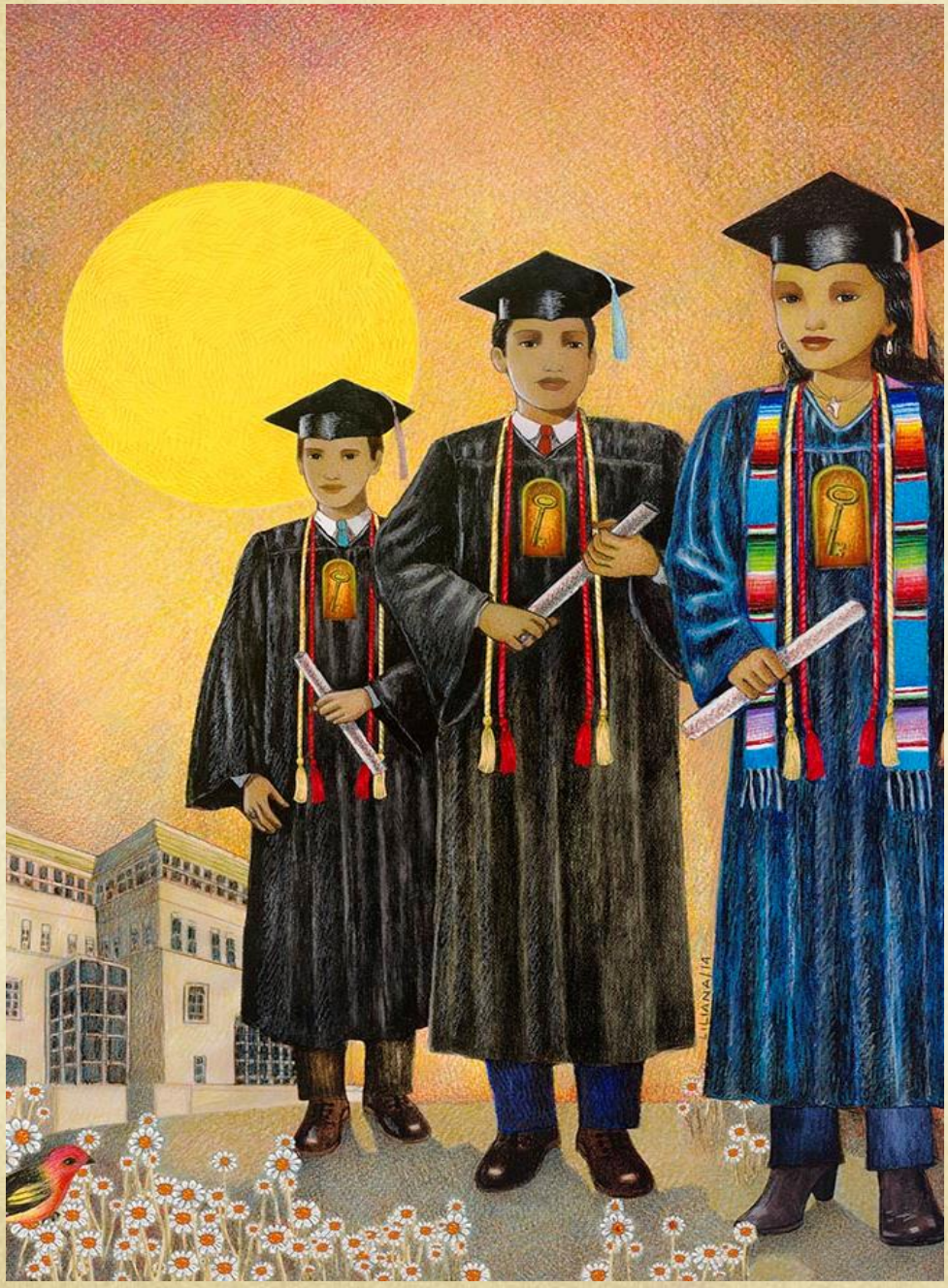

The Importance of Working With A Culturally-Validating, Asset-Based Student Success Framework in STEM

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Keynote Address
STEM Cultural Colloquium
University of New Mexico

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How I Enter This Work

Important Trends Impacting STEM Education

The Face of America is Changing

- People of color quickly becoming the majority
- More than half of all children under age 5 are of color
- In 1980 80% of the population was White. But by 2044 people of color will be the majority in the U.S.
- Low-income people of color tend to face barriers to educational and economic opportunities

http://nationalequityatlas.org/data-summaries

Structural Inequalities Work Against Low-Income Students

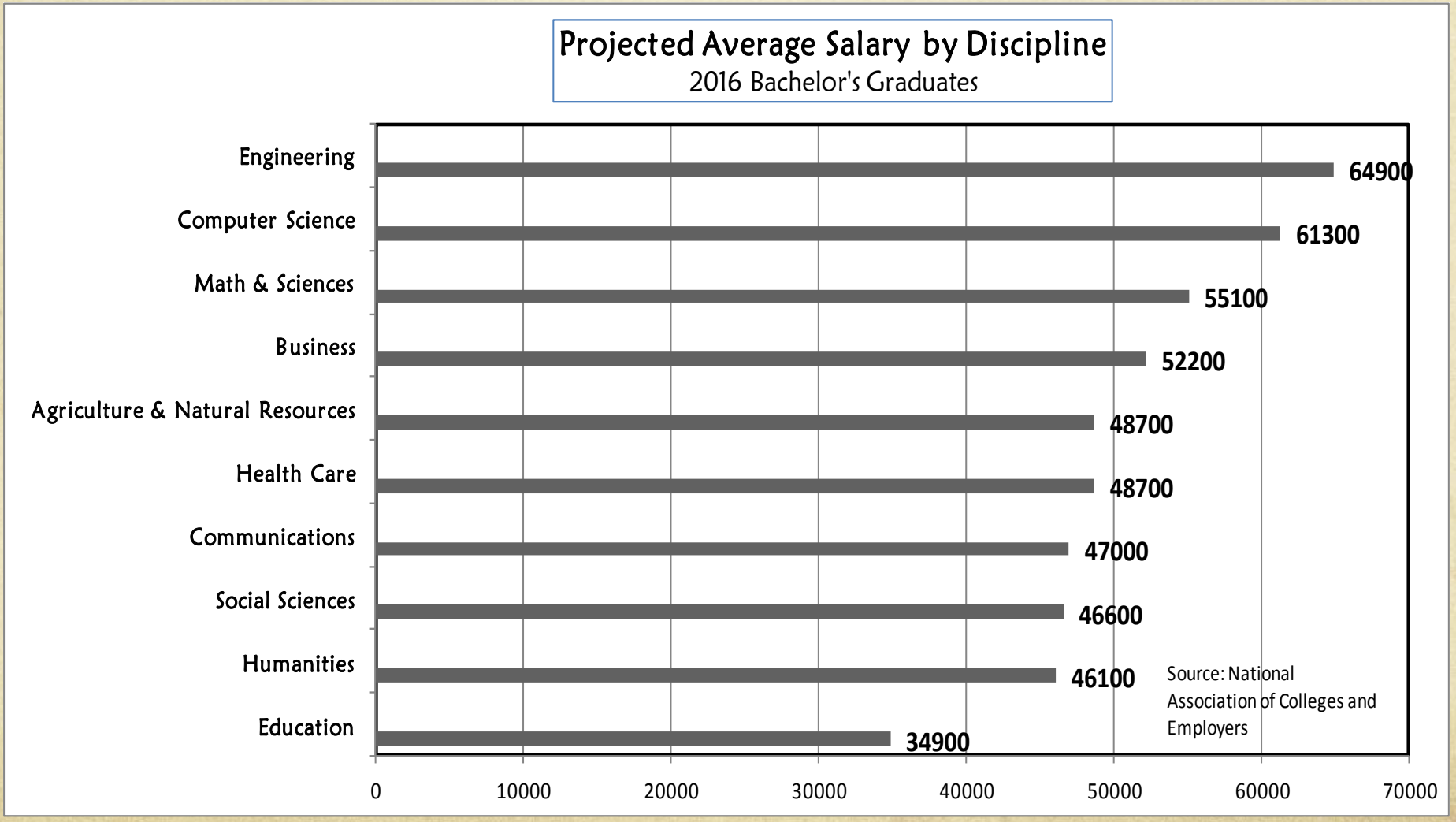
- History of exclusion, discrimination, racism
- Unequal schooling
- Unequal school financing
- Segregated schools
- Poverty
- Undocumented status

Women, Ethnic Minorities Are Underrepresented in STEM

- According to a report from the American Institutes for Research (2012): "Women, racial and ethnic minorities and persons with disabilities are underrepresented in the STEM disciplines."
- They represent the largest untapped STEM talent pools in the United States.
- There are not enough college graduates in STEM to fill labor market demands in STEM

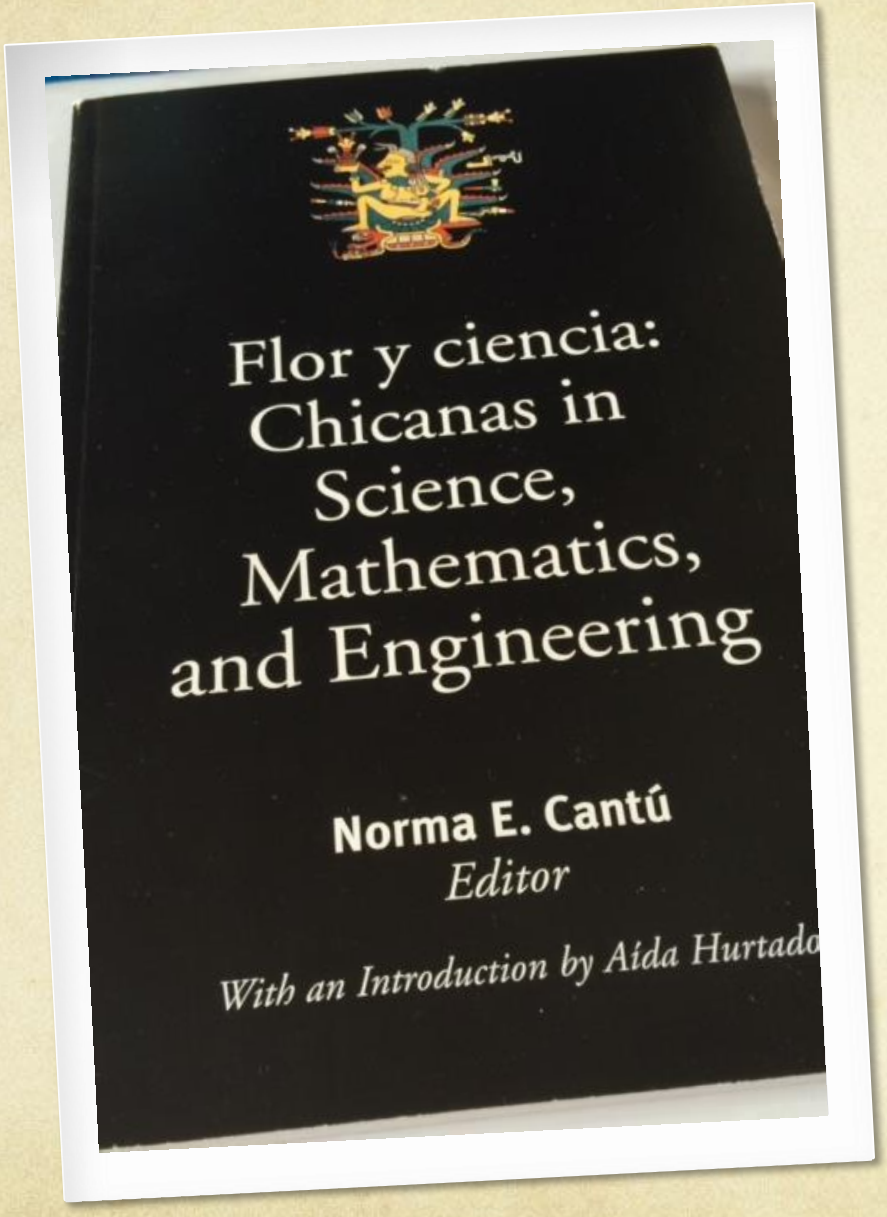
Earnings by Degree

Those who graduate with degrees in STEM fields—science, technology, engineering and math—are expected to command the highest salaries



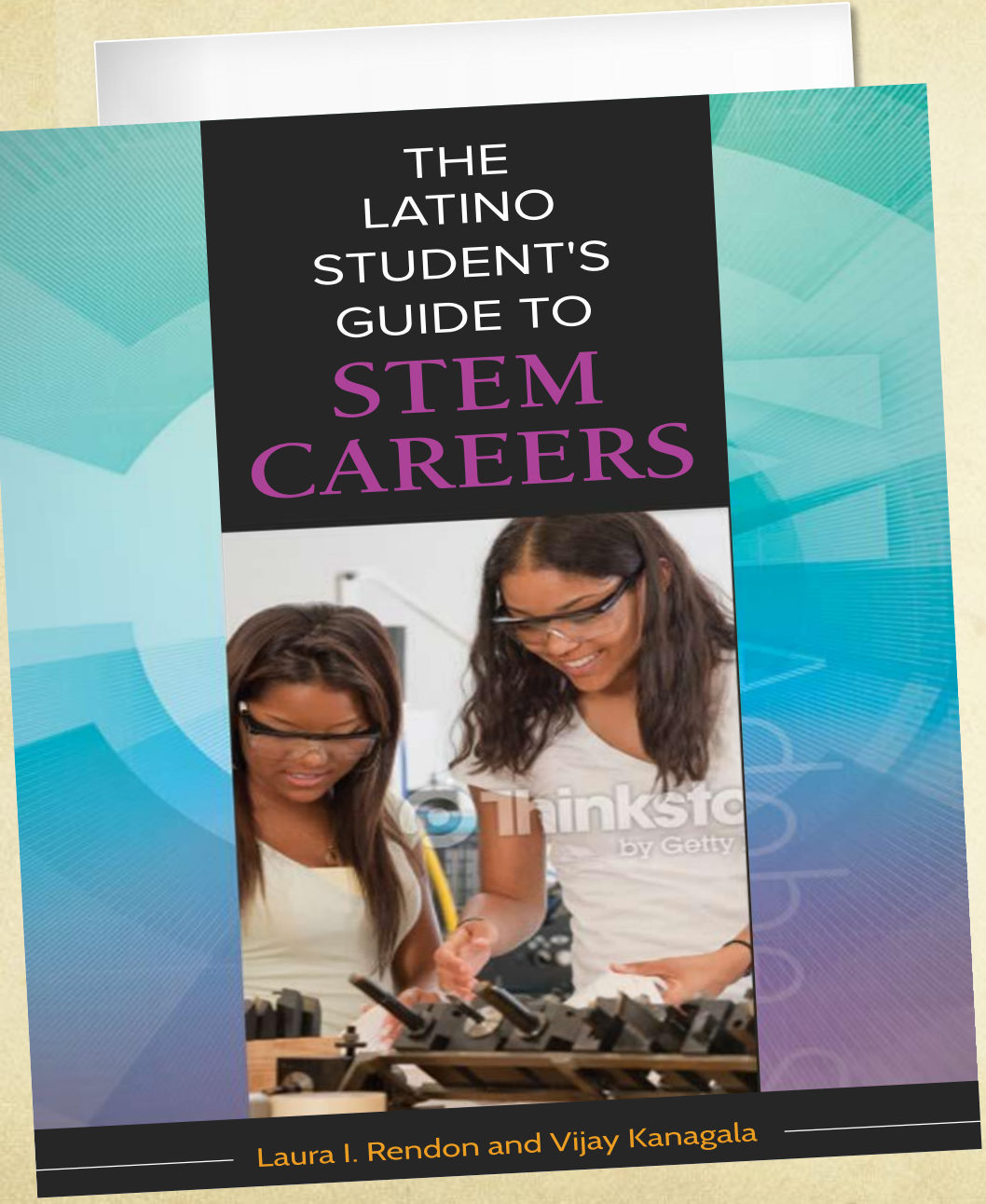
Fostering Student Success

- Gain a better understanding of the personal and academic student expeirence, especially the ways they succeed despite obstacles
- Work with an Asset-Based Framework—Current Research Has Identified Student Assets
- Redefine success in STEM education
- Employ High-Impact STEM practices



Analysis of Essays Written by Latinas Who Succeeded in STEM, N=9

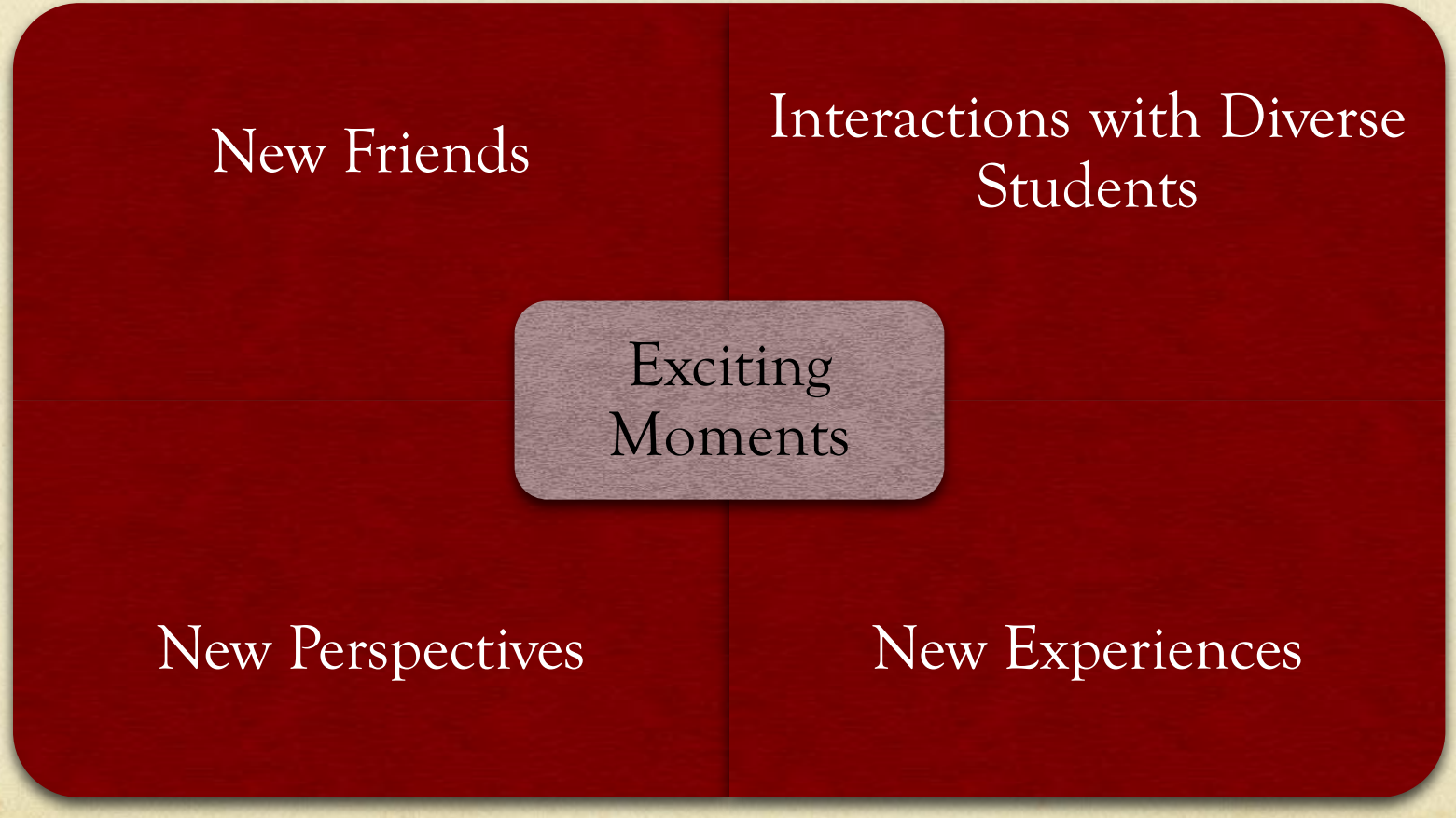
Paths to Discovery (2011) edited by Norma Cantu and Aida Hurtado



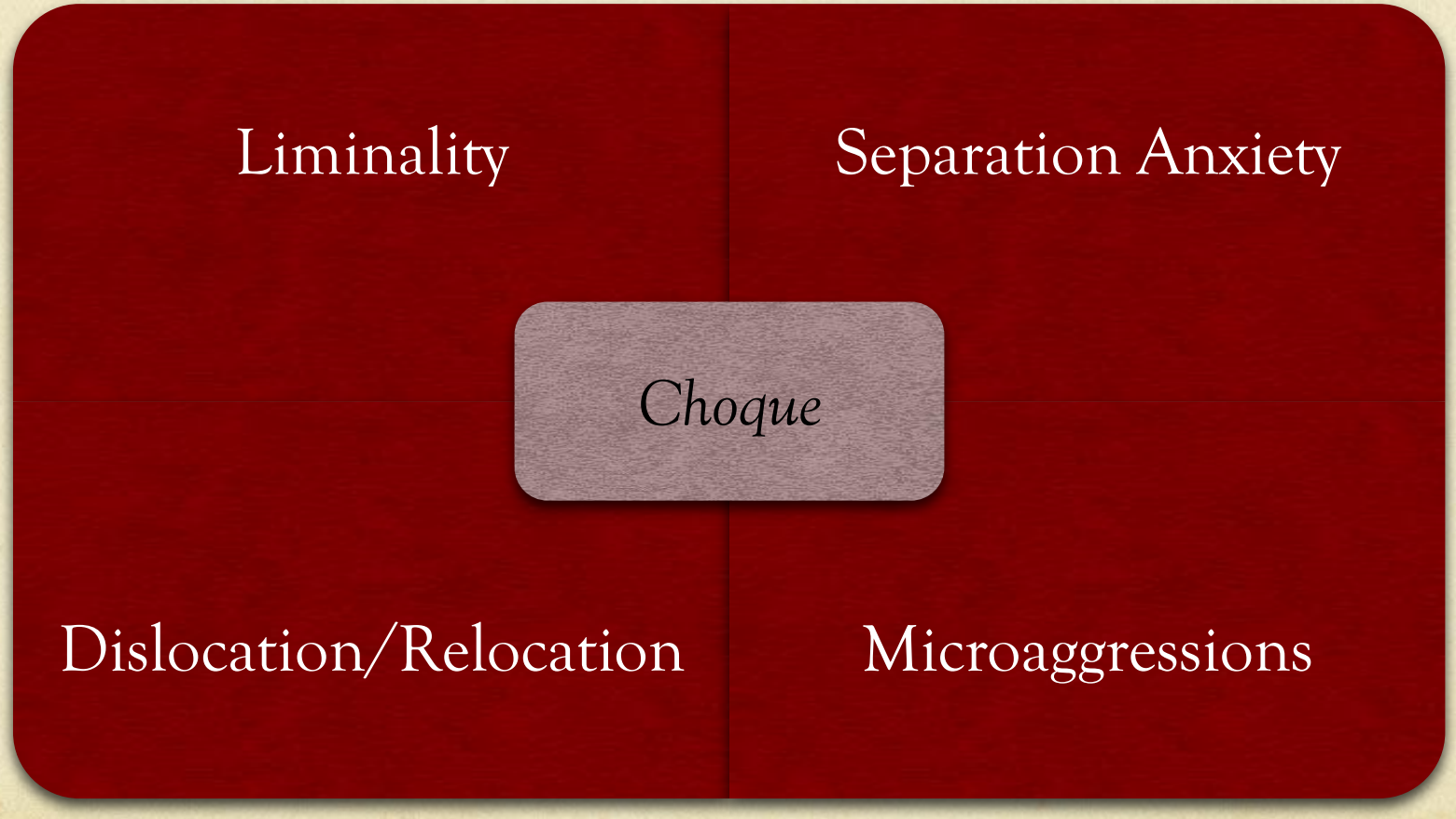
Analysis of STEM Graduate Essays, N=9

Study of Latino/a Student Assets. N=47/29 females; 18 males

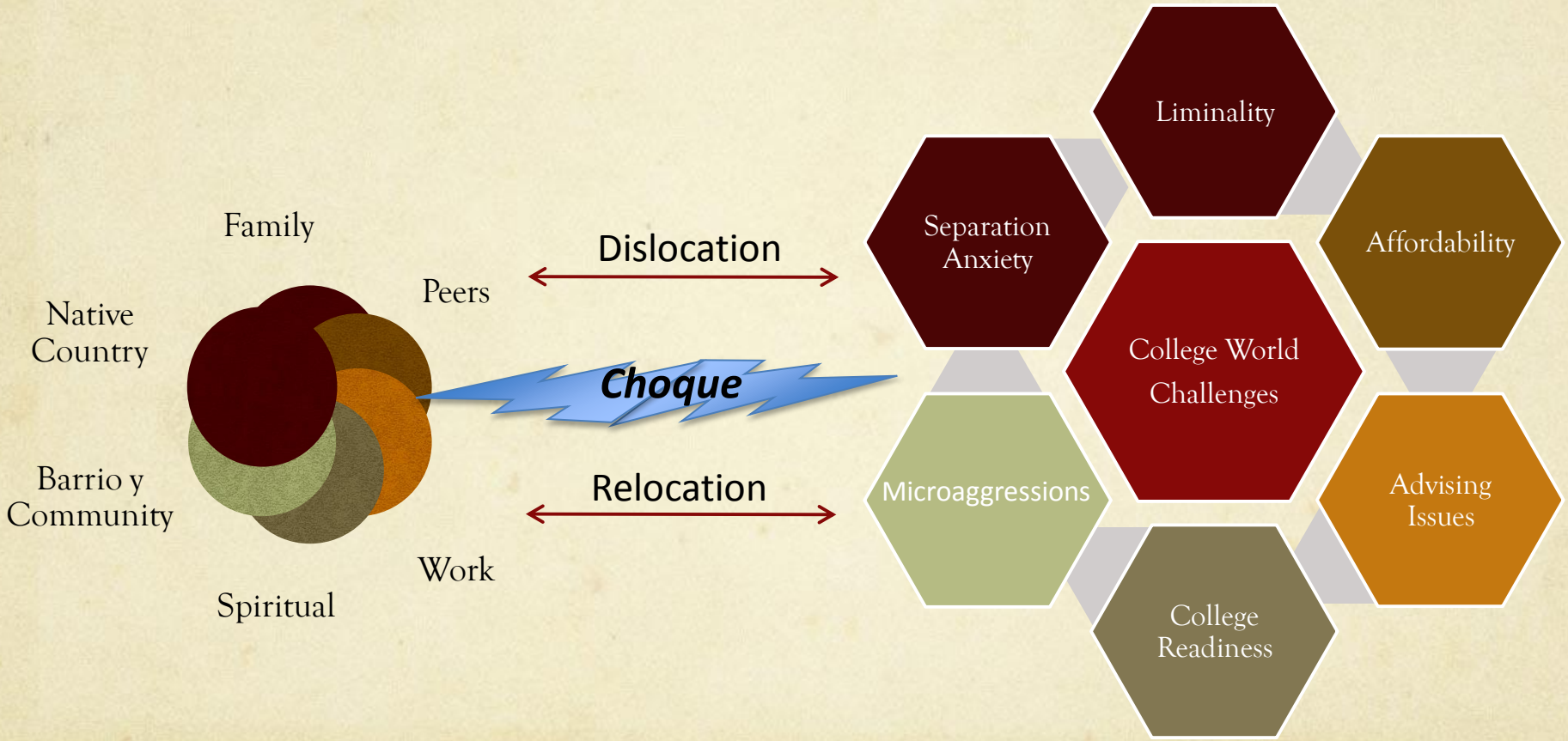
Upside of College



The Downside of College: Choque/Cultural Collision



Entre Mundos:
Navigating the Transition to College



WORKING WITH AN ASSET-BASED STUDENT SUCCESS FRAMEWORK

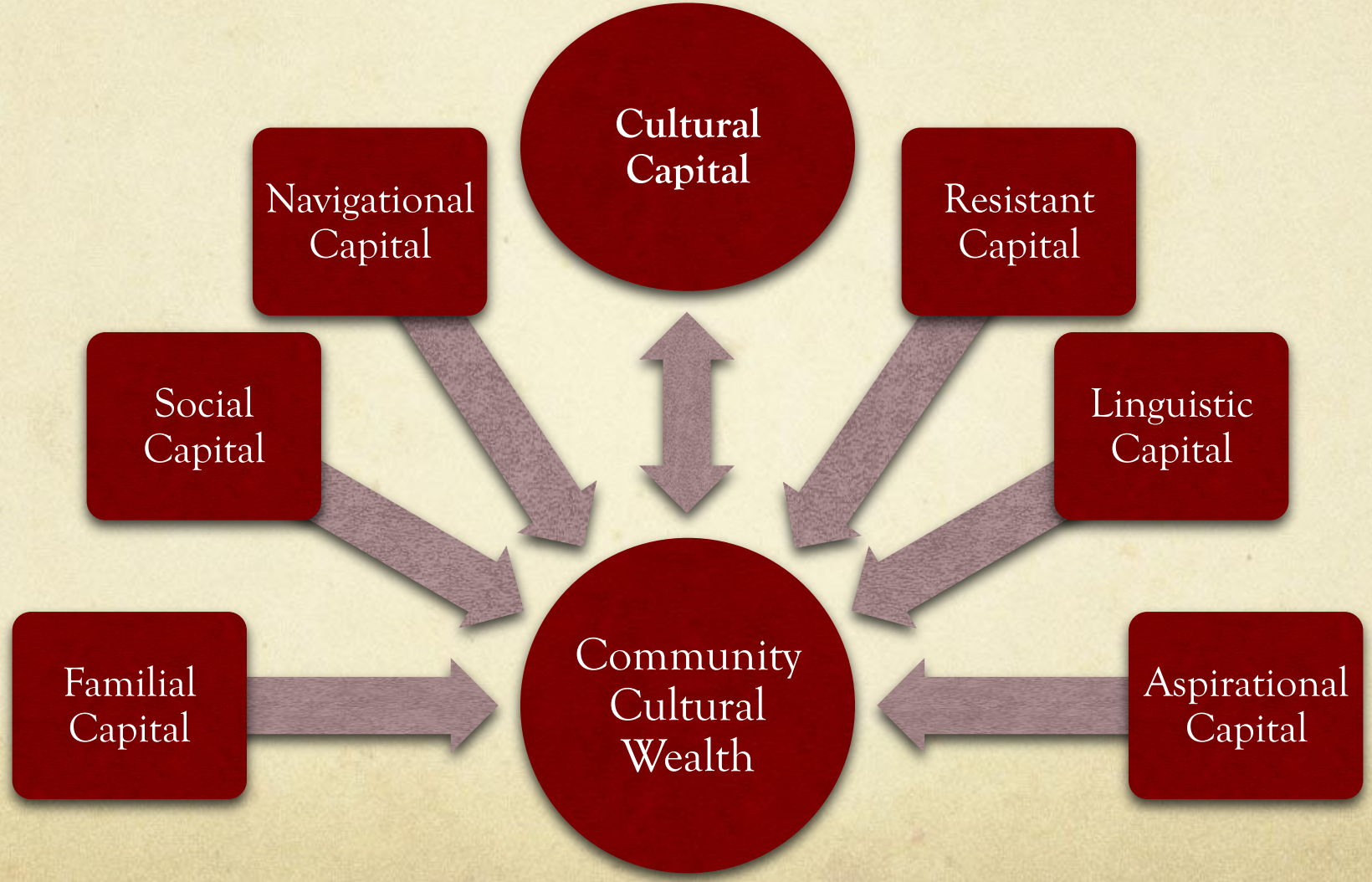
It is Time to Shatter the Dominant Deficit-Based Framework

- Deficit-based thinking pathologizes, stereotypes and marginalizes students (i.e., at risk, marginal, culturally deprived)
- Based on grand narrative that parents and communities do not value education and that low-income families are inferior
- Theories and models with deficit-based assumptions are not aligned with the experience, strengths and culture of underserved student populations

Students in STEM Fields Can Succeed Employing Their Own Cultural Intelligence

- What cultural intelligence do students of color employ to succeed in STEM?
- ***Ventajas*** (Assets)
- *Conocimientos* (Funds of Knowledge)

Tara Yosso's Community Cultural Wealth Model



Student Cultural Intelligence

Aspirational

- Set high aspirations
- Recognize value of education
- Remain hopeful about future

Linguistic

- Employ two or more languages
- Engage with formal and informal modes of expression

Student Cultural Intelligence

Familial

- Model strength & determination of family–witnessed perseverance & hard work
- Benefit from *consejos, respeto, testimonios y educacion*

Social

- Form peer networks
- Form study groups
- Peer validation

Student Cultural Intelligence

Navigational

- Operate in liminal spaces
- Traverse multiple, distinct social contexts
- Dislocate and relocate
- Navigated through challenges such as civil war in their country, immigration, poverty

Resistant

- Resist stereotypes; combat and overcome microaggressions
- Overcome hardships such as poverty and lack of guidance and resources
- Overcome patriarchy in STEM

Student Cultural Intelligence

Ganas/ Perseverance

- Develop inner strength; determination to succeed
- Recognize and embrace sacrifice made to attend college

Ethnic Consciousness/ Giving Back

- See STEM as providing services for the common good
- Want to help families and communities
- Know they can be role models

Student Cultural Intelligence

Spirituality/ Faith

- Employ faith in God/higher power
- Develop sense of meaning and purpose
- Embrace concepts such as gratitude, goodness and compassion

Pluriversal

- Adapt and operate in multiple worlds and diverse educational and geographical contexts
- Hold multiple and competing systems of meaning in tension

STEM Graduates
Case Studies

STEM Graduate: Elias Argote

"*Freedom is written with blood, and work is written with sweat*"

- BA Major: Biochemistry and Microbiology; Minor in Biotechnology
- MS: Food Science and Chemistry
- Female; Immigrant from El Salvador
- English Language Learner
- Present Profession: Food Service Industry, Quality Compliance Manager
- Experienced civil war in El Salvador
- Experienced poverty

Elias Argote

- “My story is the one many immigrants share, a story filled with overcoming obstacles for a better life, and where dreams and our faith in God are the powerful forces that keep us going.” ASSETS: SPIRITUALITY/FAITH; ASPIRATIONAL
- “It was a difficult childhood to be born in a society that appreciates males, and being born female did not give me an advantage. My mother was a single mother in a peasant family that had to work very hard to bring bread to the table every day.” ASSETS: RESISTANT; PERSEVERANCE/GANAS; FAMILIAL
- “I was guided to a career in science because I wanted to help others and alleviate suffering among my people.” ASSET: ETHNIC CONSCIOUSNESS/GIVING BACK

STEM Graduate: Stephany Alvarez-Ventura

"The toughest part of achieving a master's degree was not conducting research with two million bees, but going home with stings on my hands and carrying my two children during every single sleepless night for two years, while still achieving a 3.9 GPA."

Major: MS in Environmental Studies

Female

English Language Learner

Immigrant from Dominican Republic

Program Coordinator, Agroecology Program, Florida International University

STEM Graduate: Stephany Alvarez-Ventura

- "My story began in the mid 1980s where the sugar crisis in the Domincan Republic fueled my parents' decision to leave our homeland in search for the American Dream…For English, the television served as my educator, rambling off words which seemed to be spoken through a muzzle." ASSETS: NAVIGATIONAL, LINGUISTIC

- "My father worked every waking moment of the day…My mother has always been there to remind me to take every opportunity presented and to fight hard in the face of adversity." ASSETS: FAMILY, RESISTANT

- "You can chooose to tell yourself, 'no puedo' or you can become that person that everyone says, 'No se como le haces.' I chose the latter." ASSETS PERSEVERANCE/GANAS

Case Study of A Community College STEM Transfer Student

- Gen 1.5 student (first 7 school years in Mexico)
- Born in Juarez, Mexico
- Previously undocumented
- Married, no children
- First-generation, low-income
- No models of college graduates in family

Case Study of A Community College STEM Transfer Student

- Silvia, fourth-year student at university
- Graduated in top 10% of high school class
- Transfer student—attended two community colleges before enrolling in four-year university
- Associate of Arts (emphasis in Math & Physics)
- Now majoring in Mechanical Engineering
- Planning graduate work in Chemical Engineering

Silvia's Journey

Redefining Success

DOMINANT

- Self efficacy and individual ability; little to no assistance needed
- Linear progression to college
- Transition to college is smooth

NEWLY-EMERGING

- Culture of support; peer networks, validation and learning experiences with faculty and mentors matter
- Nonlinear progression; twists and turns--final career may be different than original one
- Transition involves culture shock, anxiety, liminality, dislocation and relocation

Redefining Success

DOMINANT

- Resource-rich—everything there for student to succeed
- Benefit from traditional ways of knowing (schooling, family support)
- Integration/involvement is only way to succeed

NEWLY-EMERGING

- Sacrifices made to get to the finish line; everything to succeed not always there
- Benefit from own cultural intelligence, *consejos*, role modeling, examples in the family
- Students employ their own cultural intelligence and ways of knowing to succeed

High Impact STEM Teaching and Learning Practices

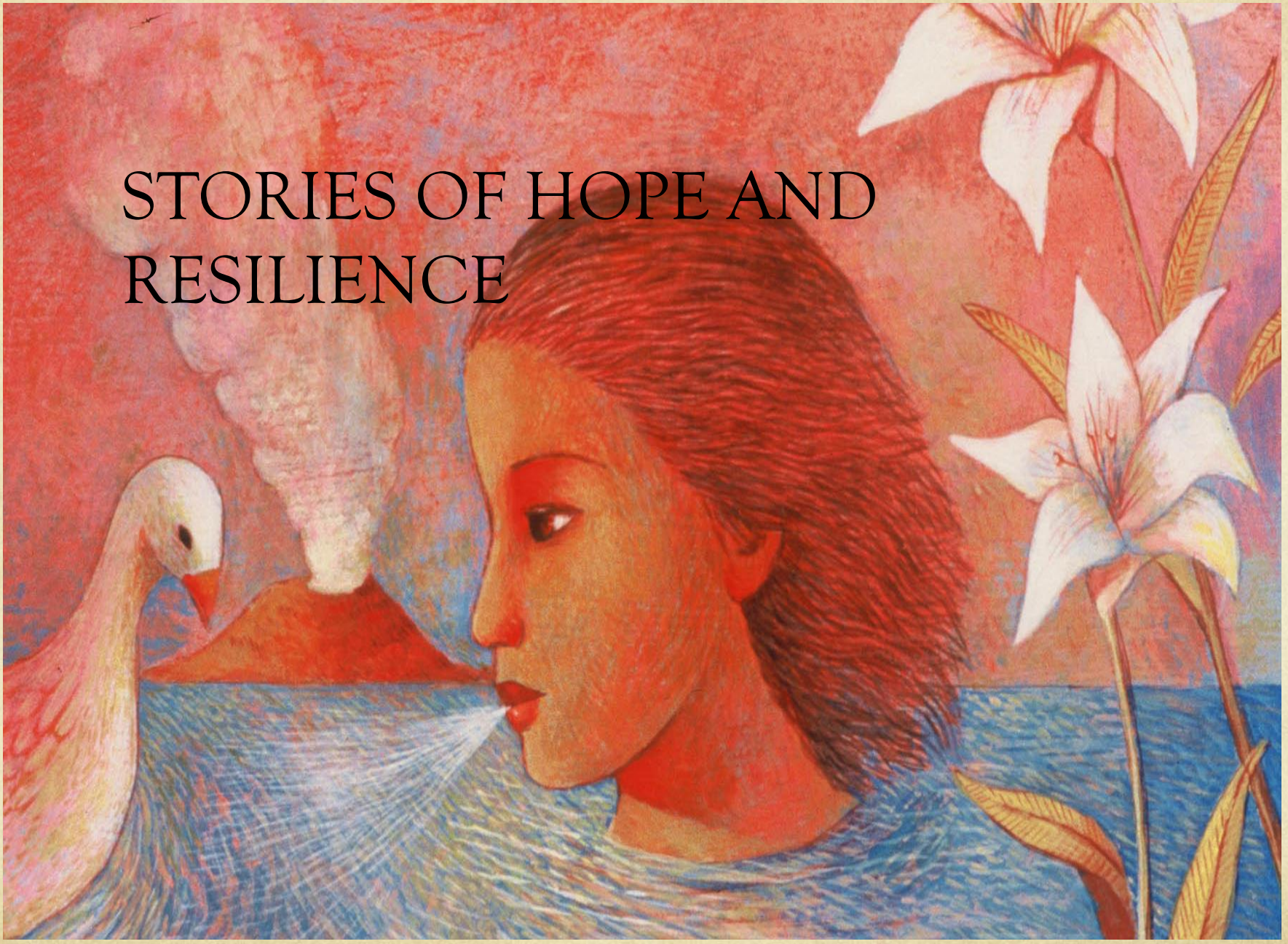
- Research with a faculty member
- Internship programs
- Hands-on experiences/applied learning through projects and activities where they can learn by making mistakes
- Reflective, deep learning experiences –study abroad, learning communities, service learning, study groups
- Validation--connection to a significant person (faculty, mentor, adviser, etc.) who provides guidance, encouragement and support

High-Impact Student Support Services

- Financial aid—scholarships, research assistantships
- Study groups
- Peer support and validation
- Mentoring & Advising
- Ethnic-themed student organizations

Key Lessons Learned About STEM Students

- Early life lessons make a difference (single mothers, working hard to survive, living through civil unrest, witnessing suffering of others, transitioning from one nation to another)
- Despite many obstacles (poverty, immigration, microaggressions, patriarchy) students can succeed
- Students are trailblazers—breaking new ground; redefining family history
- Students have cultural intelligence. They employ personal strengths, knowledge gained from past experiences, and their own ways of knowing (*ventajas y conocimientos*) to succeed in STEM
- Validation from at least one individual in or out of college is critical
- The experience of STEM students leads us to a redefinition of student success
- High-Impact STEM academic and student support practices can help to foster success


STORIES OF HOPE AND
RESILIENCE