



UTEP's Transformation: Exemplars in Practice

Lucia Dura, Associate Dean Graduate School

Moving the Nation's Research Agenda: Contributions of an HSI

Roberto Osegueda, VP of Research and Sponsored Projects



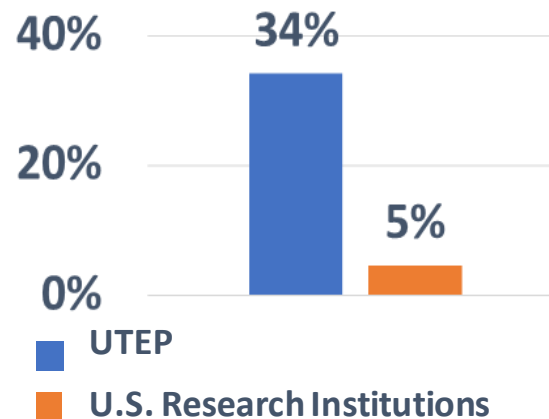
UTEP – HSI Profile

- ~25,000 Students, 80% Hispanics, >85% Regional, 7.5% International (~2/3 Mexican Nationals)
- High US Citizenship Enrollment

% US Citizenship Enrollment in STEM areas (FY 2019)

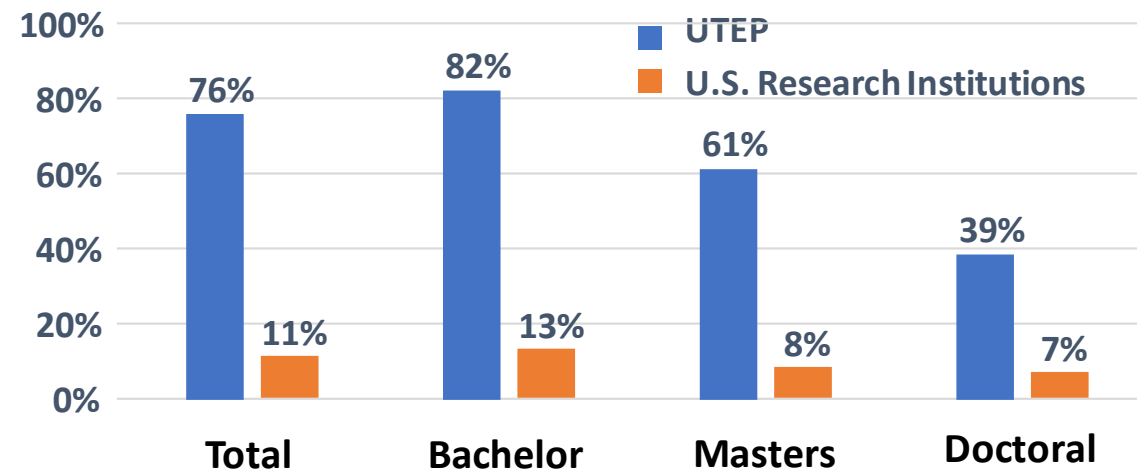
College	Undergraduate	Masters	Doctoral
Engineering	83%	72%	47%
Science	93%	67%	56%
Liberal Arts	94%	83%	76%

% of Hispanic Faculty (FY 2018)



Source: IPEDS

% Degrees awarded to Hispanics (FY 2019)



Source: IPEDS

UTEP Research

ACCESS AND EXCELLENCE

- **Research has always been driven by the educational mission**
- **2010 UTEP Vision: “The First National Research University with a 21st Century Student Demographic”**

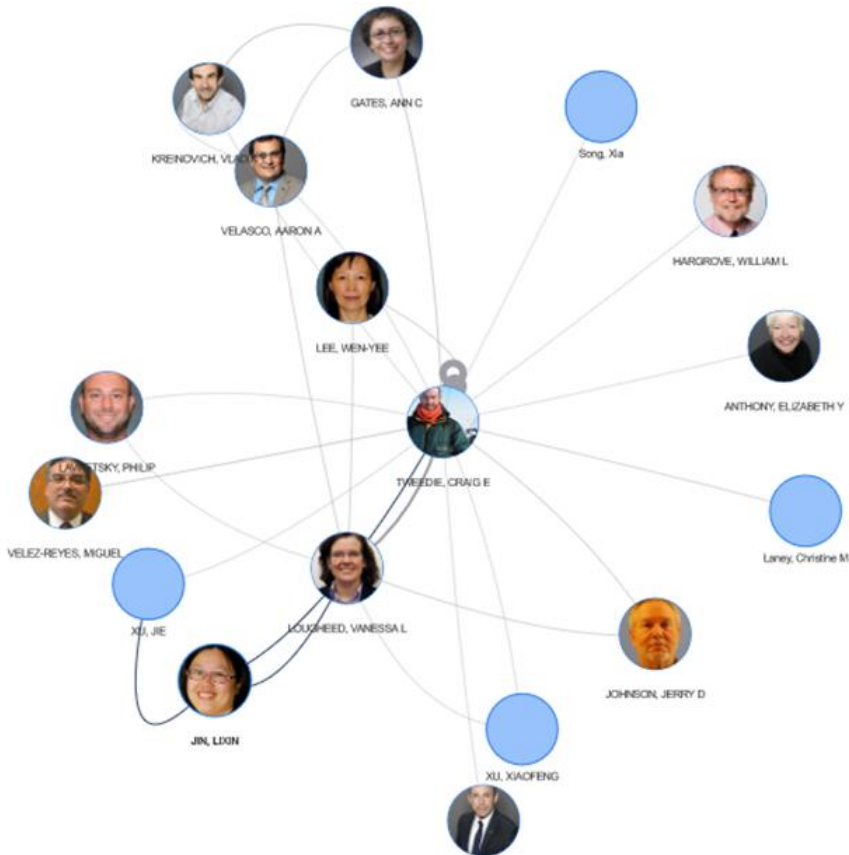
“UTEP’s Tier One goal is not status-driven. It is instead directly tied to our commitment to access, and to creating the enriched educational experience that we believe our students have every right to expect.”

“In pursuing excellence for and with our students, UTEP will create a new national research university model.” *D. Natalicio*

- UTEP’s strategy is to support research development of all faculty.

A Few Strategies ...

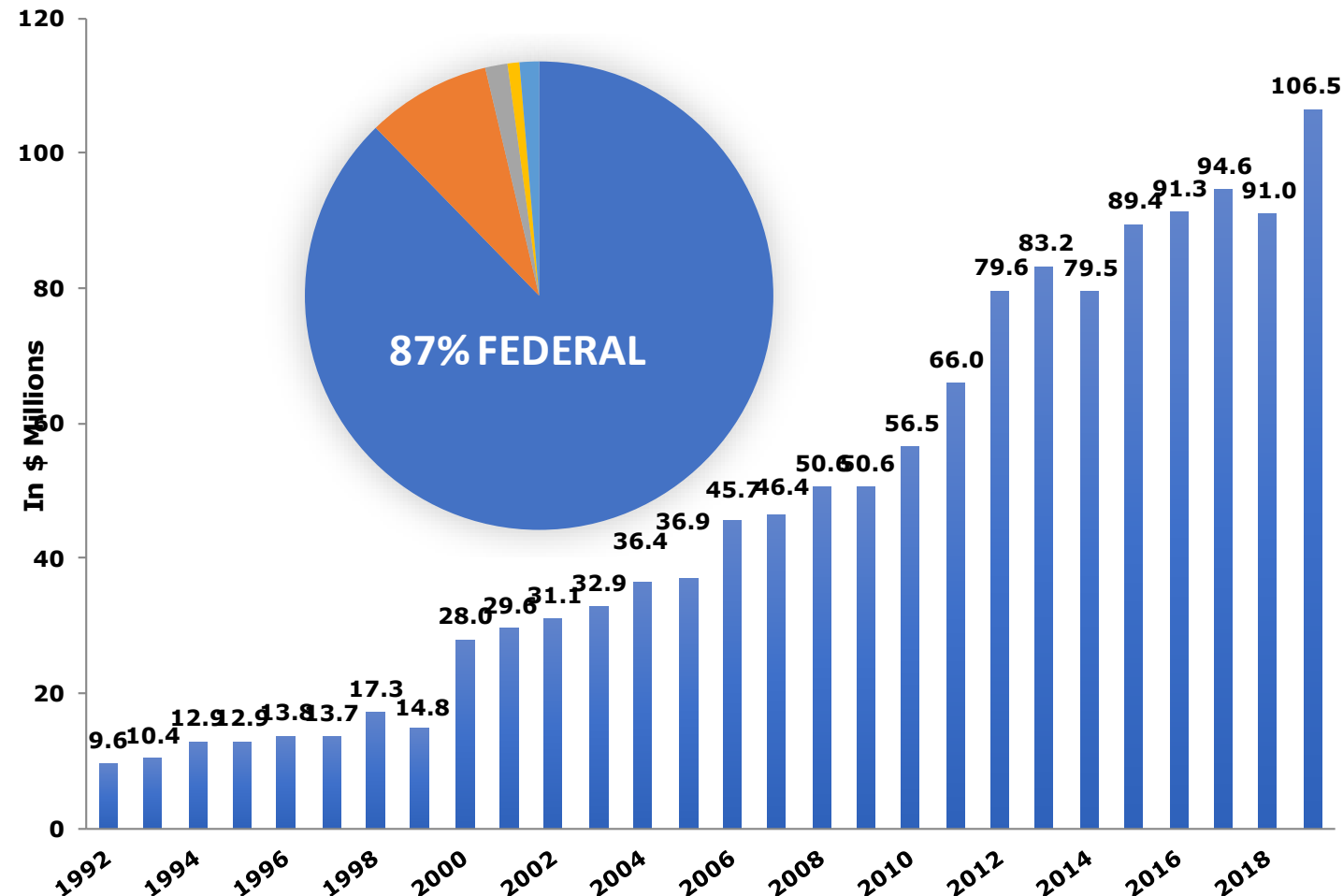
- Aligned faculty research goals to institutional mission through a JumpStart program
- Enhanced campus-wide communication about research (Newsletter)
- Communicated customized funding opportunities to individual faculty based on expertise profiles
- Established efficient processes and tools for pre- and post-award and compliance
- Established Proposal Development Services to provide improve quality of proposals
- Developed Interdisciplinary Research Program with networking support and shared platforms (Expertise Connector)



Outcomes of UTEP's Quest

- Outstanding culture of research
- 2/3 of T/TT faculty submit proposals each year
- About ½ of T/TT faculty hold active grants at any time
- Support 1,500 students per year
- Outstanding infrastructure to support top tier research

Growth in Total Research Expenditures: FY 1992 - FY 2019



Received Carnegie R1 designation in Feb. 2019 based on FY 2017 performance while never abandoning our commitment to our students.

Research Areas of Distinctive Strength

- Additive and Advanced Manufacturing
- Aerospace and Defense Systems Technology
- Biology and Biomedical Sciences
- Water and Environment
- Materials Science & Engineering
- Computer Science, Cyber Technology and Data Sciences
- Social and Behavioral Sciences in the US-Mexico Border
- Transportation Infrastructure Systems
- Electrical, Computer and Network Engineering



STEM Workforce Development Highlights

- UTEP promotes an educational "pipeline" of students progressing from K-12 educational levels to post-doctoral levels, with the high impact education, research, and career development activities surrounding the "pipeline."
- UTEP has placed more than 400 Hispanic engineers in the aerospace and defense industry as well as in NASA since 2010.
- UTEP became one of the major producers of aerospace-trained Hispanic engineers in the nation and a significant contributor to the U.S. Aerospace and Defense Workforce Diversity.
- In 2019-2020 academic year alone, one of the major defense contractors hired 101 UTEP engineering graduates.



Tapping our Hispanic Talent through Undergraduate Research

*Lourdes E. Echegoyen, Director, Campus Office of Undergraduate Research Initiatives
December 11, 2020*



COURI* Goals



MSIs: American Underutilized Resources for Strengthening the STEM Workforce –

7 Promising practices (pp 125)

2 directly related to UGR:

- Mentorship/sponsorship
- Availability of UREs

Portfolio for UGR support:

\$19.7 million (4-5 years)



U.S. DEPARTMENT OF
ENERGY

Office of
Science

hhmi

Howard Hughes
Medical Institute



*Campus Office of Undergraduate Research Initiatives

COURI Strategic Activities

For Students

- Secure external **funding** to support student research & travel
- **Coordinate** & manage academic year and summer research **programs**
- **Assist students** with
 - selection of research mentors
 - application to external research programs
- **Collaborate** with partner institutions
- Organize [two] yearly campus-wide **symposia** to showcase students' research accomplishments
- Facilitate **professional development** workshops for undergraduate research training

For Faculty

- **Assist faculty**
 - Seeking external **funding** for URE programs
 - Setting up **independent URE programs**
 - Integrating authentic **research into coursework**
 - Promoting **best mentoring practices** through workshops, individualized consultation
- **Reward** top URE mentors through yearly awards

For the Institution

- **Track participation** via zero-credit Undergraduate Research Course (RSRC 4033)
- **Assess impact** on retention, time to degree, science self-efficacy, science identity, and graduate or professional school matriculation

Daniels, H. et.al. (2016) Factors Influencing Student Gains from Undergraduate Research Experiences at a Hispanic-Serving Institution, *CBE—Life Sciences Education* 15:3
Collins, T. W., et.al. (2017). Undergraduate Research Participation Is Associated With Improved Student Outcomes at a Hispanic-Serving Institution. *JCS*, 58(4), 583–600.
Echegoyen, L.E., et.al. (2019). Impact of Open Enrollment in Course-based Undergraduate Research Experiences with At-risk Populations. *EDULEARN19 Proceedings, IATED*, 6580-6588
Monarrez, A., et.al. (2020 in press) The Moderating Effect of Faculty Mentorship on Undergraduate Students' Summer Research Outcomes

UTEP UREs by the Numbers

Traditional mentored research experience - Master-Apprentice Model

2014-15
496

2015-16
553

2016-17
620

2017-18
698

2018-19
842

2019-20
768

College	Enrollment
Science	237-296
Liberal Arts (Psychology = 48%)	172-250
Engineering	163-186
Health Sciences	33-103
Business, Education, Nursing, Pharmacy	7-16

3.5 - 4.0% of UTEP students

Seniors ~64% of participants
Juniors ~25%

Course-based Undergraduate Research Experiences (CUREs) for Freshman

2016-17
221

2017-18
218

2018-19
276

2019-20
304

BIOL I & II Labs; CHEM I & II Labs; GEOL I & II Labs; PSYC I; SOCI I

BUILDing SCHOLARS

Science/Research Self-Efficacy AY Research

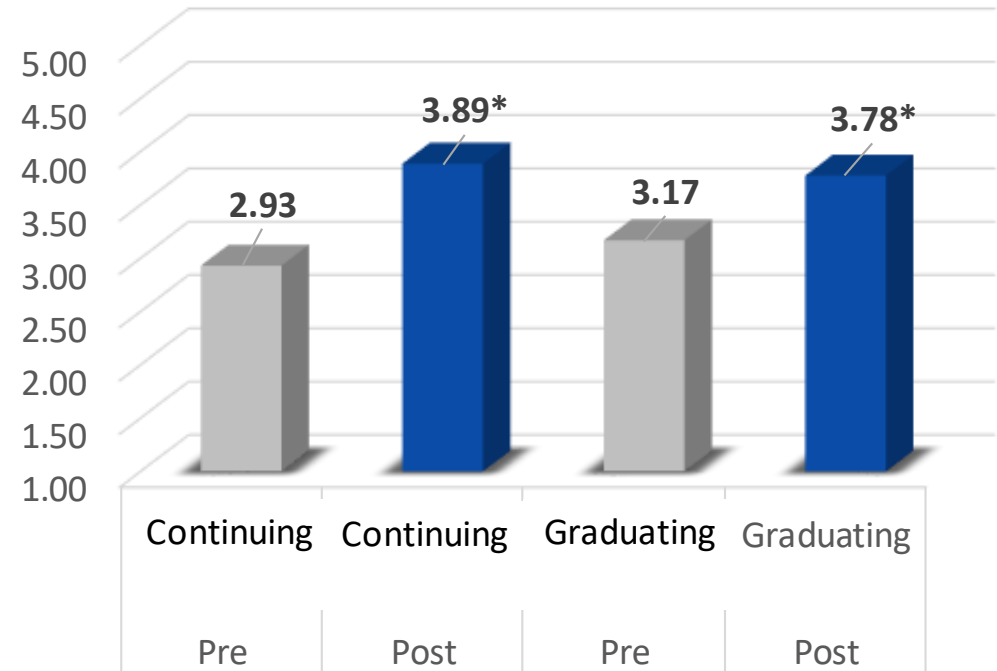
2018-19 Cohort

Post-survey

10 retrospective items*
5-point scale

Significant increases for both

- Graduating students (N=13):
 $t(12) = -4.33$; $p = .001$
- Continuing students (N=16):
 $t(15) = -3.70$; $p = .002$



*Estrada, M., Woodcock, A., Hernandez, P. R., & Schultz, P. W. (2011). *Toward a Model of Social Influence that Explains Minority Student Integration into the Scientific Community*. *Journal of Educational Psychology*, 103(1), 206–222. <https://doi.org/10.1037/a0020743>
Chemers, M. M., Syed, M., Goza, B. K., Zurbriggen, E. L., Bearman, S., Crosby, F. J., . . . Morgan, E. M. (2010). The role of self-efficacy and identity in mediating the effects of science support programs (Technical Report No. 5). Santa Cruz: University of California

BUILDing SCHOLARS

Science Identity – AY Research

2018-19 Cohort

Post-survey

4 retrospective items*

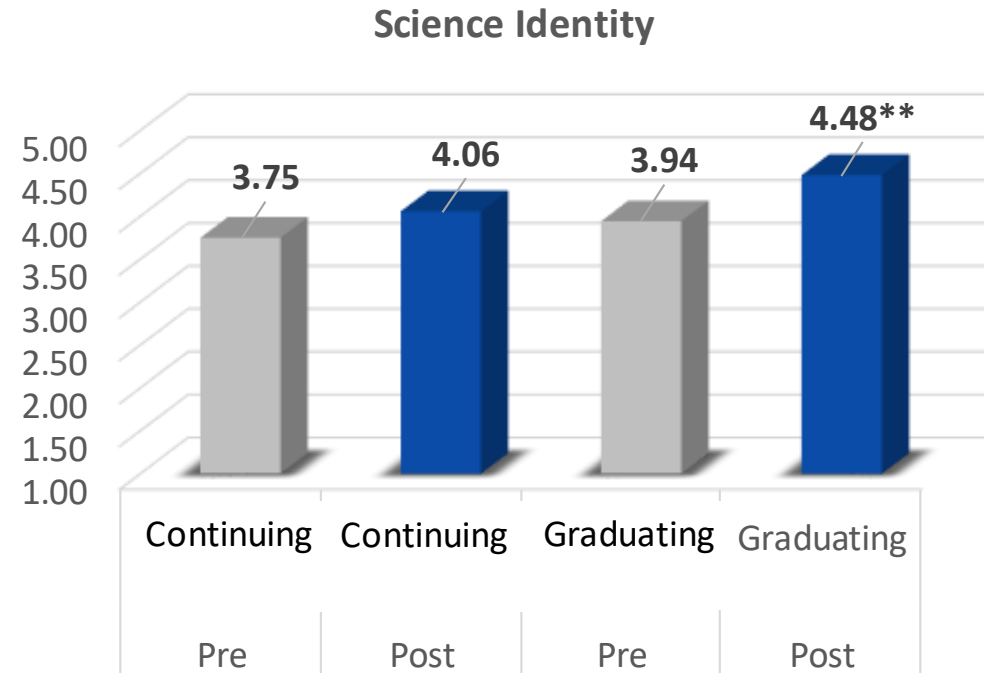
5-point scale

Significant increases for

- Graduating students (N=13):
 $t(12) = -2.87; p = .01$

Not significant increases for

- Continuing Students (N=16):
 $t(15) = 1.38; p = .19$



*Estrada, M., Woodcock, A., Hernandez, P. R., & Schultz, P. W. (2011). Toward a Model of Social Influence that Explains Minority Student Integration into the Scientific Community. *Journal of Educational Psychology*, 103(1), 206–222. <https://doi.org/10.1037/a0020743>
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Establishing a Culture of Community Engagement

Azuri Gonzalez, Director of the Center for Community Engagement



Community Partnerships and Collaborations

Exchange knowledge and resources for the purpose of

- instilling democratic, diversity, equity and inclusion values in preparation of well-rounded, educated, and engaged citizens;
- democratizing knowledge in its co-creation with community; and
- addressing critical societal issues.

All in the context of reciprocity and mutually beneficial community partnerships.



Community Engagement Approaches and Models



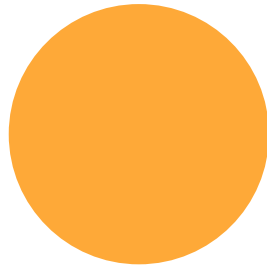
STUDENT



FACULTY



INSTITUTIONAL



Integration of Community Engagement in High-Impact Practices



Volunteerism



Community service
(professional included)



Academic based
community engagement
(service-learning)



Community-based
internships/ practicum /
clinical / student teaching



Consulting, project-based



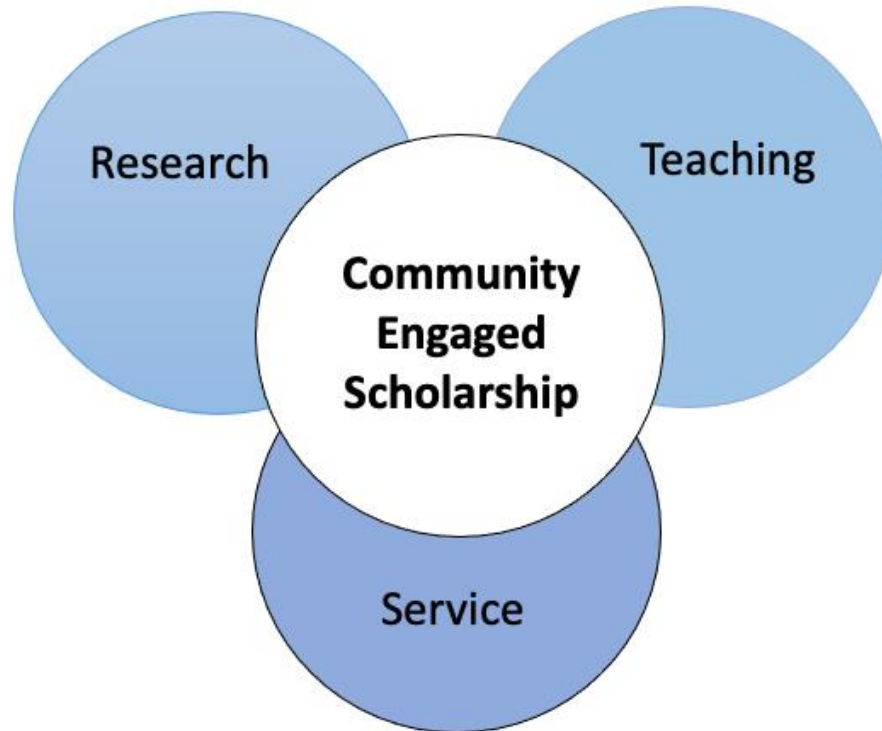
Student community-
based research



STUDENT

Community Engaged Scholarship

Integration of community engaged research, teaching and service



FACULTY

The creation, exchange, and dissemination of knowledge, information, and expertise between community and university representatives aimed at addressing social issues:

- **interdisciplinary**, reciprocal, sustainable, equitable and mutually beneficial scholarly partnerships.
- **dissemination** of peer reviewed findings to stakeholders, clients, community leaders and decision-makers with practical application implications



INSTITUTIONAL

Institutional Community Engagement



Workforce development /continuing education initiatives



Innovation and investment partnerships



Programmatic and academic collaborations



Issue-focused, unified collaborations



Figure 2. UTEP Student, Arahim Zuñiga, displays Bucket system.

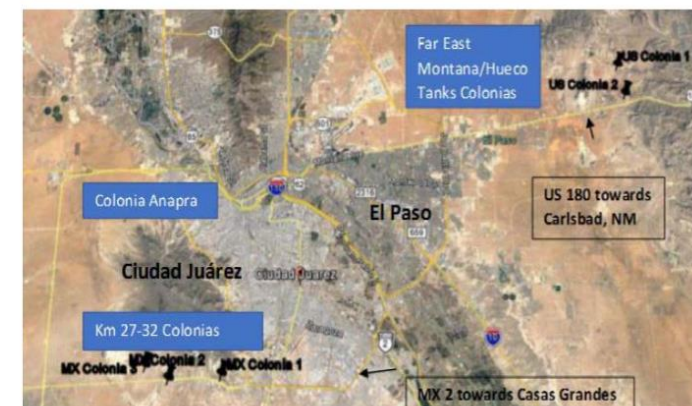


Safe Drinking Water for US - Mexico Border Colonias

*Texas-New Mexico-Chihuahua
Regional Workgroup*

KEY PROJECT HIGHLIGHTS:

- Improved water quality for 74 families
- Reduced drinking water costs for US families
- Installed 14 In-Line reverse Osmosis systems installed in US Colonias
- Installed 60 Sawyer-Point Gravity Driven Buckets distributed in Mexico
- 175 US & MX Residents educated



By the Numbers

327 faculty

50/87 departments

480 courses

10,316 students (academic)

14,913 Students (service)

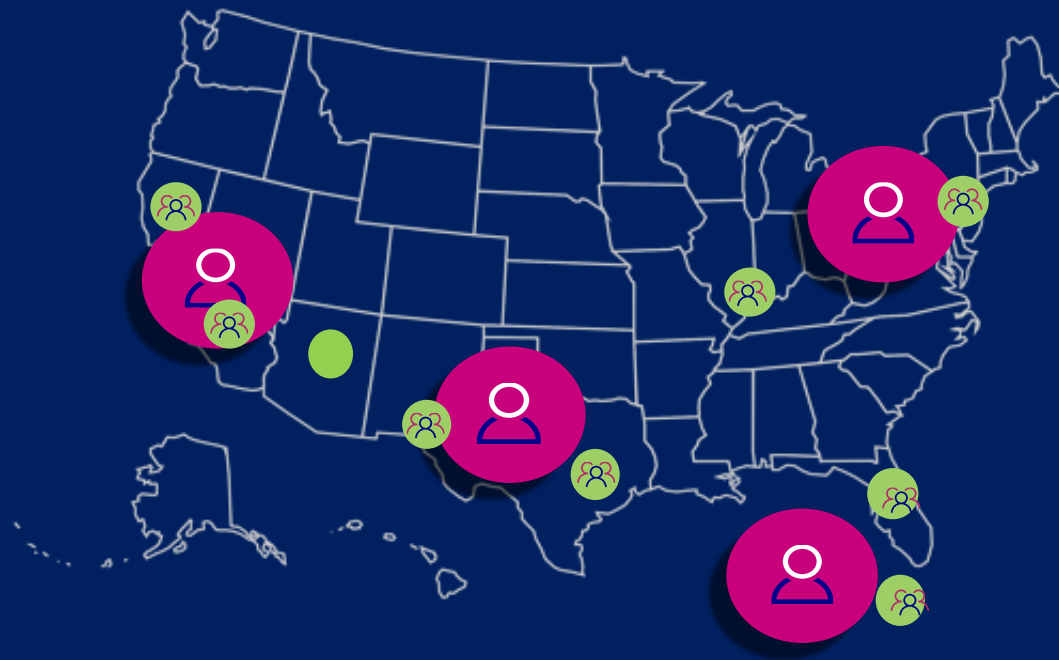
1,421,459 hours (combined)

Advancing Excellence in Computing through a National Alliance of HSIIs

Ann Q. Gates, Vice Provost for Faculty Affairs



CAHSI INCLUDES Alliance



- Populations served:
 - *First gen*
 - *Hispanics*
 - *Students at all levels*
- Geographic reach:
 - *West: CA*
 - *Southwest: AZ, NM, TX*
 - *Southeast: FL, PR*
 - *North: IL, NJ*
- Members and Partners:
 - *Four-year and two-year colleges*
 - *Non-Profits*
 - *Industry*
 - *Government entities*



HRD-1834620
CNS- 1551221



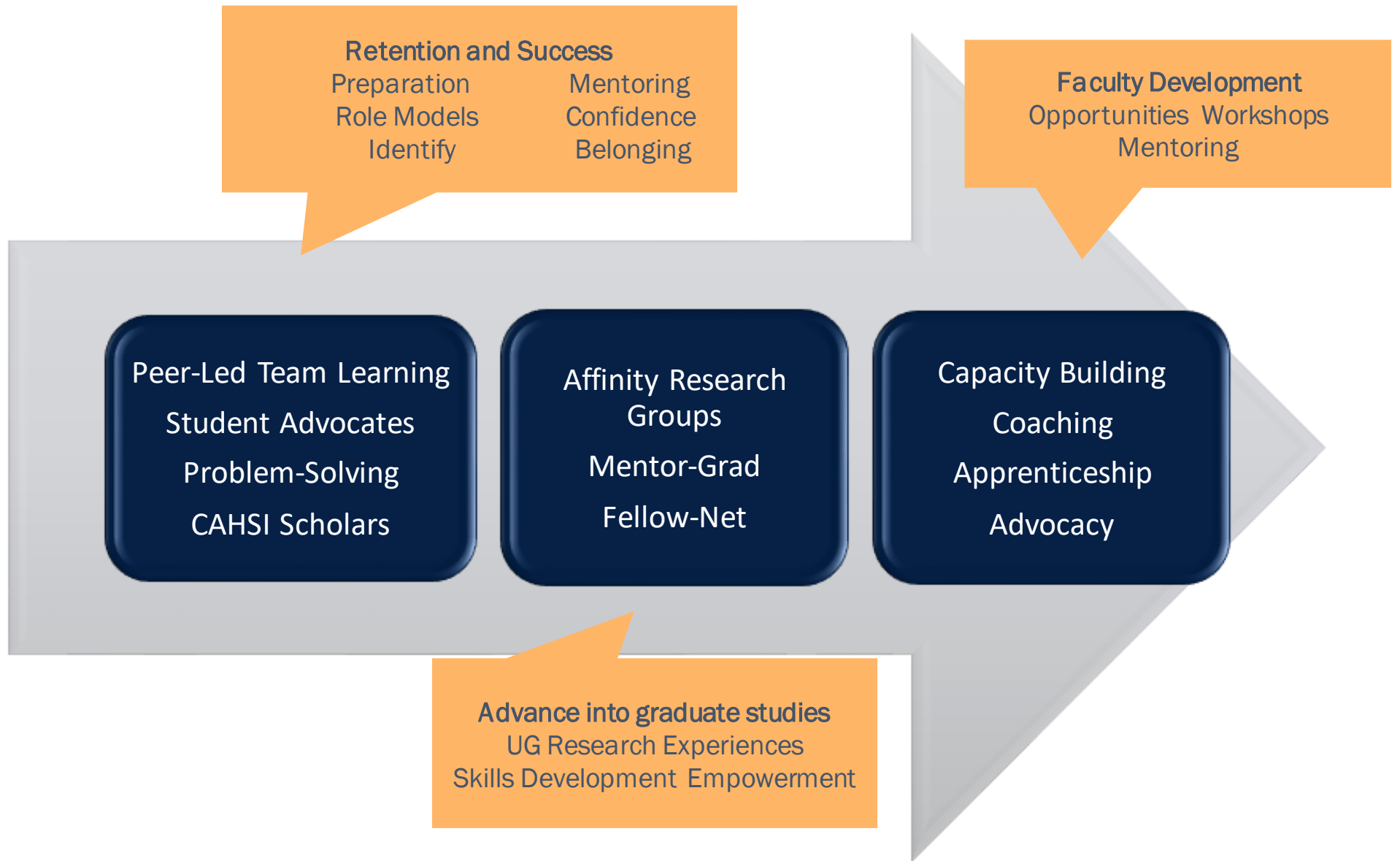
Vision

By 2030, Hispanics will represent 20% or more of those who earn credentials in computing.

Goals

Grow and sustain a networked community committed to recruiting, retaining, and accelerating the progress of Hispanics in computing.

Signature Practices: Student Success



Mutually Beneficial Partnerships: Quality Education and Workforce Preparation

Problem-
solving
course

Domestic
Exchange
Program

Allyship
Program

Cybersecurity

AI and Data
Analytics

Dissertation
Award

Faculty in
Residence

Googler in
Residence

Google



ORACLE

Teacher CS
Academy



Microsoft

ARL

REBOOT
REPRESENTATION

LOCKHEED MARTIN



UTEP

Building Research Capacity at HSIs

Inclusion and equity are critical for innovation and discovery and the U.S. to maintain a competitive edge.



2036143
CNS-1551221

- **CAHSI's Research Capacity-Building Initiative**
 - Build research capacity at HSIs
 - Increase the number of Hispanic faculty who receive competitive funding
 - Increase the number of Hispanic students involved in research
- **Virtual REU program:** adoption of effective practices to build UG researchers
- **Mini-Ideation Workshops** to generate concept papers and create competitive research proposals that:
 - address a critical need in CISE core areas,
 - demonstrate potential for transformation, and
 - contribute to fundamental research

Visit the CAHSI
website and
Library to
learn more!

<http://cahsi.org>



Written by CAHSI members and external evaluators, the CAHSI literature comprises the reports and studies of CAHSI initiatives since 2006 with an aim of broadening participation of Hispanics in computing and promoting students' educational and occupational success in computing fields. The literature includes the following subtopics: Background, Signature practices, Student development, and Recruitment and Retention.



Aiming to expand the discussion on how to best serve our students and meet their needs, HSI servingness comprises the reports and studies of the definitions of "Servingness" at HSIs and departmental/institutional structures and responsibilities for promoting student academic success at HSIs.

