marquez-Magaña, San Francisco State University
BUILDing Diverse Teams for CSU-UCSF Transformation

Kelly Young and Chi-Ah Chun, CSU Long Beach
Building a Mentoring Community: RSCA Mentor Training for the CSU

Patchareeya Kwan and Gilberto Flores, CSU Northridge
Using Critical Race Theory to Transform Biomedical Research at California State University Northridge

The California State University

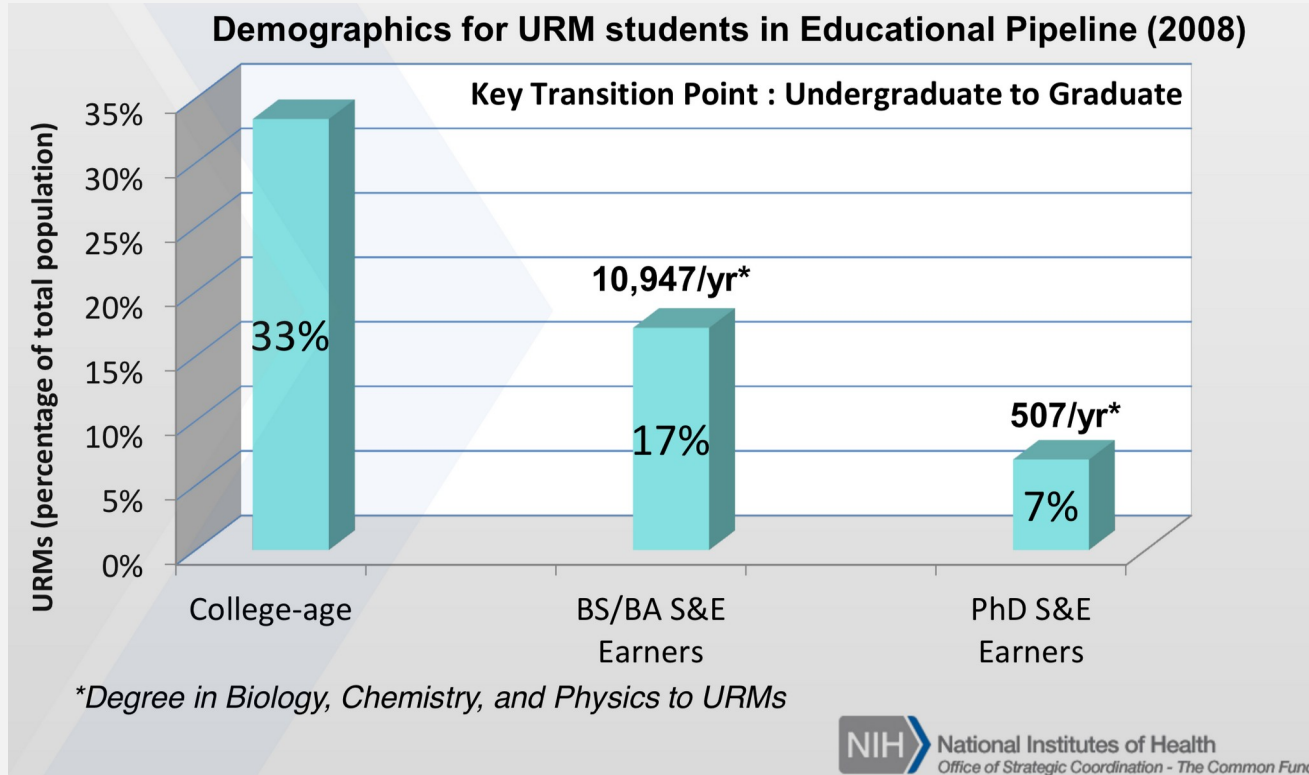# Building and Sustaining Diversity in the Biomedical* Research Workforce

Biomedical (biomedical, behavioral, social, and clinical sciences)

Sue V. Rosser, PhD

Special Advisor for Research Development and External Partnerships

Project Overview

- In response to Ginther Report NIH Launched Diversity Initiatives to reduce gap between award of undergraduate degrees and completion of doctoral degrees for biomedical research

Demographics for URM students in Educational Pipeline (2008)

Key Transition Point : Undergraduate to Graduate

- College-age: 33%
- BS/BA S&E Earners: 10,947/yr* — 17%
- PhD S&E Earners: 507/yr* — 7%

URMs (percentage of total population)

*Degree in Biology, Chemistry, and Physics to URMs

NIH National Institutes of Health
Office of Strategic Coordination - The Common Fund

Slide from 2012 Webinar announcing RFAs for NIH Diversity Initiative Grants

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Activities

Three interrelated approaches implemented by national leaders:

1. **Bu**ilding **I**nfrastructure **L**eading to **D**iversity (**BUILD**) Initiative

2. **N**ational **R**esearch **M**entoring **N**etwork (**NRMN**)

3. **C**oordination and **E**valuation **C**enter (**CEC**)

$200 million over 5 years (2014-2019) BUILD I

(2019-2024) BUILD II

https://diversity.nih.gov/

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Activities

"While past efforts to diversify our workforce have had significant impact on individuals, we have not made substantial progress in expanding diversity on a larger scale. This program will test new models of training and mentoring so that we can ultimately attract the best minds from all groups to biomedical research."

- Francis S. Collins, MD, PhD

Director, NIH

"We are injecting the __rigor of science__ into our efforts to diversify science…"

Hannah Valantine, MD
Inaugural NIH Officer for
Scientific Workforce Diversity

**Sue V. Rosser, PhD**, *Special Advisor for Research Development and External Partnerships*

Activities

- Provide research evidence for diversity's impact on the quality and outputs of science.

- Create evidence-based approaches to recruitment and training.

- Identify individual and institutional barriers to workforce diversity.

- Build a national strategy for eliminating barriers to career transition, with scientifically based approaches for scaling and dissemination.

Valantine and Collins, PNAS 112(40):12240-12242.

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Results & Lessons Learned

10 BUILD Sites
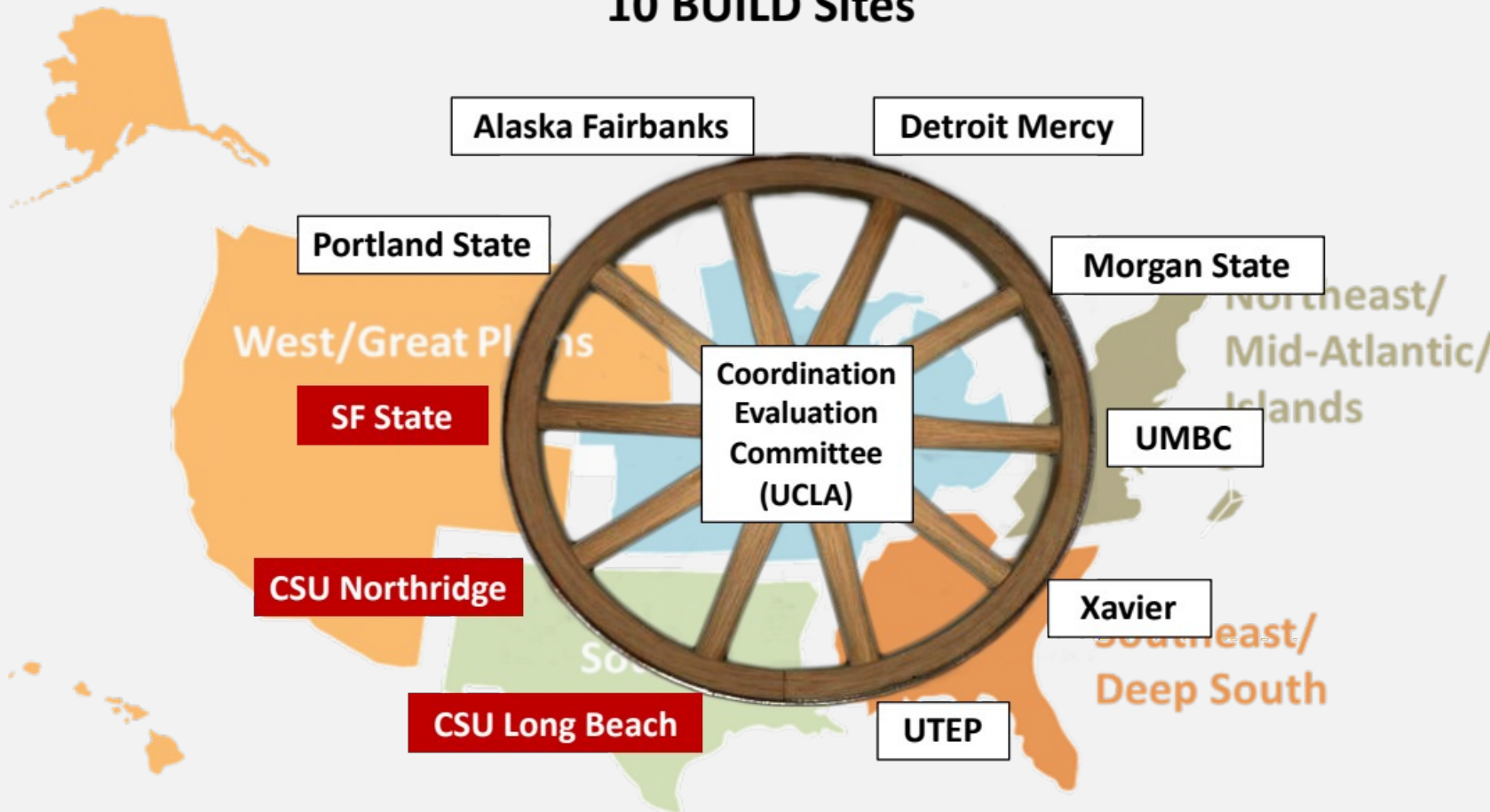
- **DPC Consortium testing what works for whom and in what context.**

- ***One size does not fit all!***

Primary Institutions are not research intensive because underrepresented students are better supported in these types of universities – Hurtado, et al., (2011) J Soc Issues

Next Steps/Long-Term Plans

- Primary goals of BUILD II are dissemination and sustainability

- Dissemination targeted at similar institutions (i.e., sister CSUs)

- Sustainability requires institutional transformation

- In California better linking CSUs to UCs can increase number of historically underrepresented students who enter advanced degree programs relevant to biomedical research careers.
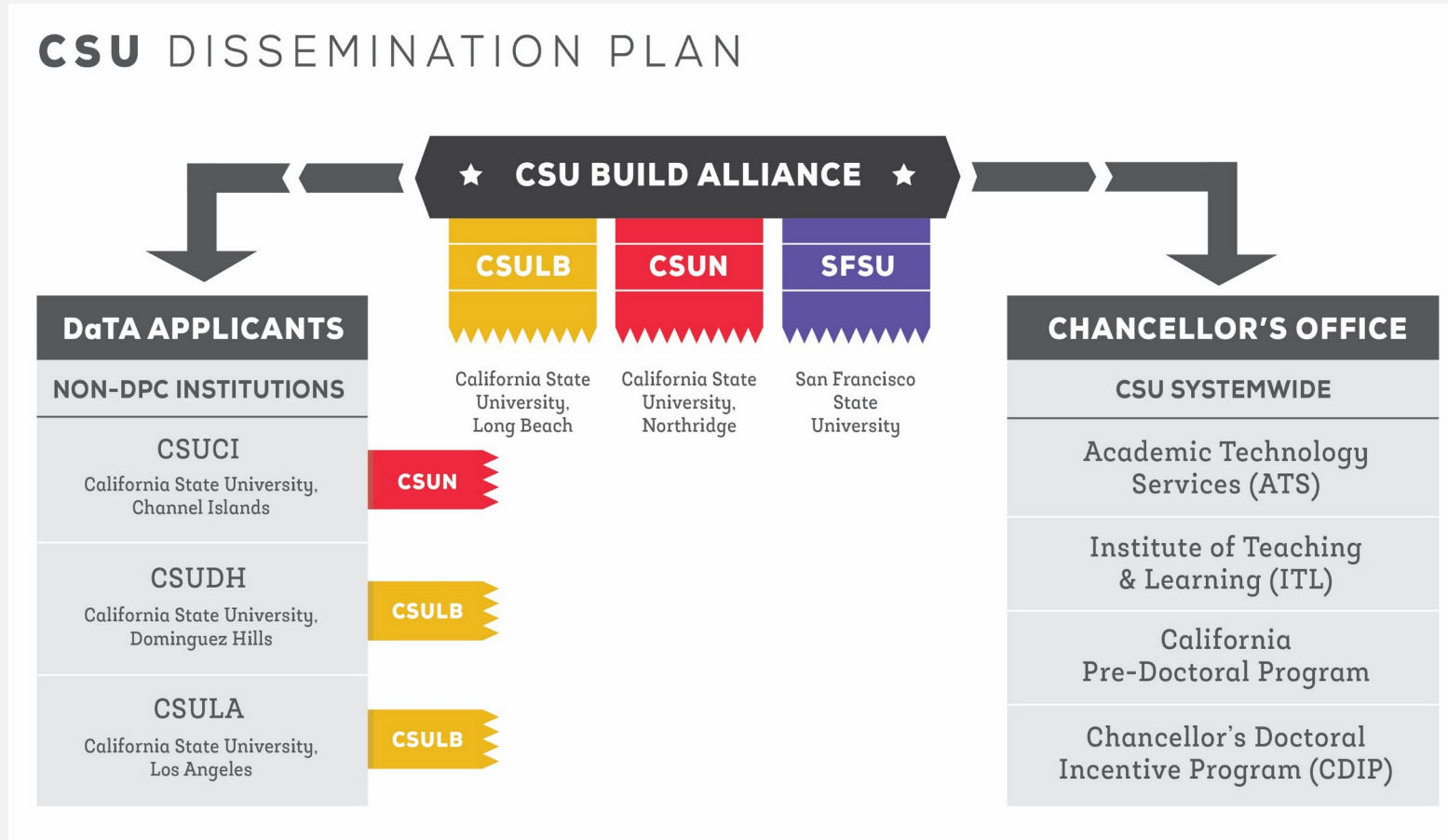
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CSU BUILD Alliance

CSULB

CSUN

SFSU/UCSF

Sue V. Rosser, PhD, Special Advisor for Research Development and External Partnerships

CSU Dissemination Plan

CSU DISSEMINATION PLAN

★ CSU BUILD ALLIANCE ★

CSULB	CSUN	SFSU
California State University, Long Beach	California State University, Northridge	San Francisco State University

DaTA APPLICANTS

NON-DPC INSTITUTIONS

CSUCI
California State University, Channel Islands
— CSUN

CSUDH
California State University, Dominguez Hills
— CSULB

CSULA
California State University, Los Angeles
— CSULB

CHANCELLOR'S OFFICE

CSU SYSTEMWIDE

Academic Technology Services (ATS)

Institute of Teaching & Learning (ITL)

California Pre-Doctoral Program

Chancellor's Doctoral Incentive Program (CDIP)

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Summary

- NIH launched diversity initiatives in 2014 to address bias in review by working systemically to enhance diversity of the biomedical research workforce

- BUILD sites were selected from pool of comprehensive institutions most capable of reducing gap between award of undergraduate degrees and completion of advanced degrees for biomedical research.

- 30% of BUILD Sites reside in the CSU = CSU BUILD Alliance

- Each site uses multi-level approach and is testing a theory of change to determine "*what works in what context.*"

- Some practices have shown efficacy and will be shared in this Webcast, and beyond.

- Future directions include dissemination of lessons learned, and best practices to sister CSU and cultivation of UC partnerships.

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BUILDing Diverse Teams for CSU-UCSF Transformation

SF BUILD Team

Leticia Márquez-Magaña, PhD, Professor of Biology
SF BUILD Partnership (SF State and UCSF), sfbuild.sfsu.edu

Diverse, Mission-Driven SF BUILD Team

Principle Investigators
Leticia Márquez-Magaña,
  PhD Biochemistry
Kirsten Bibbins-Domingo,
  PhD, MD, MAS
Tung Nguyen, MD

Alegra Eroy-Reveles, PhD
Chemistry
SciEd Post-doc
(now at UCSC)

SFSU Core Team
Teaster Baird Jr., PhD Biochem
Audrey Parangan-Smith, PhD Microbiology
  SciEd Post-doc
Blake Riggs, PhD Cell Biology
Nichole Coleman, PhD Med Pharma
Kelechi Uwaezuoke, DrPH
Kenjus Watson, PhD Race,
  Ethnic Studies in Education

UCSF Core Team
Esteban Burchard, MD, MPH; Yazmin Carrasco, PhD; Peter Chin-Hong, MD; Alicia Fernandez, MD,
Maria Glymour, ScD Bob Hiatt, MD, PhD, Kala Mehta, Dsc MPH, Sonny Vernard, MPH, MPP

SF BUILD
enabling full representation in science

**SAN FRANCISCO
STATE UNIVERSITY**

UCSF
University of California
San Francisco

Project Overview

SF State

- Increase number of undergraduates earning advanced degrees for biomedical research careers

- Nearly 70% of science and math majors are students of color desiring opportunities in health-related fields

- Partner with UCSF to serve science related needs of San Francisco, especially communities of color, as the City's University

UCSF

- Become the most diverse, equitable, and inclusive academic medical system in the country

- Faculty and research labs want to train/hire diversity, but pool size and high cost of living are barriers

- Partner with SF State to better serve role as anchor institution tasked with improving long-term health and welfare of communities in its hometown

Leticia Márquez-Magaña, PhD, Professor of Biology
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UCSF
University of California
San Francisco

Activities

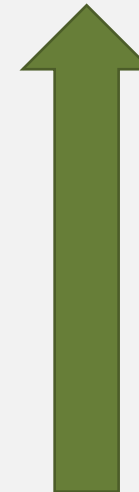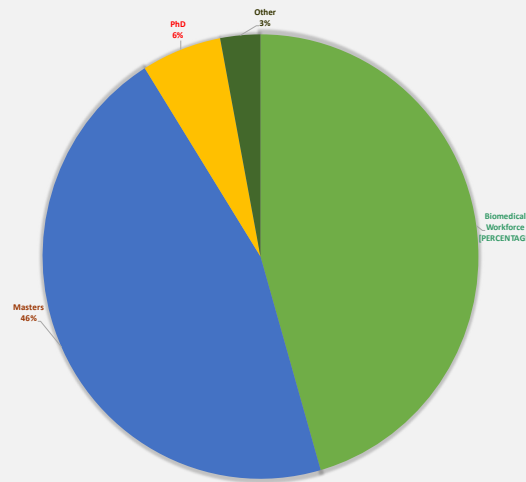| Goal 1: Affirm values and lived experiences of students for improved Biomedical Research	Goal 2: Broaden student research experiences & faculty professional development	Goal 3: Disseminate to Sister Institutions

• Systemically affirm "giving back" values & community cultural wealth as valuable assets for research that improves community health
 	
  - Increase awareness of faculty
  - Provide classroom modules, community service learning, and health equity research experiences
 	
• Provide critical research training to increase student persistence and enable resistance (agents of change)
	• Deliver Diversity Supplement informational/matchmaking sessions, and resources for applying
	
	• Implement "Research with Communities Course" at SF State, and follow-on training for Clinical Research Coordinators at UCSF
	
	• Organize quarterly "in the Mix" networking event, and semi-annual mentored Writing Retreats that are cross-institutional
		• Publications, presentations, workshops, Webcast
		
		• Consultations, technical assistance, sharing of evidence-based tools
		
		• MA^2 app
		  - Microaggressions
		  - Microaffirmations

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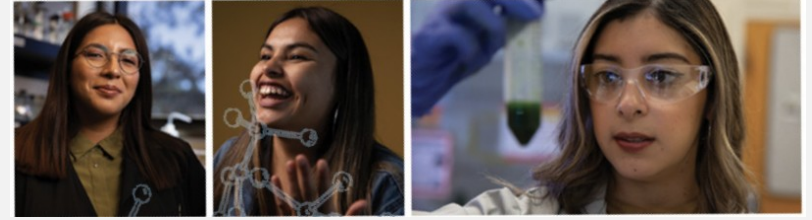
Student-Centered Results through Institutional Lens:

Towards Transformation

https://magazine.sfsu.edu/fall-2019/lab-partners

SF BUILD Scholar Outcomes

31% apply to
PhD Programs

Other
3%

PhD
6%

Biomedical
Workforce
[PERCENTAGE]

Masters
46%

SF State Science students
with high participation in
BUILD activities report
greater:

- Science Identity
- Sense of Belonging
- Science Community
  Values

Need for training of SF State students as Clinical Research Coordinators
Identified as a mechanism to improve clinical trail inclusion at UCSF

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Towards Transformation

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UCSF
University of California
San Francisco

CSULB

Faculty-Centered Results through Institutional Lens:

in
the
mix

Pedagogy
SF State faculty created Social Justice Pedagogy (Kindle book) and Faculty Agents of Change Approach

Research Development
Networking events and writing retreats for faculty from both campuses have been *Institutionalized*

Diversity Supplements
UCSF faculty made aware of diversity supplement mechanism and 396 eligible NIH grants

Diversity Supplements awarded to UCSF in 2018 & 2019

47

15%
>$0.5M

7/47 Awarded to SF State Graduates

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Results through Institutional Lens: Catalyzing Change

Towards Transformation

Tackle Negative Thinking Head-On To Boost Diversity In Biomedicine

September 16, 2017 · 5:09 AM ET

n p r
shots

SF BUILD team members engage in site-specific & cross-institutional leadership roles

Sharing Theories of Change
- 5 Papers
- 1 Book
- 68 Presentations

Workshops at National Conferences
- "Addressing the Threat in the Air
- Coping through Reflective Journaling

Broadcasting Successes through Media
- In the last 2 years, 17 local & 4 regional pieces in media outlets

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Lessons Learned

- **Working across institutions, disciplines, and organizations is challenging**
  - Logistical barriers due to silos
  - Cultural divides and hidden rules require relational trust, flexibility, and compassion

- **Focus on the *problem* to lift mission-driven, transdisciplinary teams over obstacles**
  - Transdisciplinary research is transformational
  - Results are useful, meaningful, and impactful

- **"*One size does not fit all*"**
  - Institutional transformation efforts usually fail
  - Successful efforts are anchored in institutional history/culture
    - SF State 1968-69 Student-led Strike
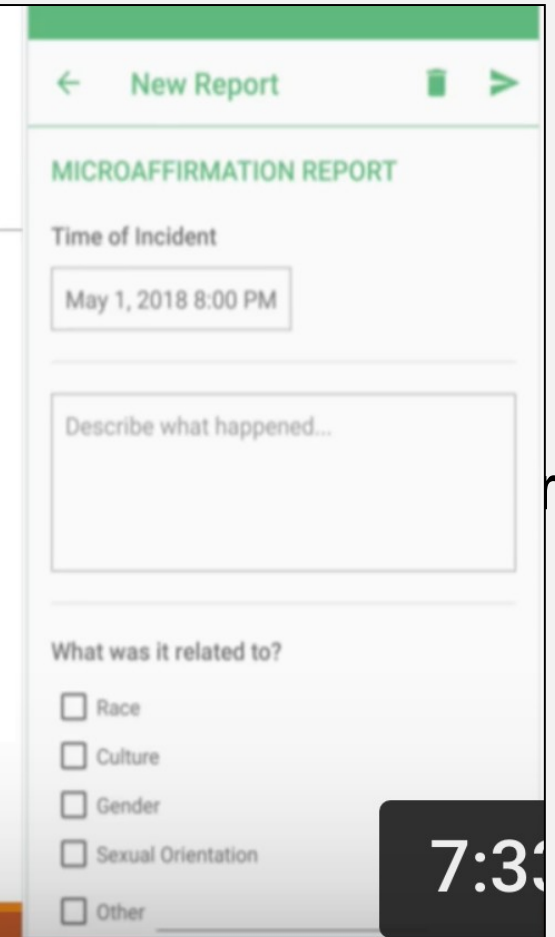   - UCSF 2014 Protest - White coats for Black Lives

https://ethnicstudies.sfsu.edu/home2   https://www.ucsf.edu/news/2015/08/131226/ucsf-medical-students-win-human-rights-award-white-coats-black-lives-movement

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![SF BUILD - enabling full representation in science] ![San Francisco State University] ![UCSF University of California San Francisco]

Next Steps

Microaffirmation: Description

- <u>Example:</u> "In my STEM class the instructor made eye contact."

- Current Time

- Related to "Race"

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Summary

- Leveraged existing SF State UCSF partnership to improve the transition from undergraduate to advance degrees to enhance diversity of the biomedical research workforce

- SF BUILD links all 3 public universities in San Francisco and is expected to improve health and welfare of local communities

- Partnership is based on relational trust and convergent interests for mutual benefit

- Activities are anchored in history/culture of institutions and grounded in theories of change that are based on scholarly and empirical evidence

- Our Ambassador Agents of Change are available for consultation, technical assistance, presentations, and workshops

- MA^2 app will be available in fall 2020

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References and Funding

Publications and Book on Theories of Change

1. Trujillo, G, Aguinaldo, PG, Anderson, C, Bustamante, J, Gelsinger, DR, Pastor, MJ, Wright, J, Márquez-Magaña, LM, and Riggs, B. (2016). Near-peer STEM Mentoring Offers Synergistic Benefits for Historically Underrepresented Minority Students. *Perspective on Undergraduate Research and Mentoring*, 4.1:1.

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3. Estrada, M., Eroy-Reveles, A., Ben-Zeev, A., Baird, T., Domingo, C., Gomez, C.A., Bibbins-Domingo, K., Parangan-Smith, A., Márquez-Magaña, L. (2017). Enabling full representation in science: the San Francisco BUILD project's agents of change affirm science skills, belonging and community. *BMC Proceedings*. 11(Suppl 12)(25), 57-67.

4. Estrada, M, Eroy-Reveles, A., Matsui, J. (2018). The Influence of Affirming Kindness and Community on Broadening Participation in STEM Career Pathways. *Social Issues and Policy Review*, 12(1), 258-297.

5. Eliason, M.J. (2019). *Social Justice Pedagogy Plus: Transforming undergraduate research methods courses.* Amazon Kindle Direct

6. Estrada, M, Young, G, Nagy, J, Goldstein, EJ, Ben-Zeev, A, Márquez-Magaña, LM, Eroy-Reveles, A. (2019). The Influence of Microaffirmations on Undergraduate Persistence in Science Career Pathways, *CBE Life Sciences Education,* 18(3):ar30-mr3

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BUILD
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**Building a Mentoring Community
RSCA Mentor Training for the CSU**

Introduction to CSULB BUILD

Principal Investigators

Phase I (2014-2019)
Laura Kingsford   former Dean of College of Natural Sciences and Mathematics
Guido Urizar   Professor of Psychology

Phase II (2019-2024)
Chi-Ah Chun   Professor of Psychology
Jesse Dillon   Professor of Biological Sciences
Simon Kim   AVP of Research and Sponsored Programs
Panadda Marayong   Professor of Mechanical Engineering
Kim-Phuong Vu   Professor of Psychology

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INITIATIVE

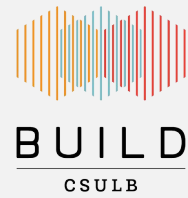**Chi-Ah Chun**, Professor   CSULB, Department of Psychology   Chi-Ah.Chun@csulb.edu

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Major Aims

Interdisciplinary Approach to Health-related Research

Research-Infused Undergraduate Curriculum

Assets-Based Approach to Undergraduate Research Training

Faculty Development in Culturally Responsive RSCA Mentoring

1-BUILD Mentoring Community
2- Advancing Inclusive Mentoring
3-Multicultural Workshops

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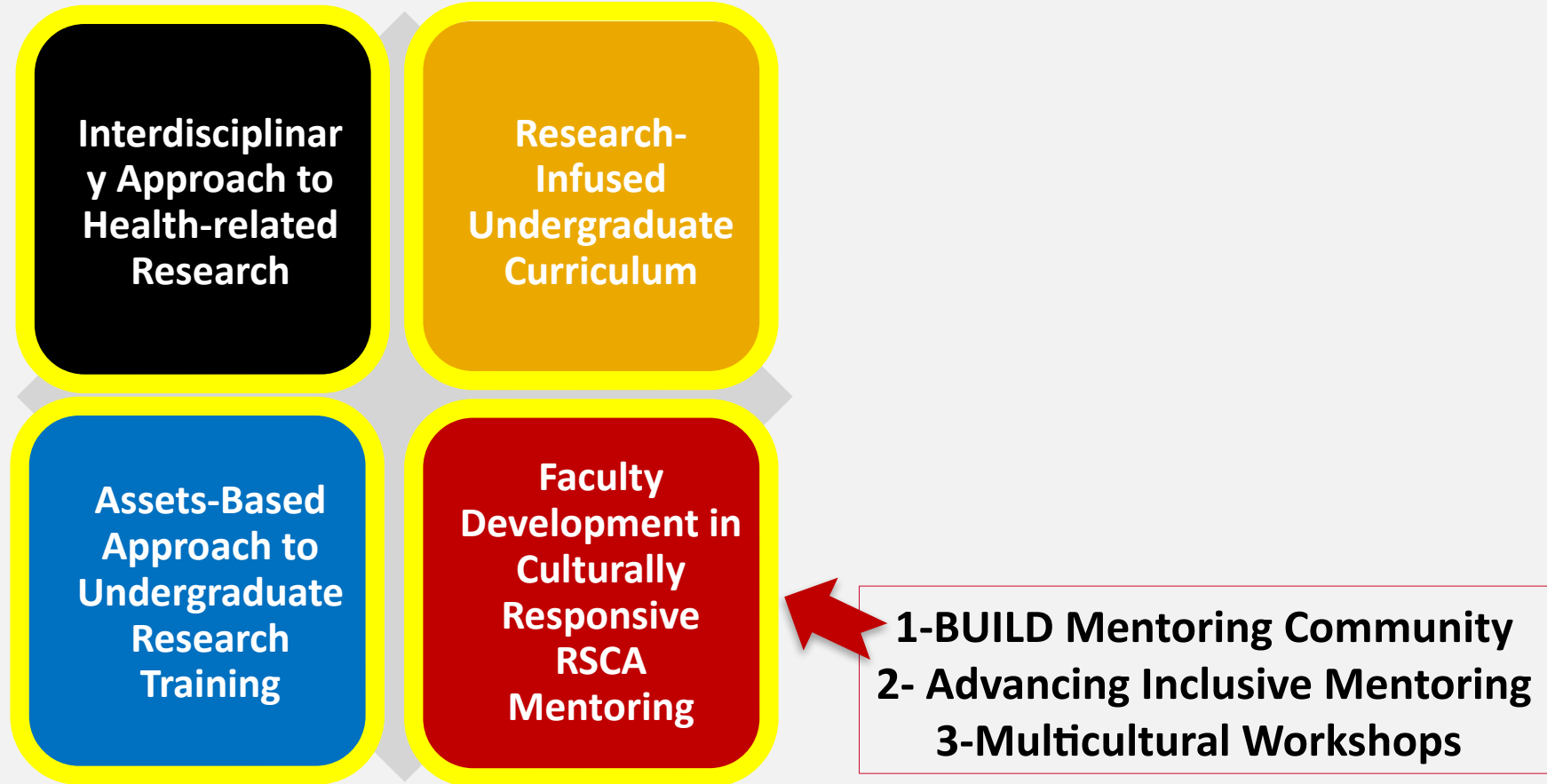
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CSULB BUILD Mentoring Community (BMC)

- **Semester 1: Hybrid Online Discussion Group**
  - Topics Include: Communication, Equity and Inclusion, Aligning Expectations, Professional Development, Assessing Understanding, Promoting Ethics, Fostering Independence, Mentoring Philosophy/ Mentor-Mentee Compact

- **Semester 2: Implement & Apply**
  - Test innovative mentoring practices generated from BMC Semester 1 readings and discussions

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NRMN Curriculum-Based

National Research Mentoring Network (NRMN)

- A member of the NIH Diversity Program Consortium along with BUILD
- *Entering Mentoring* by Drs. Christine Pfund, Janet Branchaw, and Jo Handelsman
- NRMN-Certification with successful completion of the BMC

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Sustaining the Mentor Community

- **Facilitator's Role**
  - Posts readings and discussion prompts
  - Facilitates online discussions
  - Works with faculty in Semester 2 as needed to complete their project.
- **Built In Train-the-Trainer**
  - Each BMC cohort produces the next facilitator
  - Facilitator follows a 'ready-to-implement' BMC curriculum manual

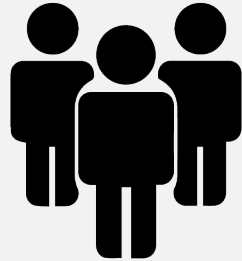**Chi-Ah Chun**, Professor   CSULB, Department of Psychology   Chi-Ah.Chun@csulb.edu

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CSULB BMC Participation

93 CSULB Mentors Currently BMC-Trained

Across 4 Colleges

From 24 Different Departments

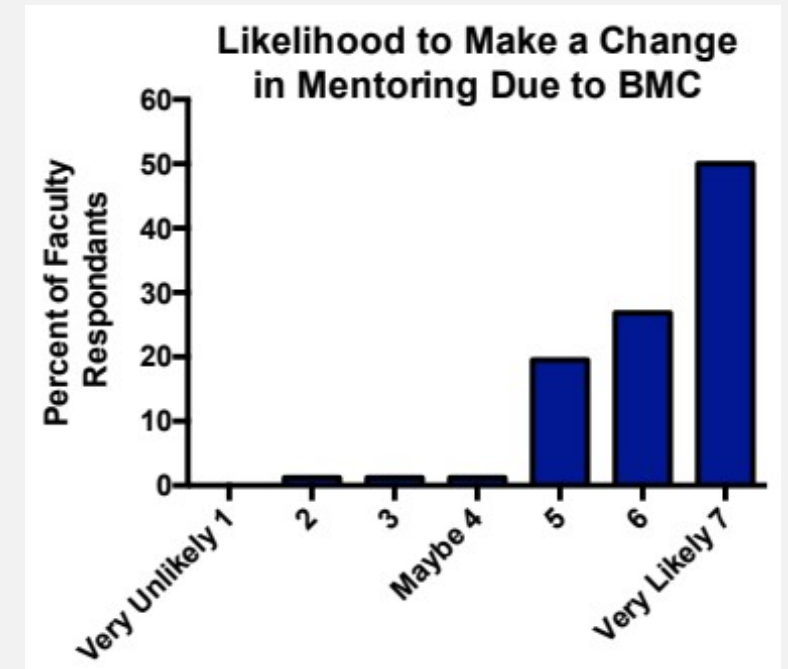**Chi-Ah Chun**, Professor   CSULB, Department of Psychology   Chi-Ah.Chun@csulb.edu

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CSULB BMC Results

- 73.8% of faculty respondents reporting that the BMC workload was 'reasonable.'

- 86% of respondents probably, likely, or very likely to recommend the BMC to a colleague.

- 97% of respondents responding that they would probably, likely, or very likely make a change in their mentoring as a result of BMC participation.

Young & Stormes, *In Press,* 2019

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**Building a Mentoring Community
RSCA Mentor Training for the CSU**

BMC at Your CSU!

- **Our Next Step:** Dissemination of *Building a Mentoring Community* to other comprehensive universities

CSU Dominguez Hills:

Toro Mentoring Community
in Spring 2020

CSU San Bernardino:

CSU "Train the Trainer"
session February 3rd - April
6th 2020

"Train the Trainer"
workshops in SoCal and
NorCal

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BMC Online: "AIM" Advancing Inclusive Mentoring

AIM PROGRAM
Advancing Inclusive Mentoring

- The AIM Program will be an online mentor training program (videos, handouts, quizzes) that meets all learning goals of BMC/NRMN programs.

- AIM will target RSCA mentors across campus, *regardless of discipline.*
- Faculty members can earn AIM certificates of completion.

Communication

Inclusive Mentoring

Facilitating Mentee Wellbeing

Cultivating Mentee Growth

Mentoring RSCA Projects

Promoting Ethical Behavior

Personalizing Your Mentoring Plan

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Multicultural Workshops

- **Goal of the Workshops:** To improve intercultural communication skills of faculty mentors and help professors foster collaborative relationships with their student mentees

- **Objective for CSU-wide Dissemination:** To develop the pedagogical skills and intercultural effectiveness of faculty mentors, and thereby, enhance the experience of inclusive excellence at their CSU campus

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Workshop Topics

- ***Workshop #1: "Cultivating a Culture of Invitational Dialogue in Diverse Mentoring Relationships"***
  - Aims to create a culture of inclusive dialogue in diverse mentoring communities

- ***Workshop #2: "The Structure of Effective Interactions During Mentoring Conversations with Diverse Students"***
  - Aims to train faculty mentors to encourage conversations with diverse students, and thereby, promote active dialogue, interactive exchanges in the university classroom, and proactive engagement on teams

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Workshop Format

- **Sessions include:**

  1. Presentation of pertinent, intercultural communication content

  2. Discussion of theoretical and research articles, highlighting some of the best supportive practices in communication pedagogy according to the National Communication Association

  3. Interactive, group discussions of topics germane to each session

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Multicultural Workshops for You

- ***Regional In-Person Workshops***
  - Face-to-face workshops with a "live" audience of 12 to 25 faculty members from CSU campuses in Southern California

- ***CSU-systemwide Online Workshops***
  - Webinar training series with a "live" audience of 25 to 75 faculty members from across the CSU system

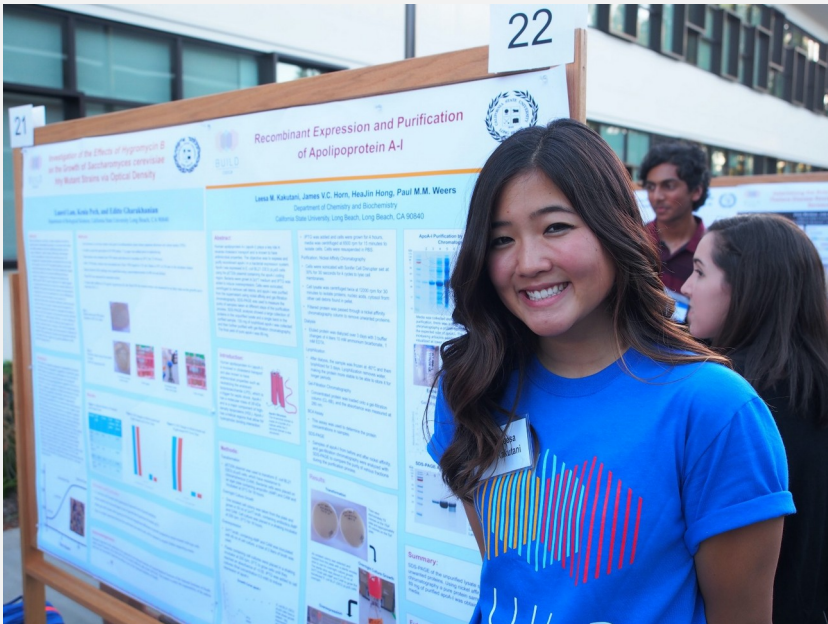**Chi-Ah Chun**, Professor   CSULB, Department of Psychology   Chi-Ah.Chun@csulb.edu

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Coming Soon: Resources for Student RSCA Training

- **Available in Spring 2020**

  - Online modules for Summer Internship and Graduate School Application Preparation
  - Course materials for Research-infused Curriculum

- **Available in Fall 2020 or later**

  - Undergraduate student research training curriculum
  - Culturally Congruent Science Identity Instrument

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**Building a Mentoring Community
RSCA Mentor Training for the CSU**

CSULB BUILD Contacts & Funding

**Overall Dissemination
Coordination**
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BMC or AIM Programs
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CSUN | CALIFORNIA STATE UNIVERSITY NORTHRIDGE

BUILD ❖ PODER
Promoting Opportunities for
Diversity in Education & Research

Using Critical Race Theory to Transform Biomedical Research at California State University Northridge

PIs: *Carrie Saetermoe (contact), Gabriela Chavira, Crist Khachikian, Patchareeya Kwan*
PDs: *Gilberto Flores, Angie Guan*

Patchareeya Kwan, Associate Professor

Department of Health Sciences

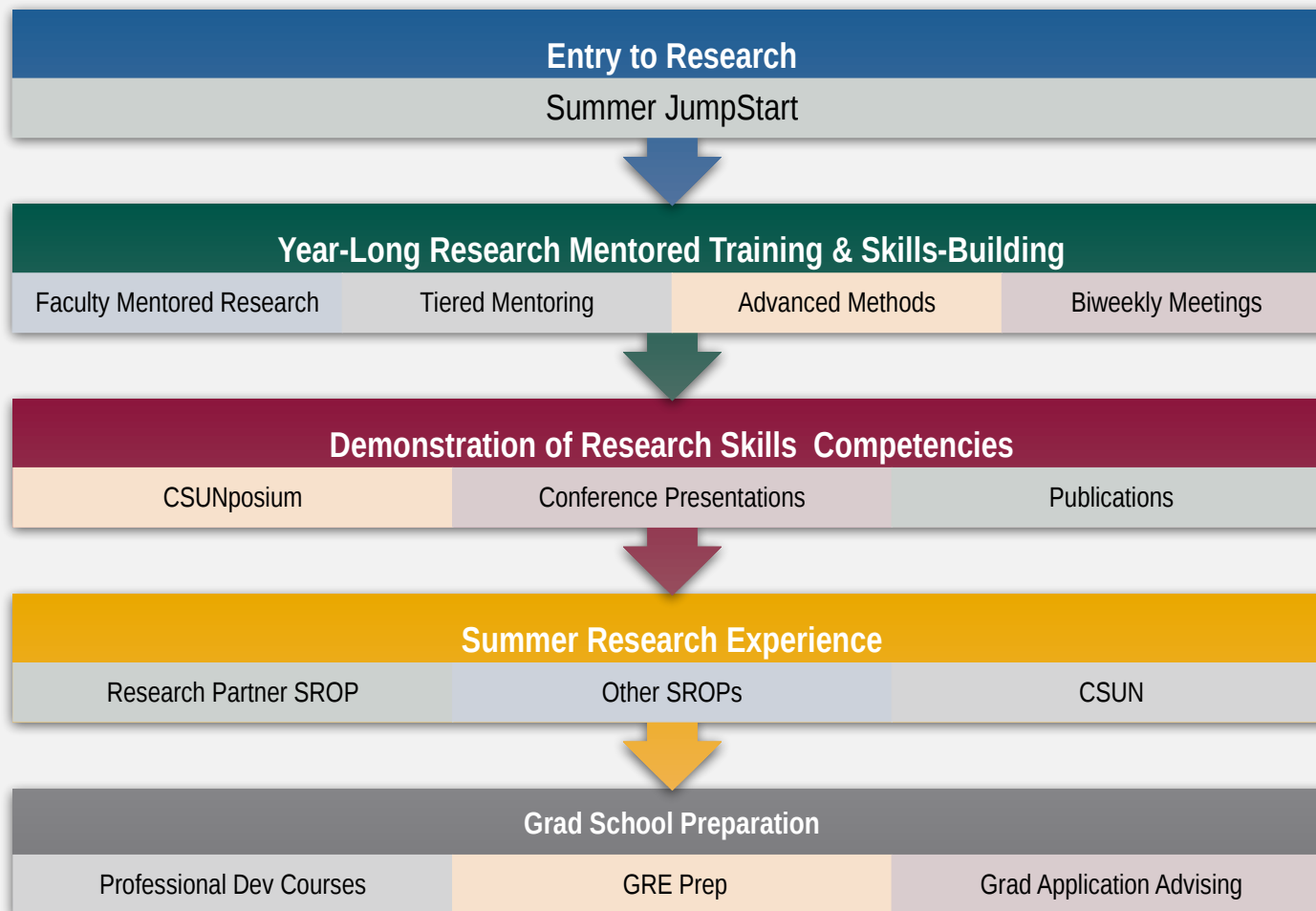Patty.kwan@csun.edu

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BUILD PODER
Promoting Opportunities for
Diversity in Education & Research

Project Overview

- Foundation in critical race theory with 5 tenets: (a) racism is ubiquitous, (b) racism must be challenged, (c) we must respect and include the knowledge and wisdom of oppressed communities, and that societal transformation must be: (d) in the service of social justice, and (e) transdisciplinary

- **Student goals**: develop CRT-informed training curriculum, increase diverse undergraduate students' interests in pursuing a scientific research career, and share best practices.

- **Faculty goals**: develop skills and network to conduct rigorous, meaningful research with students; situating work in strong mentoring that acknowledges racial/ethnic and other power differentials

- **Institutional goals**: maintain BUILD beyond the 10-year funding cycle by developing community partnerships with activists, service providers, and politicians to reduce local health disparities

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Activities: Student Training

Entry to Research

Summer JumpStart

Year-Long Research Mentored Training & Skills-Building

| Faculty Mentored Research | Tiered Mentoring | Advanced Methods | Biweekly Meetings |

Demonstration of Research Skills Competencies

| CSUNposium | Conference Presentations | Publications |

Summer Research Experience

| Research Partner SROP | Other SROPs | CSUN |

Grad School Preparation

| Professional Dev Courses | GRE Prep | Grad Application Advising |

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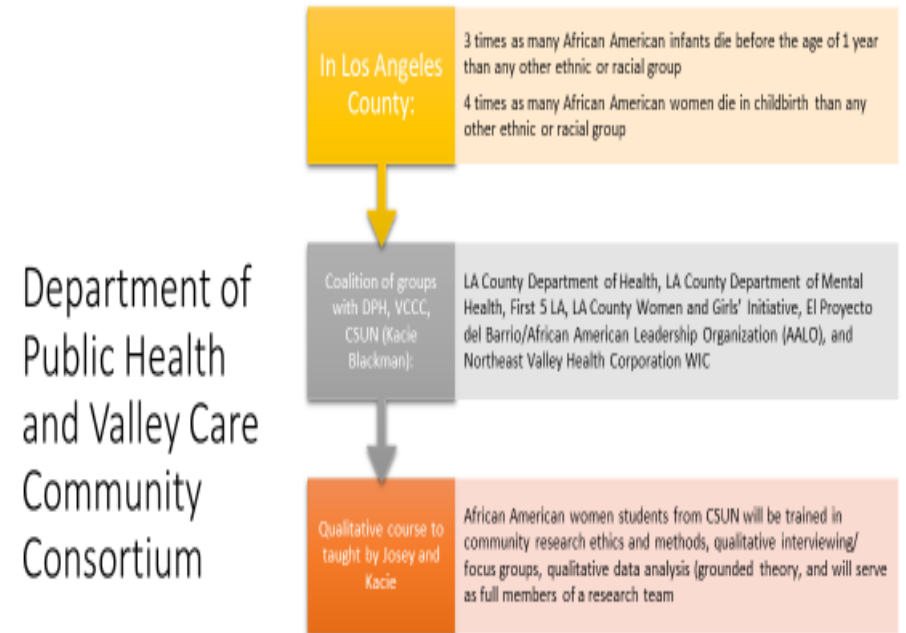
Activities: Faculty/Institution

- **Faculty Development**: (a) Critical mentoring training for 4 years, ending with Theatre of the Oppressed, (b) Early and advanced research training, pilot projects, reading, writing groups, grant-writing support; pipeline partners are specializing at each campus in biology, chemistry, or social sciences

- **Institutional:** HERE Center: 4 cluster hires in Lilac Hall: (a) Research education for students, faculty, and community partners, (b) Community-academic partnerships with health and healthcare institutions, agencies, and nonprofits, and (c) Mapping, research, and policy work around health equity research projects in the San Fernando Valley; first project, African American Infant and Maternal Mortality

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Results: Student Training

197 STUDENTS AT CSUN
61 WERE TRAINED
WERE IN OUR GRAD
PROGRAMS

138 PARTICIPATED IN
UNDERGRADUATE
SUMMER RESEARCH
EXPERIENCE (SURO)
RESEARCH
OR INDUSTRY

517 PRESENTED POSTER
14 ARE APPLYING TO
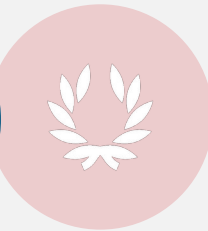AND ORAL
GRAD PROGRAMS
PRESENTATIONS

13 CO-AUTHORED
PUBLICATIONS
 in BIOLOGY
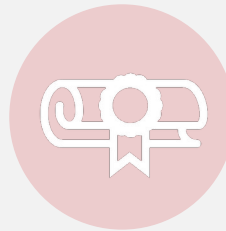
107 EARNED THEIR
BA/BS FROM CSUN

14 – TAKING "GAP
YEAR"
2 WERE AWARDED NSF
GRFP FELLOWSHIPS

10 – UNKNOWN
7 WERE AWARDED
POST-GRAD NIH
FELLOWSHIPS

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Results: Faculty Dev

Trained over 120 faculty mentors from 5 colleges, 22 departments, and 4 community college partners

Four years of training: 16-hour entry mentoring, applications, institutional racism, and Theatre of the Oppressed

In one 18 month period, 78 BUILD PODER faculty members generated 34 BUILD manuscripts, 225 conference papers and posters and 22 external grants

8 pilot projects completed, 5 have generated an average of $400K+ with a Return on Investment of 8:1

June writing group: 36 papers, 8 chapters, 9 grants, 1 IRB, 1 data analysis script from 19 faculty members

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Lessons Learned

- Scaling up is possible: make a large student training program feel "smaller" and yet successful

- BP trainees in CRT training have a stronger sense of science identity, science self-efficacy, and more likely to commit to a science career than non-BP students in the sciences with and without a mentor.

- Government agencies and nonprofits are eager to work with academic institutions

- Course work and real-world community issues are a good forum for learning biomedical research

- Because racism is ubiquitous yet silent, we will continue offering anti-racism training for the campus

- Faculty meet interdisciplinary collaborators in the context or trainings and speakers

- With greater support at the PI and PD level, we can accomplish much more, including writing

- Institutional change such as new buildings and cluster hires requires administrative buy-in

- Cluster hired faculty members create a research synergy that goes beyond 4 people

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Next Steps/Long-Term Plans

- **Student training:** continue working on a facilitator's guide for in-person training; develop online student training modules

- **Student training:** engaging families to increase their awareness of scientific careers to reduce conflict and increase support of students' research career paths

- **Student training:** strengthening graduate school advising towards research career paths

- **Faculty mentor training:** online critical analysis of power in one's research laboratory

- **Faculty research:** emphasis on biomarkers and EEG in interdisciplinary research

- **Institutional:** Develop community-academic partnered projects, publications, and grants

- **Institutional:** Develop financial plan including SBIR, STTR, training modules, center grant

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Summary

- BUILD PODER brings people together as a community – this is key

- Students feel empowered to explore scientific career options and develop science identities

- Large programs can work when leaders (Chavira, Adamian) are tremendously passionate (1:1)

- Institutional, faculty, and student energies can be brought to the broader university and local communities to extend the BUILD effect

- Three investments in the future:

  - K-12 program (Adamian/Malone) have worked with over 500 middle school students on biomedical experiments with health disparities implications

  - The Health Equity Research and Education (HERE) Center will sustain training and research opportunities

  - Dissemination of work to journals and policy-makers will keep BUILD PODER alive

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Questions & Answers

The California State University
OFFICE OF THE CHANCELLOR

Next Steps/Closing Remarks

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