

Work in Progress: H-AGEP - A Model to Improve the Preparation and Transition for Hispanic STEM Doctoral Students into Community College Faculty Positions

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Dr. Miguel Velez-Reyes is the George W. Edwards Distinguished Professor in Engineering and Chair of the ECE Department at University of Texas at El Paso. He received his BSEE degree from the University of Puerto Rico at Mayaguez (UPRM) in 1985, and his SMEE, and PhD from MIT in 1988 and 1992 respectively. He was a faculty member of the UPRM ECE Department from 1992 to 2012. He is the UTEP Campus Coordinator for the NOAA Center for Earth Systems Science and Remote Sensing Technology. He was the Founding Director of the UPRM Institute for Research in Integrative Systems and Engineering, and Associate Director of the NSF CenSSIS ERC. His research interests are in integrating physical models with data driven approaches for information extraction using remote or minimally intrusive sensing. He has over 160 publications. He is Fellow of SPIE and the Academy of Arts and Sciences of Puerto Rico. Received the Presidential Early Career Award for Scientists and Engineers award from the US President in 1997. He chairs the SPIE Conference on Algorithms, Technologies and Applications for Multispectral, and Hyperspectral Imaging. He is the UTEP Campus Director for the Hispanic Alliance for Graduate Education and the Professoriate. Dr. Velez-Reyes is interested in improving educational opportunities for students from under-served and socioeconomically disadvantaged communities.

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Dawn Horton earned her first doctorate from Teachers College, Columbia University in Education. Her dissertation, The Genetic Epistemology of the Human Genome Field, expanded her mentor Dr. Howie Gruber's cognitive case study methodology to consider how an entire field develops new knowledge. Her second doctorate, from Montclair State University, focused on the differential effectiveness of school counselors in the graduation of their assigned students. Dr. Horton's research focuses on creativity and the development of new knowledge, systems to improve student outcomes in high school, and the college/career trajectory of students. She is currently employed as an Assistant Professor at the University of Massachusetts, Amherst.

Dr. Yajaira Mejia, The City College of New York

Dr. Mejia is the Director of The Hispanic Alliance for the Graduate Education and the Professoriate on Environmental Sciences and Engineering (H-AGEP). Dr. Mejia earned a Doctorate degree in Civil Engineering from the City University of New York (2008) Graduate Center, a Master in Civil Engineering with a focus on water resources at the City College of New York (2004), and a Bachelor's degree in Civil Engineering at the University of Medellin in Colombia (2001). Dr. Mejia worked as a postdoctoral researcher at the National Oceanic and Atmospheric Administration – Cooperative Remote Sensing Science and Technology (NOAA-CREST) Center in collaboration with NOAA Scientists at the Cooperative Institute for Climate and Satellites (CICS), 2008-2010. Dr. Mejia's graduate and postdoctoral research focused on snowfall detection and estimation using satellite information. She presented her research work at many national and international conferences and also published it in several journals. Her passion for research and education lead her to take a position as the assistant director of the Earth Sciences and Environmental Sustainability (ESES) Graduate Initiative and the Alliance for Continuous Learning Environment for

STEM (CILES) at the City College of New York (CCNY) where she also served as an outreach team member at the NOAA-CREST Center, 2010-2015. Since 2012, Dr. Mejia has also served as evaluator for the Greater Caribbean Regional Engineering Accreditation System (GCREAS). She has visited and evaluated over five engineering programs at different academic institutions in the Caribbean. Dr. Mejia has wide experience managing graduate and undergraduate programs in engineering and sciences fields. Over ten years, Dr. Mejia gained extensive experience in working in the academic environment at a higher education institution working with students, faculty, and administrators at different levels. She is also an educational consultant to provide support to national and international higher education institutions to improve student learning, enhance curricula, provide teaching and academic support, expand student professional opportunities, provide professional development to faculty, and increase the source of resources available to the institutions.

Dr. Ivonne Santiago P.E., University of Texas at El Paso

Dr. Ivonne Santiago is a Clinical Professor of the Civil Engineering (CE) Department at the University of Texas at El Paso (UTEP). Dr. Santiago has a combined experience of over 20 years in the areas of water quality, water treatment and wastewater treatment in Puerto Rico (PR), New Mexico and Texas. Dr. Santiago is passionate about providing experiential learning opportunities to both undergraduate and graduate students locally, regionally and internationally with a focus on Hispanic and female students. She is currently Co-PI of UTEP's NSF-AGEP program focusing on fostering Hispanic doctoral students for academic careers; the Department of Education's (DoE) STEMGROW Program and DoE's Program YES SHE CAN. With support from the Center for Faculty Leadership and Development, she leads a Learning Community for Diversity and Inclusion for Innovation at UTEP. She is also a member of two advisory committees to UTEP's President: The Diversity, Equity, and Inclusion committee and is chair of the Women's Advisory Council. She is a member at large of the UTEP Council of Academy of Distinguished Teachers. She is secretary-treasurer for the Public Service Board, which manages El Paso Water. She was a member of the Environmental Protection Agency National Advisory Committee (NAC), that advises the Administrator of the EPA on environmental policy issues related to the implementation of the North American Agreement on Environmental Cooperation. Also, she was a member of the Good Neighbor Environmental Board (GNEB) that advises the President and Congress of the United States on good neighbor practices along the U.S./Mexico border. She has received local and state teaching awards: 2014 UTEP's CETaL Giraffe Award (for sticking her neck out); 2014 College of Engineering Instruction Award; 2014 The University of Texas System Regents' Outstanding Teaching Award; and the 2012 NCEES Award for students' design of a Fire Station. She also received 2018 American Society of Civil Engineers' Texas Section "Service to the People" award, and 2019 El Paso Engineer of the Year by the Texas Society of Professional Engineers. This is the first time in more than 30 years that a UTEP faculty wins this prestigious award.

Prof. Jorge E Gonzalez

Prof. González is the Director of The Hispanic Alliance for the Graduate Education and the Professoriate on Environmental Sciences and Engineering (H-AGEP), of The CUNY Initiative to Promote Academic Success in STEM (CiPASS), lead scientist of the Coastal-Urban Environmental Research Group (CUERG), The City College of New York Presidential Professor, and the NOAA CREST Professor of Mechanical Engineering at the City College of New York. Prof. González earned his Doctorate (1994) and Bachelor (1988) degrees in Mechanical Engineering from the Georgia Institute of Technology and from the University of Puerto Rico-Mayagüez, respectively. He joined The City College of New York faculty in 2008 after tenures at Santa Clara University, California, as Professor and David Packard Scholar, and as Chairman and Professor of Mechanical Engineering at the University of Puerto Rico-Mayagüez. He teaches and conducts research in urban energy sustainability, urban weather and climate, urban remote sensing, and regional climate modeling and analysis. Professor González holds several patents in solar energy equipment, aerosol detection, and energy forecasting for buildings, and was recognized as a prominent young researcher by the National Science Foundation with a prestigious CAREER Award. He has authored or co-authored more than 10 peer-reviewed publications, has delivered 100s of conference

presentations, and his research has attracted more than \$30M in external funding. He is a Fellow Member of the American Society of Mechanical Engineering (ASME), and Vice-Chairman of the American Meteorological Society Board on the Urban Environment. He was appointed in 2015 by the Mayor of the City as Member of the Climate Change Panel for the City of New York, and more recently as Senior Visiting Scientist of the Beijing Institute of Urban Meteorology and of Brookhaven National Laboratory. He was named in 2019 the Founding Editor of the newest ASME Journal of Engineering for Sustainable Buildings and Cities.

Dr. Jeff Sivils Ph.D., El Paso Community College

Dr. Jeff Sivils is an assistant professor of biology at El Paso Community College (EPCC). Dr. Sivils is currently the EPCC National Science Foundation Principal Investigator for the Hispanic Alliance Graduate Education and the Professoriate (HAGEP) grant in Environmental Sciences and Engineering. The HAGEP grant promotes the expansion of Hispanic doctoral students to faculty at community colleges or teaching intensive universities. Dr. Sivils received his B.S. in microbiology from The University of Texas at El Paso (UTEP), worked in the biotechnology field before returning to UTEP to receive his Doctorate in Toxicology, where he studied the compensatory mechanism resulting from the loss of the multi-drug resistance transporters 1 (MRP1). He attained a Post Doctoral position at UTEP where he collaborated in the discovery and development of small molecules used for the treatment of prostate cancer.

Dr. Harry Meeuwsen, The University of Texas at El Paso - El Paso, TX

Dr. Harry Meeuwsen's PhD training at LSU-Baton Rouge was in motor learning and control, followed by a Post-doc in motor control at UW-Madison where he worked on NIH grants focusing on lower limb control in older adults and fine motor control in Parkinson's patients. During his training he employed methods and instrumentation typically used in biomechanics and motor learning. The theoretical foundations for his research were largely in cognitive psychology and neuroanatomy, with practical application in motor control. He conducted research in perception-action issues in older adults and in recent years, as a result of leading the Center for Excellence in Teaching and Learning at the University of Texas at El Paso, he has investigated the implementation of Team-Based-Learning in undergraduate education and led faculty development efforts in teaching and learning. Currently he is engaged in training Ph.D. candidates in the College of Engineering in teaching and learning of through the NSF-sponsored H-AGEP grant while chairing the Department of Kinesiology and serving as the Associate Dean for Teaching and Learning in the College of Health Sciences.

Prof. Fred Moshary, City University of New York, City College

Fred Moshary is a Professor of Electrical Engineering at the City College of New York (CCNY) and on the Doctoral Faculty of Earth and Environmental Science at the City University of New York Graduate Center. He received his PhD from Columbia University in Applied Physics in 1989 and was a postdoctoral research associate at the Harvard University Physics Department before joining CCNY in 1992. His initial research work was in the area of nonlinear optics and spectroscopy and subsequently evolved towards optical sensing where for the last 20 years, he has focused on sensors, sensor networks, and remote sensing techniques, technologies, and application. He is currently working on active and passive remote sensing of the atmosphere and coastal ocean waters with applications to atmospheric dynamics, air quality, ocean color (water quality), and climate change. He leads CCNY's Optical Remote Sensing Laboratory, and is the Science Lead Coordinator for the NOAA Cooperative Center for Earth System Science and Remote Sensing Technology, a NOAA funded university consortium led by CCNY which focuses on experiential training and workforce development at Undergraduate and graduate levels.

Dr. Joseph Barba, City University of New York, City College

Dr. Joseph Barba is Professor of Electrical Engineering at the Grove School of Engineering at the City College of New York. He received his BEE and MEE from the City College of New York and his PhD from the City University of New York. His research interests focus on the development of image and

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signal processing algorithms for biomedical applications. These include image segmentation, contour extraction, and quantitative measure of image shape, color and texture for use in classification of cell images in pathology. He served as Associate Dean of Undergraduate Studies for the School of Engineering from 1997-2000 and Deputy Provost at CCNY from 2000-2004. He was the founding dean of the Grove School at CCNY and served in this capacity till 2013. He currently serves as Director of the CCNY STEM Institute and serves as PI or Co-PI on several grants focusing on retention and workforce development of underrepresented students in STEM. He has served as the faculty advisor to the Latin American Engineering Student Association - Society of Hispanic Professional Engineers (LAESA-SHPE) since 1983.

Work in Progress: H-AGEP - A Model to Improve the Preparation and Transition of Hispanic STEM Doctoral Students into Community College Faculty Positions

Abstract

This work in progress paper presents an overview of the Hispanic Alliance for the Graduate Education and the Professoriate (H-AGEP) program. H-AGEP is working on developing and implementing a new model to improve the preparation and transition of Hispanic STEM doctoral students into community college faculty positions. The partnership is a collaborative effort between the City College of New York (CCNY) (lead institution) and The University of Texas at El Paso (UTEP) along with a group of partner community colleges: LaGuardia Community College, Queensborough Community College, and El Paso Community College. The H-AGEP model consists of three main elements: (1) a training and mentoring program for effective STEM teaching at community colleges; (2) a training program for effective mentoring of community college students in STEM research; and (3) a professional development program to address career preparation, transitioning, and advancement at academic careers in community colleges. H-AGEP research goals are: (1) to consider the collected evaluation and research data to determine what intervention activities are most impactful, and (2) to better understand the career-decision making process of Hispanic STEM doctoral students regarding whether they will seek employment at community colleges and other two-year institutions. An interesting aspect of the partnership is that the institutions in El Paso, Texas, serve primarily a Mexican-American student population while the New York institutions serve primarily a Hispanic population of Caribbean origin. This provides the unique opportunity to compare Hispanic students from both groups. The program evaluation: (1) documents and provides feedback on H-AGEP activities and model implementation; and (2) assesses the extent to which H-AGEP is achieving its intended outcomes. Assessment results on the first cohort of students in the program show the value of including community college faculty as career and teaching mentors in the program. Furthermore, the effect of model interventions in students from the first cohort show positive advances in improving teaching skills, increasing student professional networks, and increasing interest and awareness in careers at community college.

1 Introduction

Studies have found that representation of faculty from Hispanic and other underrepresented minority (URM) groups on campus had a positive impact on URM student success when measured in grades and course completions [1, 2]. Role modeling and mentorship are critical factors in the college careers and experiences of Hispanic and other URM students. However, in fall 2017, according to the National Center of Educational Statistics data [3] Hispanics comprised only 5% of all full-time faculty in degree-granting postsecondary institutions. The percentage is even lower in STEM areas [4]. This is in contrast with Hispanic undergraduate student enrollment, which made up 24% of all undergraduate students.

Fifty-two percent of Hispanic undergraduates attend community college (CC) because of its lower cost compared to four-year institutions. However, as stated in [5], only one in ten Hispanic students who start at a community college (with or without receiving an associate degree first) completed a degree at a four-year institution. Research in [1] states that class retention rates and grade performance between white and URM students improves by 20 to 50 percent when the course is

taught by an URM instructor at community college. Furthermore, they found that these interactions affect longer-term outcomes such as subsequent course selection, retention, and degree completion. Therefore, the need for Hispanic faculty at community colleges is quite critical to improve Hispanic student retention and success in undergraduate education.

The low percentage of Hispanics in STEM faculty positions is primarily driven by their low representation in graduate programs. Furthermore, doctoral student training is primarily focused on research-centered careers in academia and industry. Therefore, most doctoral students, even those with a passion for teaching, most often do not consider faculty careers at community colleges as a viable option. However, in the United States there are about 1,300 two-year institutions accounting for one third of the higher education sector [6]. Furthermore, 35 to 40 per cent of the full-time advertised teaching positions are at community colleges [6].

2 H-AGEP consortium

To address the problem of a lack of Hispanic faculty at community college, the Hispanic Alliance for the Graduate Education and the Professoriate (H-AGEP) was proposed as a new NSF-AGEP consortium in 2016. H-AGEP is working on developing and implementing a new model to improve the preparation and transitions for Hispanic STEM doctoral students into community college faculty positions. The program will provide Hispanic STEM faculty, mentors and role models for STEM undergraduate students. The pursuit of five objectives will facilitate achievement of its goal:

- **Objective 1:** Develop a strong mentorship and networking program to support *H-AGEP* Fellows during their transition to academic careers in community colleges and in their professional lives.
- **Objective 2:** Develop Fellows' skills in traditional and innovative technology-based teaching and in cutting-edge interdisciplinary research.
- **Objective 3:** Build Fellows' soft-skills and provide mentoring training critical to success in academic careers.
- **Objective 4:** Enhance Fellows' research skills to become effective and contemporary researchers in ESE, and better teachers by incorporating real ESE problems into the classroom.
- **Objective 5:** Contribute to the knowledge base and literature on the career decision-making and success of Fellows, particularly focused on barriers that affect Hispanic doctoral student selection of an academic career and the mitigation of those barriers.

The partnership is a collaborative effort between the City College of New York (CCNY) (lead institution) and The University of Texas at El Paso (UTEP) along with a group of partner community colleges: LaGuardia Community College, Queensborough Community College, and El Paso Community College. The goal is to develop, implement, and assess this model for Hispanic doctoral students. An interesting aspect of the consortium is that the institutions in El Paso, Texas, serve primarily a Mexican-American student population while the New York institutions serve primarily a Hispanic population of Caribbean origin. This provides the unique opportunity to compare Hispanic students from both groups.

3 H-AGEP Fellows

Doctoral student participants, referred to as H-AGEP Fellows, are selected based on the following criteria: interest in the professoriate, and endorsement by the research faculty mentor. Each Fellow joins the program for 2 years. Students must be at the candidacy level: have completed all coursework, defended their dissertation proposal and passed qualifying exams. The first cohort of six students (3-CCNY, 3-UTEP) joined the program in spring 2018. The second cohort in fall 2019 (3-CCNY, 4-UTEP).



Figure 1: H-AGEP Model Structure.

4 H-AGEP Model

The program model is depicted in Figure 1. The model has two phases: 1) Mentorship program, and 2) Academic and professional training.

4.1 Mentorship program

H-AGEP Fellows are supported by a team of mentors that serve as role models and provide advisement and guidance in their training for the professoriate.

- Dissertation Advisors: They guide the Fellows on their research project, monitor and evaluate their academic and research performance, provide career advice and serve as role models.
- Teaching Coaches: Faculty from the universities who develop and deliver the teaching training program. They also serve as teaching mentors to the Fellows.
- Community College (CC) Mentors: These are STEM faculty at community colleges who introduce the H-AGEP Fellows to the culture of the CCs, and help them recognize the challenges and rewards of academic careers at their institutions. They also mentor the students during the teaching practicum at the community college.

4.2 Academic and professional training

The academic and professional training is depicted in Figure 2. It includes three primary intervention components:

- Training and mentoring program for effective teaching at community colleges;

- Training to mentor undergraduate student in research; and
- Professional development program to address career advancement in academia.

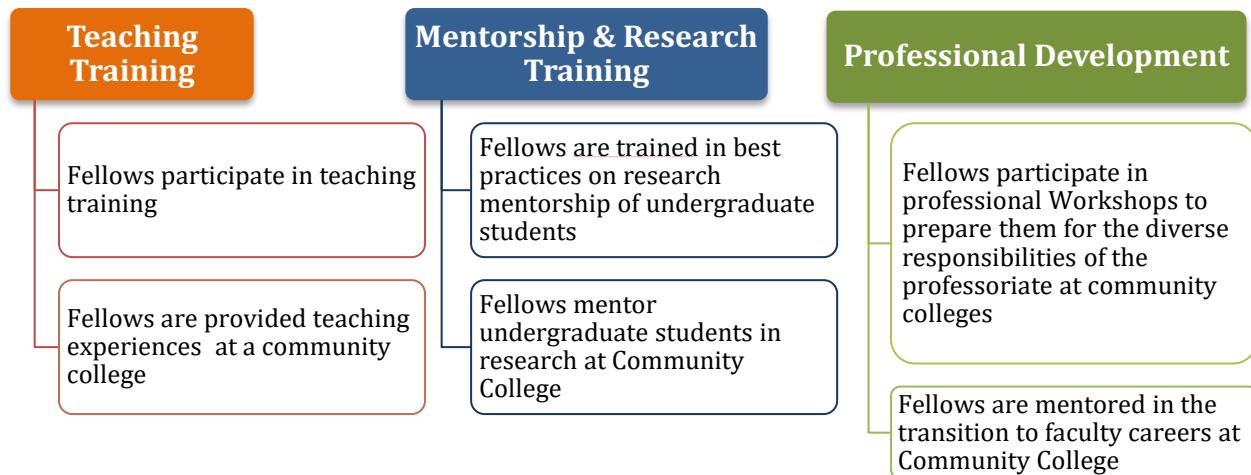


Figure 2: H-AGEP Academic and Professional Training Program.

4.2.1 Teaching Training

Training in teaching is critical in preparing Fellows for faculty positions at CC. The teaching training program consists of training in teaching followed by a practicum at one of the partner community colleges.

The first implementation of the teacher-training program was completed in spring 2018. The teaching training consist of self-paced learning modules with a weekly discussion facilitated by the teaching coaches. The modules are based on the MOOC “An Introduction to Evidence-Based Undergraduate STEM Teaching” developed by the Center for the Integration of Research, Teaching and Learning (CIRTL) [7] under NSF Grant No. 1347605. CIRTL graciously allowed the use their materials that were made available to all Fellows via Blackboard at UTEP. This is a summary of the modules:

- Basic Teaching/Learning Processes: students will be able to describe teaching as an ongoing developmental process, outline the primary characteristics of effective teaching, build a teaching portfolio, discuss the role of the scholarship of teaching and learning within professional life of college instructors, and discuss relevance of institutional context for teaching.
- Design of an effective class: students will be able to establish learning outcomes, align assessments with course outcomes, align activities and assignments with course outcomes, and prepare an effective syllabus.
- Creation of a productive learning environment: students will be able to promote a civil and engaging learning environment and embrace diversity in course planning and activities, use concept maps and other visualization tools, and develop self-directed learners.
- Active learning techniques: students will be able to implement flipped classroom approach and create active learning opportunities in lecture courses.

- Technology in teaching: students will be able to understand the use of Learning Management Systems (LMS) for instruction (i.e. Blackboard, Canvas), use online communication tools in diverse and effective ways, and use student response systems in ways that promote active learning.
- Assessment to inform instruction and promote learning: the students will be able to develop fair, consistent and transparent grading practices, use student achievement and feedback to improve teaching, and design online assessments using LMS.

Through the videos in the modules, the Fellows learned about various aspects of teaching. After reviewing the videos, the Fellows met with the teaching coaches to discuss how they might implement that information in their lesson plans and their teaching. The online course modules helped the Fellows understand and apply research-based teaching practices in developing one or more lessons.

The second phase is a teaching practicum where Fellows participate in approximately 40 hours of teaching experience at one of the partner Community Colleges (CC). The practicum allows the students to put in to practice what they learned during the first phase of the program as well as become more aware of the CC student community. Fellows are matched to a CC faculty mentor with similar expertise. The Fellow selects a STEM course in collaboration with their CC faculty mentor. Fellows shadow the CC faculty mentor during the entire semester, and teach selected lectures and laboratory sessions. CC mentors and Fellows work on a lesson plan that highlights pedagogical techniques, tools/ideas, and handouts, as applicable. The CC mentors provide the syllabus, schedule, textbooks, handouts, and presentation materials to the Fellows. After each lecture, the CC mentor prepares an observation report which includes strengths and weaknesses in teaching, and pedagogical recommendations. The CC mentor meets with the Fellow to discuss the report. Fellows use these observations to refine, revise, and adjust future lesson plans for the next lecture. The same process is repeated for multiple lectures if applicable.

4.2.2 Mentoring community college students in research

Careers at CC are primarily focused on teaching and the availability of research opportunities for CC students varies significantly across institutions. How CC faculty participation in research is accounted for in tenure and promotion at CC is quite variable. For instance, inside our partnership, research expectations for faculty at the CC of the CUNY system are much higher than at EPCC. However, UG research at CC is recognized [8] as a high impact practice to support student success that can positively impact graduation, STEM retention, and transfer rates.

H-AGEP provides training to the Fellows in best mentoring practices of undergraduate students in research. Workshops on student mentoring and on research opportunities at CC are given to the Fellows. CC faculty mentors provide opportunities for some of the Fellows to mentor CC students in research projects.

4.2.3 Professional Development

The professional development workshops aim to promote the Fellows' professional development and knowledge in areas that are key to the professoriate. The curriculum for the professional development includes:

- Faculty Careers at CC: environment, policies, student population.

- Getting an Academic Job at a CC: application and interview processes, how to prepare an effective application, differences between applying to a CC and to a four-year or a research institution.
- Developing STEM Research and Educational Programs at CC: identifying opportunities, applying for external funding, understanding different university environment, development of scholarship.
- Professional Environments: etiquette, time management and setting priorities, and unconscious bias.
- Negotiating a Job Offer: positive strategies for negotiating a job offer in academia, private or public sector.
- Integrating Cognitive Diversity and Inclusion for Innovation: The series examined theories of diversity and inclusion, the different levels of diversity, case studies, and building inclusive classrooms, syllabi, and faculty offices. The series also provided an informal forum for conversations about the challenges facing individuals from underrepresented groups in academia.

The alliance holds an annual conference that provides an opportunity for networking and for CCNY and UTEP Fellows to interact, share experiences, and learn about topics related to teaching and academic careers particularly at community colleges.

5 Research Component

An additional element of the H-AGEP grant is the research component. The research goals are two-fold: (1) to consider the collected evaluation and research data to determine what intervention activities are most impactful, and (2) to better understand the career-decision making process of Hispanic STEM doctoral students as regards to whether they will seek employment at community colleges and other two-year intensive teaching colleges. In gathering and analyzing the data, the overarching goal is to increase the knowledge we have about those barriers and supports which influence the career decision-making of Hispanic STEM doctoral students as it relates to this career path.

Data are being collected on Fellows' reactions to individual grant activities and their overall participation. In addition to Fellow data, participating faculty are surveyed to provide further information on student growth in key areas of concern (teaching, research, and multicultural awareness to work with diverse populations). Fellow surveys will continue to be collected beyond graduation to further understand how Fellows transition into and exist within academic settings.

The research on career decision-making is being conducted through a Social Cognitive Career Theory lens. This lens focuses on three aspects of career development and decision-making: (1) how an individual develops their career interests, (2) how an individual makes education and career decisions, and (3) how an individual achieves career success. To explore these three aspects, participant students and a matched control group are being interviewed about how they came to select a STEM major and career focus. Questions explore the influences, structural and relational, that have impacted student career decisions. Student perceptions about working as a professor at a two-year college are collected at multiple points over the grant. Additionally, Hispanic STEM professors currently teaching at two-year colleges are surveyed with an online instrument to gather data about their career development and current experiences working at a two-year institution.

Collecting data from current Fellows will provide insight into experiences and expectations of Hispanic STEM doctoral students. By collecting data from practicing faculty, information on the lived experience of Hispanic STEM faculty will provide rich insights into the realities of this profession today.

The research process will provide an analysis of the various H-AGEP grant interventions and the unique career decision making paths of our Hispanic STEM doctoral students to consider recommendations for future work that is geared towards effectively preparing Hispanic STEM doctoral students to consider teaching at two-year colleges. This analysis will include a look at how various intersectionalities may predict, inhibit, or support this career path among our student participants. The intersectionalities considered include Hispanic subgroups, race, gender, first-generation status, personal experience as a community college student, and Pell Grant status as an undergraduate.

6 One-Year Program Impact on Cohort 1 H-AGEP Fellows

The H-AGEP external evaluation is examining, among other program implementation facets, what the Fellows perceptions of and experiences with the program are, and the extent to which program participation is broadening and strengthening their: (i) undergraduate STEM teaching and mentoring skills; (ii) professional networks and career-development skills; and (iii) preparation for and transition into the professoriate at the community college level.

The findings presented here are derived from data collected from Cohort 1 Fellows' baseline survey in the spring of 2018, a survey of post teaching training and community college teaching practicum in the winter of 2018, and end of year interviews in the summer of 2019. Results show that one year of participating in H-AGEP has helped Fellows to develop their knowledge and skills in undergraduate STEM teaching, expand their professional networks and change their assumptions about and interest in community college faculty careers. Highlights from Year 1 impacts are presented here.

6.1 Increase in H-AGEP Fellows' Undergraduate STEM Teaching Skills

Cohort 1 Fellows reported on prior teaching experiences and self-assessed their teaching skills in four core areas: general pedagogy, lesson design, assessment and STEM pedagogy prior to and after one year of program participation. Table 1 shows their mean self-ratings.

Four of six Fellows in H-AGEP's first cohort reported that they had prior teaching experience. The most widely cited prior teaching experience was as a teaching assistant for STEM courses and laboratories at the undergraduate and graduate levels. One Fellow had been a lecturer at a community college and another had teaching experience at the high school level. Despite this level of prior instructional experiences, at baseline, Fellows in general self-assessed their teaching skills in the *medium* range in general pedagogy (3.2), lesson design (3.2), and student assessment (3.0). Fellow rated somewhat higher in STEM pedagogy (3.7).

After participating in the semester-long course on best practices in STEM undergraduate teaching followed by a semester-long community college STEM teaching practicum, H-AGEP Fellows, on average, reported higher skill levels (in the *somewhat strong* range) in all four teaching facets measured, with their skills in *student assessment* and *lesson design* receiving the largest mean increases from baseline levels.

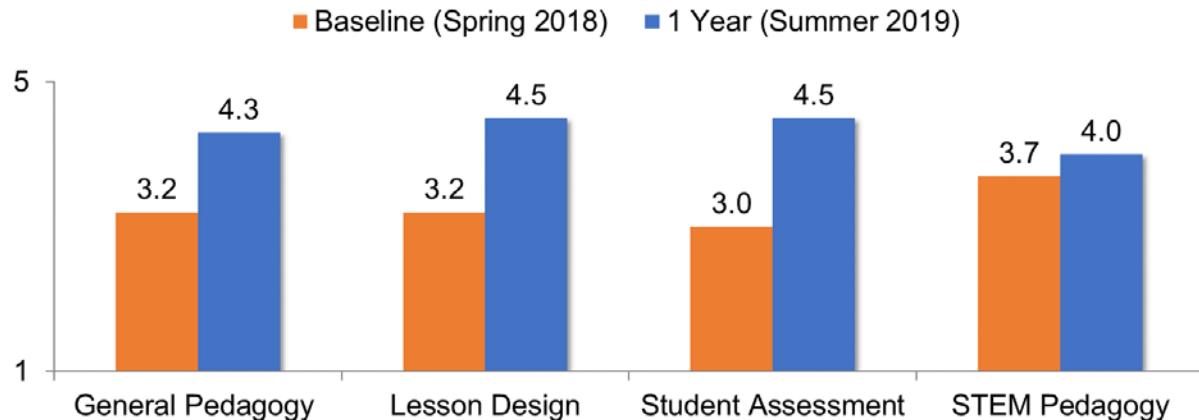


Figure 3: H-AGEP Cohort 1 Fellows' Ratings of their Teaching Knowledge and Skills.

Fellows rated their teaching skills on a 5-point scale with 1 corresponding to “weak” and 5 to “strong.”

The Fellows' written comments demonstrate that they experienced profound learning through the community college teaching and faculty mentoring. The following are illustrative quotes:

- *Sometimes the opportunities to gain teaching experience are scarce and therefore having these types of opportunities where you are the actual instructor for the class and you have guidance from a professor at the same time are priceless.*
- *I learned how different the student population is from that of high school and even the 4-year university populations. This helped me realize what kind of hurdles they face and how to better prepare for that.*
- *I learned to be more aware of the students' needs, especially at a two-year college where the student population is so diverse. ... I learned how to incorporate the students' input into the classroom.*
- *I feel good at what I'm teaching. I look at myself a year back, before the [H-AGEP] fellowship, I do see a big difference, because I do know how to apply things now; how to teach better.*

Table 1: H-AGEP Cohort 1 Fellows' Estimates of the Size of Professional Networks.

Professional Network		Baseline (Spring 2018)	Year 1 (Summer 2019)	Change
Within home academic institution	Mean	23	36	+13
	Min	5	5	0
	Max	70	75	+5
Outside home academic institution	Mean	19	32	+13
	Min	5	10	+5
	Max	55	100	+45

6.2 Expansion of H-AGEP Fellows' Professional Networks

The Fellows estimated the number of individuals in their professional networks, defined as their connections with individuals, who are professors, work in industry, government, or other academic institutions. Table 1 shows Fellows' estimates at baseline and after one year of H-AGEP. Prior to

H-AGEP participation, Fellows estimated their professional network to consist of, on average, 23 individuals within their home academic institution, and 19 individuals outside of their home academic institution. After one year of Project participation, Fellows perceived that their professional networks had expanded on average by 13 individuals both within and outside of their academic institutions.

Several Fellows attributed H-AGEP opportunities, in particular the community college teaching and faculty mentoring experiences and their interactions with faculty outside of their own departments as contributing to the expansion of their professional networks. As two Fellows noted:

- *I did meet a lot of people while I was at community college. At the community college here, to get into a teaching position it is about who you know.... [My H-AGEP community college faculty mentor] was really good about going around and introducing me to all the people that we would run into.*
- *We had to work with professors from different departments, that was a good networking opportunity there. Also when we went to the annual [HAGEP] conference, being able to talk to the other Fellows there in person, meeting the other faculty members.*

6.3 Shift in H-AGEP Fellows' Career Interest in Community Colleges

Fellows were asked to rank in order of interest six career choices, in higher education, government, industry and a start-up/other at baseline and after one year of participating in H-AGEP. Table 2 shows their top ranked career choices at baseline (spring 2018) and after one year of participating in H-AGEP (summer 2019). Prior to participating in the H-AGEP, Fellows' top ranked career choices was being a faculty member at a research-intensive institution (5.5) and at a teaching intensive higher education institution (4.2). Fellows' lowest ranked career choice at baseline was faculty at 2-year College (3.2). A noteworthy shift can be seen after one year of H-AGEP participation in Fellows' ranking of *professor at a two-year college* career choice, to which they assigned the second highest rank (4.6).

Table 2: H-AGEP Cohort 1 Fellows' Mean Rankings of Their Career Interests.

Career Choice	Mean Rankings		
	Baseline (Spring 2018)	Year 1 (Summer 2019)	Change
professor at a research-intensive institution	5.5	3.6	-1.9
professor at a teaching-intensive institution	4.2	4.8	+0.6
professor at a two-year college	3.2	4.6	+1.4
government	3.8	2.6	-1.2
industry	3.6	3.4	-0.2
startup/other	3.3	2.0	-1.3

Exposure to the community college environment, including having the opportunities to shadow and co-teach with community college faculty mentors and to learn about their career experiences appears to be having an impact on Fellows in terms of debunking their preconceived notions and misconceptions about community colleges. The following comments are illustrative of this.

- *I learned that teaching in community college was actually very positive, because I learned that Oh! There are tenure track positions! Oh! The pay is commensurable ...its competitive!*
- *I came from a private undergrad ... [that] created my biases towards community colleges. We had [an H-AGEP] discussion regarding the community college careers....[My community college faculty mentor] made himself available to just answer all our questions. That was a huge benefit. That definitely opened my eyes to the community college as an option more. It was definitely helpful to see [his] perspective, his interaction with students... I decided to kind of check my own biases as to the type of students that go to community colleges.*
- *Whenever I think about community colleges now, I just think, okay, more teaching-intensive...I would survive there more than at a research-intensive institute.*
- *[This] experience really broadened my interest and kind of guided me, towards academia. I would like to stay in academia once I graduate and I'm really considering community college. I didn't really have quite an understanding before, but through this program I do, and I enjoyed it.*

7 Summary and Conclusions

This paper presented a description of the H-AGEP program and summarized initial program assessment results. H-AGEP's focus on community colleges distinguishes H-AGEP from other AGEP programs. Although the model interventions share similarities with other faculty development models, our focus on careers at community colleges is significantly different from other models. A key feature of the proposed model is the integration of community college faculty members in H-AGEP. Community college faculty members provide Fellows the opportunity to shadow them during classes and serve as mentors to Fellows in teaching several modules in STEM courses. The teaching shadowing and lecturing provide Fellows the opportunity to gain understanding of the student population at community college and its differences from the student population in their doctorate-granting research-intensive institution. Furthermore, community college faculty members provide their personal perspectives in the rewards and challenges of a career at community colleges. The benefits of this interaction are demonstrated in the comments collected by the program evaluator. Furthermore, preliminary assessment results on assessing the effect of the interventions show positive advances in improving teaching skills, increasing student professional networks, and increasing interest and awareness in careers at CC.

We are currently starting the second cohort of students in the program while refining different elements of the program informed by stakeholder feedback and assessment results. The effort is also helping participant faculty from UTEP and CCNY to become more aware of the culture and challenges of faculty at CC. This has improved the collaboration between all partners in the project.

8 Future Work

Future work will focus on refining the interventions, and in documenting the lessons learned during the development and implementation of the model. This gained knowledge will be used to refine the model and, we expect, will facilitate its transfer to other institutions who want to adopt or adapt it. Furthermore, based on input from different stakeholders, we are strengthening the networking component to increase the size of the fellows' network with community colleges that can support and facilitate their transition into community college faculty positons.

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10 References

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