Update on Academics with Diversity Education and Mentorship in Engineering (ACADEME) Activities and Fellows

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Dr. Cutright is a Professor of Civil Engineering at The University of Akron. She has a B.S., M.S., and Ph.D. in Chemical Engineering with emphasis on environmental remediation techniques with over 20 years of experience conducting site assessments, soil characterizations and treatability studies for a variety of environmental contaminants. In addition she also conducts education research via an EPA education grant and a NSF Scholarships for STEM education. Most recently she and her colleagues were awarded a NSF collaborative research grant to host workshops to broaden the participation of underrepresented minorities that in engineering.

Rebecca Kuntz Willits, The University of Akron

Rebecca Kuntz Willits is the Margaret F. Donovan Endowed Chair for Women in Engineering, a professor and interim department chair in the Department of Biomedical Engineering at The University of Akron and a member of the National Center for Regenerative Medicine at Case Western Reserve University. She obtained her undergraduate degree in chemical engineering at Tufts University, her MS in chemical engineering at Johns Hopkins University and her PhD in chemical engineering at Cornell University. Her current research interests are at the intersection of nerve regeneration, tissue engineering, and biomaterials, and are funded by the NSF and NIH. As an educator, she has received STEM-based funding from the National Science Foundation to support undergraduate research, STEM scholarships, and diversity.

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Prof. Debora F Rodrigues, University of Houston

Debora F. Rodrigues received her B.S. and M.S. degrees in Biology and Microbiology, respectively, from the University of Sao Paulo, Brazil, and her Ph.D. in Microbiology and Molecular Genetics from Michigan State University in 2007. She was a postdoctoral associate in the Environmental Engineering Program at Yale University from 2007 to June 2010, with her research focus dealing with toxicity of carbon nanotubes to microorganisms, as well as the effect of bacterial surface structures on bacterial adhesion and biofilm formation and maturation. She is currently an Assistant Professor at the University of Houston in the Department of Civil and Environmental Engineering and her research interests involve investigation of the toxicological effects of carbon-based nanomaterials and polymer nanocomposites to wastewater microbial communities and their potential applications for water treatment and corrosion prevention.

Dr. Lakiesha N. Williams, University of Florida

Dr. Lakiesha Williams, a native of New Orleans, La., obtained both a Bachelor of Science and a Master of Science in Biological Engineering from LSU. She completed her Ph.D. in Biomedical Engineering at Mississippi State University (MSU). She was the first African American to obtain a graduate degree in Biological Engineering from Louisiana State University, and the first African American to obtain a Ph.D. in Biomedical Engineering from Mississippi State University. Dr. Williams is an Associate Professor in Biomedical Engineering at the University of Florida. She directs the Tissue Mechanics, Microstructure, and Modeling Laboratory (TM3). Her team studies the mechanics of biological tissues and organs using experiments and computational tools. While a faculty at Mississippi State, she was recognized by Mississippi's Business Journal as Top 21 of Mississippi's most wanted in technology. Additionally, she was awarded the IBM Women of Color Rising Star Award, Champion of Diversity Award, and LSU Rising Star Alumnus Award. Dr. Williams enjoys spending time with her husband, Dr. Byron Williams and their two daughters.

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Abstract

Global competition, changes in manufacturing/automation and desire for more sophisticated technology has increased the demand of graduates in STEM fields. Although the graduation of technically competent individuals with diverse backgrounds can help the US regain its competitive advantage, a large percentage of the population is left untapped. In engineering, women, racial and ethnic minorities, and persons with disabilities are classified as underrepresented minorities. In addition to the disparity in industry, diversity in faculty and academic administration positions lags, which can marginalize or prevent full participation of underrepresented groups graduating in engineering disciplines. This paper will provide a brief overview of our approach and update of a National Science Foundation (NSF) sponsored collaborative project to broaden the participation of underrepresented engineering minorities in engineering academia by providing participants with an improved skill set for entry into a faculty position. The project has completed three, two-week summer intensive professional trainings that provided participants with skills for entry into a faculty position and recently started the third year of mentoring.

The first summer intensive professional preparation was held at The University of Akron and had 13 ACADEME (Advancing Career in Academics with Diversity and Mentorship in Engineering) Fellows from The University of Akron, universities in the same geographical region, and from the collaborating institutions. Modifications to the advertising approach were successful; yielding applicants from across the country and increased participation. The second summer professional preparation held at the University of Houston had 27 ACADEME Fellows while the third training held at Mississippi State University had 25 ACADEME Fellows. This paper highlights the assessment results from the three professional trainings, includes details as to which project activities have worked, and first-hand accounts of how the program benefited Fellows securing academic positions.

Introduction

In 1999, a report of the status of women faculty at MIT documented the gender disparity in academia [1]. Since then, numerous initiatives were implemented to increase the number of underrepresented groups that pursue engineering as a career. NSF's ADVANCE program alone has awarded over $200 million to create and sustain a diverse and inclusive STEM workplace [2]. Even with the ADVANCE program, although strides have been made at the undergraduate level, yet the number of M.S. and Ph.D.'s awarded to underrepresented groups has not increased appreciably since the mid 1990s [3], [4]. For instance, between 1997 and 2017, the number of Hispanic undergraduates grew from 14% to 24% whereas Hispanic faculty only increased from 3% to 5% during the same time frame [5]. Zellers et al. [6] reported in 2008 that less than 10% of the full professors in sciences were women and only 3% of assistant and associate professors were African American.

There were 12,156 doctoral degrees were awarded with Native Americans earning 0.3% of the Ph.D.'s, Hawaiian/Pacific Islanders 0.6%, African Americans 4.2%, Hispanics 6% and women 23.6% in 2018 [7]. As shown in Figure 1, during the 2017-2018 academic year, women were
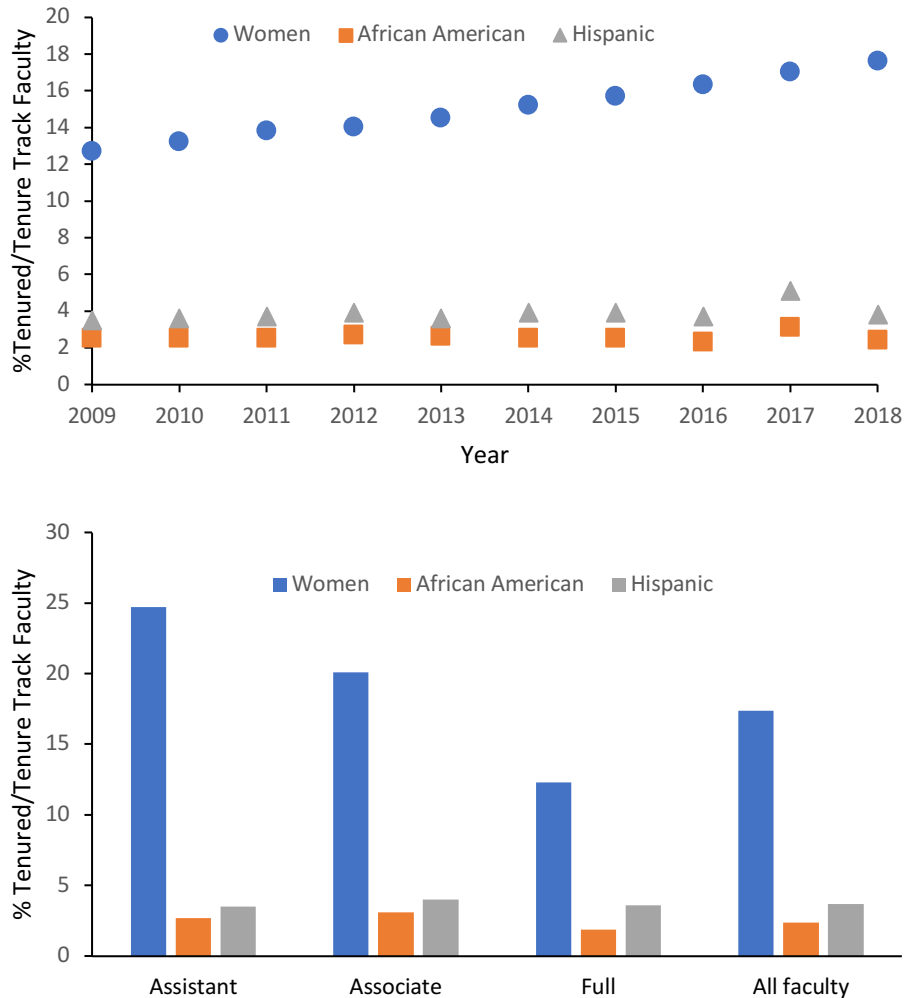

Figure 1. Percentage of engineering tenured/tenure track oft women, African American or Hispanic (a) between 2009 and 2018 and (b) by academic rank during 2018-2019 year (data compiled from Roy [7])

Only 24.7% of the tenure track assistant professors, 20.1% of the associate professors and 12.3% of the full professors in engineering; leading women to be only 17.4% of the total faculty [7]. The rank of full professor was filled by only 1.9% African American faculty and 3.6% Hispanic faculty members. Although there were no American Indian or Pacific Islander/Hawaiian tenured

or track faculty, there was some marginal representation in the non-tenure track positions. In 2018-2019, Native Americans were 0.25%, 0.5% of 0.21% of non-tenure track assistant, associate and full professors, respectively while Pacific Islanders/Hawaiian's were 0.1%, 0.15% and 0.04% of the non-tenure track assistant, associate, and full professors [7]. Over 1/3 of the underrepresented doctoral students in Jaeger et al.'s [8] study expressed desire to work at a teaching university due to their anxiety pertaining to designing a project and developing a lab.

The lack of diversity in engineering academia is a critical issue. A diverse and inclusive STEM workforce is important for the education of future scientists as well as science itself [9]. Taylor et al. [10] stated that students are better educated, prepared for leadership and professional competitiveness when exposed to diverse perspectives in the classroom. The theory of proportions (i.e., numerical representation of groups influence group dynamics and cultural context) applies to the proportion of female faculty and the potential that female doctoral students will complete their degrees [11]. The this can be extended to all underrepresented groups. Critical mass of 10-15% of underrepresented groups is needed to reduce marginalization and provide sustainability at each level [12]. The overall goal of this proposed project was to utilize previous knowledge and approach gained from our initial study to provide an expanded, intensive professional preparation for PhD and post-doctoral students in engineering to move into academia. This paper highlights the assessment results from the three professional trainings, includes details as to which project activities have worked, and first-hand accounts of how the program benefited Fellows securing academic positions.

Data collection and methods

A utilization focused evaluation framework guided this evaluation with an approach of mixed methods for data collection [13], [14]. The utilization focused framework placed value on the usability of the evaluation, and often relied on collecting mixed methods data that can be useful to various stakeholders. The evaluator worked with members of the PI team to develop the goals of the evaluation and develop assessment measures that would be most useful for the team to document program impact as well as to continue improving the program. Preliminary feedback was shared with members of the PI team during the summer workshop and preliminary results and the feedback on the quality of the summer professional development were shared to inform program implementation for the next year's cohort. Table 1 contains the data collection measurements and timeline.

Likert scale survey items were analyzed using descriptive statistics. A paired sample t-test was performed to determine if there was any significant change from pre to post assessments within group, with a p-value of .05. A two-sample t-test assuming unequal variance was used to compare the two groups. Items related to teaching, research or career preparation were grouped in these categories to conduct the within group and between groups analysis for change from pre to post administration of the survey.

Table 1. Data sources and timeline correlated to project goals (PD=professional development training)

Goal	Assessment Measure	Timeline
Increase awareness of what is needed to be assistant professor	Pre and post survey	Pre: before summer PD Post: after PD Follow up: after academic year activities
Quantify specific areas PhDs students and post-docs need the most assistance with	Application questions Documentations discussions during summer PD	During summer PD
Increase participant knowledge on effective STEM undergraduate learning	Pre and post survey Assessment mini lesson	Pre: before summer PD Post: after PD Follow up: after academic year activities Rubric during PD
Advance awareness/skills of curriculum development, delivery and assessment	Pre and post survey Assessment mini lesson Focus group interview	Pre: before summer PD Post: after PD Follow up: after academic year activities Rubric during PD During summer PD
Enhance establishment research career	Pre and post survey Documentation engagement research activities	Pre: before summer PD Post: after PD Follow up: after academic year activities Follow up years 2-4
Increase networking	Document participation in follow up conferences Networking survey	Follow up: after academic year activities

Open ended survey questions were analyzed by performing a content analysis. Each response was entered into a computer software, then codes were assigned to the response inductively. The initial codes were later condensed into fewer codes based on program learning outcomes. Direct quotations of responses that are provided in this document are verbatim to illustrate the responses by theme.

There were limitations to the data collection the small number of participants in the comparison group, and the nature of self-reported data when assessing perceptions of knowledge and skills.

Using multiple data sources to assess impact of the program provided a means of triangulation, and the qualitative data provided a rich description of the participants' experiences.

Results and Discussion

Best approach for recruiting and participant travel

The project officially awarded July 1, 2017. Although the PI's started advertising in June when they heard the project was going to be funded, the first summer intensive professional, had only 12 ACADEME (Advancing Career in Academics with Diversity and Mentorship in Engineering) Fellows participated in the first year. Subsequent years advertising started earlier in December and was done country wide. This approach increased both the overall number of interested participants as well as the number of post-docs (Table 2). Interestingly, the number of applications from the host institution was low each year. The potential to win one of two Amazon gift cards was successful at securing a control group each year.

Table 2. Demographics of ACADEME Fellows and Control Cohort

		Year 1		Year 2		Year 3	
		Fellow	Control	Fellow	Control	Fellow	Control
Gender	Female	9	8	19	14	16	26
	Male	4	6	7	1	7	1
Ethnicity	African American	2	2	4	0	5	4
	Caucasian	3	6	5	9	5	11
	Hispanic	1	0	9	1	4	1
	Asian	5	5	5	5	4	8
	Middle Eastern	2	0	0	0	1	0
	Polynesian/Native American	0	0	1	0	1	0
	African American-Hispanic	0	0	0	0	3	0
	Other	0	1	3	0	0	2
	Prefer not to answer	0	0	0	0	0	1
Level	PhD	13	27	19	14	15	27
	Post-doctorial	0	0	7	1	8	0

Commitment to the program was essential to its success. Therefore, one of the application requirements was a letter of support from the academic advisor or post-doc supervisor. This letter was required to ensure each applicant had approval from their supervisor to be gone for two weeks. In addition, travel, food, and accommodations were provided to mitigate expenses. As with the first Fellow cohort in 2017, the 2018 Fellows had a last minute cancellation even though plane ticket was already purchased. Additionally, a Fellow from 2018 left after first week as she wanted to attend a conference. None of the third years' Fellows in 2019 canceled or

left. We correlated this commitment to the participant group's developmental stage (higher percentage Ph.D.'s 12 months to graduation and post-docs) and a change in how travel was handled. Instead of pre-paying for travel, Fellows in the third cohort were provided a flat travel allowance that was processed upon completion of the summer professional development training.

Summer professional development training

The order of the summer professional training workshops was modified based on feedback from ACADEME Fellows from year 2017 and 2018. In the summer training, topics were divided into the two main aspects of a tenure-track position – teaching and research. Service topics were integrated as they came up during the training. Changes over the course of the project increased the time for open discussion as well as free time. In both 2018 and 2019, 'teaching' week included guest speaker(s) of local faculty. The research week in year three provided more time for students to develop their own equipment list, budget for first proposal, etc. Table 3 contains a brief list of topics covered. One of the items during teaching week was a video conference discussion with a former ACADEME participant. Each year a Fellow from the previous cohort had contacted a mentor (unsolicited) and asked if she could speak to the new cohort. Video conferencing was used as they could not be there in person (one was starting a new faculty position in Wisconsin (the Mid-West) and one was at a conference in Paris France). Each of the former Fellows gave an overview of what she thought about summer training, year-long mentoring activities and advice as to how she secured teaching position. The fact that this was unsolicited was taken as corroboration of the impact the program had on these two Fellows.

Table 3. Topics covered during teaching and research focused weeks of summer professional development

Teaching Related	Research Related
Orientation & survey of expectations	Feedback research statements
Video conference with former ACADEME participant	Developing cover letter
Tenure track explained, expectations assistant professor	Interviewing tips
Teaching and mentoring	Equipment and start up packages
Learning styles	Time management
Developing course learning outcomes- ABET	Mock grant review
Discipline based education research	Finding sources of funding
Guest lecture-Actualizing education theory in classroom	Preparing proposal budget
Mini lesson – development, video tape, feedback	Collaborations
Reflection – strategies to improve teaching	Proposal tips
Use of assessments	Networking
Teaching evaluation	Mentoring tips – students
Interactions students outside of classroom	Final surveys
Teaching philosophy: feedback, how translate into classroom	

Only 8% and 4% of the 2018 Fellows strongly disagreed or disagreed, respectively with the statement that the 'content was useful for my professional development.' As shown in Table 4,

all other Fellows were at least in agreement that the content was useful. Fellows did feel that the pacing of the sessions was inappropriate. Qualitative comments in the surveys identified two areas of associated with pacing: more time to develop the mini-lesson and time to read proposals for the mock panel review. Even with these comments, 100% of the Fellows from each year indicated that they would recommend the professional development to their peers. Table 5 contains a few comments from each year as to why they would recommend it to their peers. A common theme was the how much was learned about they learned about the topics and academia.

Table 4. ACADEME Fellows perceptions of the quality of the professional development workshop

	% Strongly Disagree			%Disagree			%Agree			% Strongly Agree		
Cohort year	17	18	19	17	18	19	17	18	19	17	18	19
Content was useful for my professional development	0	8	0	0	4	0	20	0	26	80	88	74
Skills presented were practical for future career plans	0	8	0	0	0	0	31	8	30	69	84	70
Material was presented in understandable way	0	8	0	0	4	4	31	8	52	69	84	44
Presenters were engaging	0	8	0	0	0	4	20	8	52	80	84	44
Pacing of sessions was appropriate	0	8	0	8	15	35	46	31	48	46	46	17
Opportunities to network with peers were provided	0	8	0	0	0	9	31	23	30	69	69	61

The impact of the Fellow's knowledge and skills was also measured using a Likert scale perception of knowledge survey, open ended questions about topics learned and focus group interviews. Fellows were asked to rate their perceived change in knowledge before participating in the program using the scale of 'little to no knowledge' (1), 'some knowledge' (2) and 'very knowledgeable' (3). The same scale was used after completing the summer professional development and at the end of the academic year activities. Figure 2 contains the aggregated results for perceived knowledge pertaining teaching, research and academic career topics for each year. It is important to note that the follow-up assessment of the 2019 Fellows will not be completed until June 2020. For each category, the Fellows in each year reported a little to know knowledge before attending the summer professional development training (i.e., pre scores). There was a significant increase ($p<0.05$) in knowledge immediately after the two-week training (post). The increased knowledge remained stable for the 2017 and 2018 Fellows, with no significant change between the post survey at the end of the training to the follow up at the end of the academic year.

Table 5. Rationale of why Fellows would recommend professional development to peers

New Knowledge	*"It was a program with the most information provided in detail. It provided opportunities to work on our skills instead of just talking about them"*
	"I learned a lot of information that I have not gotten elsewhere. My academic mentors have mostly focused on research, with very little emphasis on how to get a job and none on how to get tenure."
	"Extremely relevant for anyone considering a career in academia"
Application process	*"It has tremendously improved my understanding about teaching, how to interview, how to prepare my application package an what is expected of me after being hired."*
Academic career	*"The skills, knowledge and connections acquired are essential to preparing for and succeeding in an academic career."*
	"Very informative about how to be a successful faculty member"
	I would recommend it to anyone interested in a faculty position or even people who have not decided what they want to do after graduation as it was very informative and eye-opening."
	"If you want to be a faculty, it is necessary to know how to prepare yourself for it and how to continue to get tenure. This is not something that you can learn comprehensively without attending this workshop."
Getting perspective	*"The time that I have to ask PIs questions about their process and my ideas have been phenomenal. I appreciate the honesty and that PIs care more about my success than they do recruiting me"*
	"Hearing from the experienced faculty at different stages of their career was very invaluable. I really enjoyed that they were all very open and professional in sharing their experiences and had stories to tell for different cases and questions that were asked of them."
Networking	*"I appreciate the peer support and network that I have been able to develop"*
Misc.	*"The fact that the faculty are still willing to help after the workshop was not expected as I have never seen that before in any other workshops that I have participated. This is by far one of the strengths of the workshop (getting more mentors/advocates for my success inside and outside of academia)."*
	"The additional resources on brightspace are a great tool that I plan to continue to refer back to throughout my journey?"

In comparison to a control group that did not participate in any of the summer or academic year activities, the 2017 Fellows had significantly improved their knowledge (Table 6). Conversely, the perceived knowledge of the control group had little change or decreased slightly ($p>0.05$). Similarly, the 2018 Fellows reported a significant increase in knowledge while the control group did not. In addition, the Fellows perceived knowledge was significantly higher ($p<0.05$) than the control group each year. While the Fellows and control groups are not equivalent, the results indicate that the program had a positive impact on the Fellows perceptions of their knowledge.
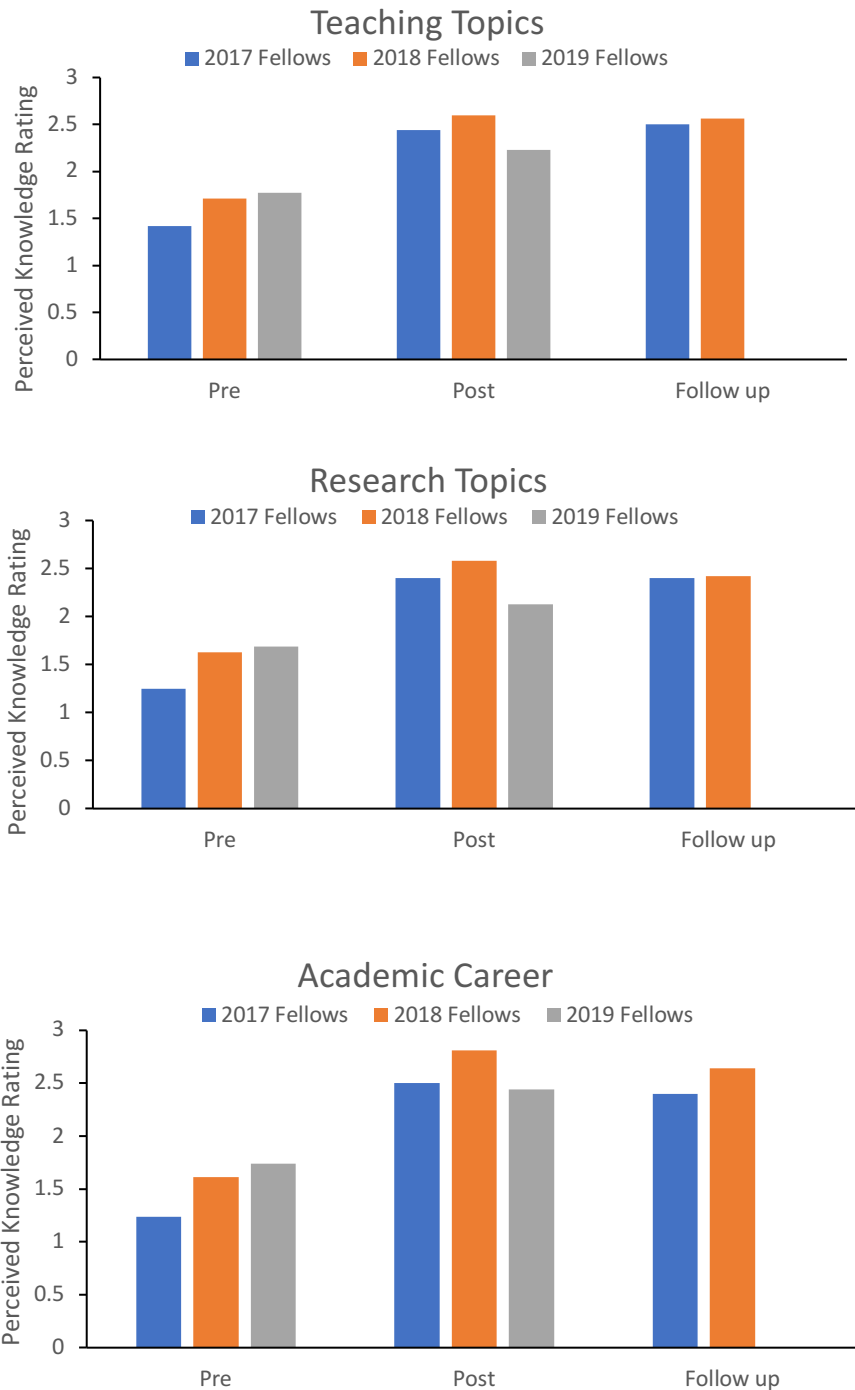
Figure 2. ACADEME Fellows perceived knowledge pre summer development, post summer development and after academic year activities (follow up) pertaining to teaching, research and academic career topics. Ratings were 'little to no knowledge' (1), 'some knowledge' (2) and 'very knowledgeable' (3).

Table 6. Descriptive statistics for Fellows versus control group for 2017 and 2018 cohort self-assessment of knowledge (1: little to no knowledge, 2: some knowledge, 3: very knowledgeable)

			Teaching (25 items)	Research (15 items)	Career Preparation (8 items)
2017	Fellows	Change pre to follow up	1.139±0.46	1.07±0.67	1±0.866
	Control		0.222±0.443	-0.01±0.252	-0.025±0.268
		T stat	5.329	5.746	4.349
		P(T<=t) 2 tail	<0.001	<0.001	<0.001
		T critical 2 tail	2.06	2.064	2.06
			18 items	14 items	8 items
2018	Fellows	Change pre to follow up	0.74±0.5	0.71±0.0	0.86±00.7
	Control		-0.14±0.1	-0.04±0.1	-0.05±0.05
		T stat	5.006	4.496	4.42
		P(T<=t) 2 tail	<0.001	<0.001	<0.001
		T critical 2 tail	2.03	2.03	2.05

Mentoring activities during academic year

One of the key successes of the project was the mentoring activities during the academic year. ACADEME Fellows were required to meet with their mentor a minimum of twice a semester to receive the second half of the stipend. Assessment of the mentoring activities are from the first two cohorts as mentoring of the third ACADEME cohort will be completed in June 2020. Mentors kept a log of which mentee they met with, the topic of the meeting, and potential date of follow up meeting. At the end of each official meeting, the mentees were asked to keep reflective journal (what was discussed, was it beneficial, what to do next) to assist them, as well as to assist with completing the evaluators survey at the end of the year. The minimum number of required video conference interactions was four. During the first year mentors reported a range of interactions with fellows between one to five and Fellows reported two to seven. Two of the Fellows from the first cohort exceeded that number and interacted with more than one mentor. During the second year, the 2018 ACADEME Fellows reported meeting with their mentor less than four times (8), four times (12) and five to six times (4). Several of the Fellows from the 2017 and 2018 cohort are still interacting with their mentors. PI documentation indicated that mentor meetings focused on career plans. ACADEME Fellows from the 2017 cohort indicated that were predominantly used for editing their teaching philosophies and resume (Figure 3). For the 2018 Fellows, advice on completing a job search was and how to modify their research statement was discussed at a higher frequency than their resume (Figure 3). This was attributed to the majoring of the first cohort of Fellows being in first two years of their PhD study at the time.
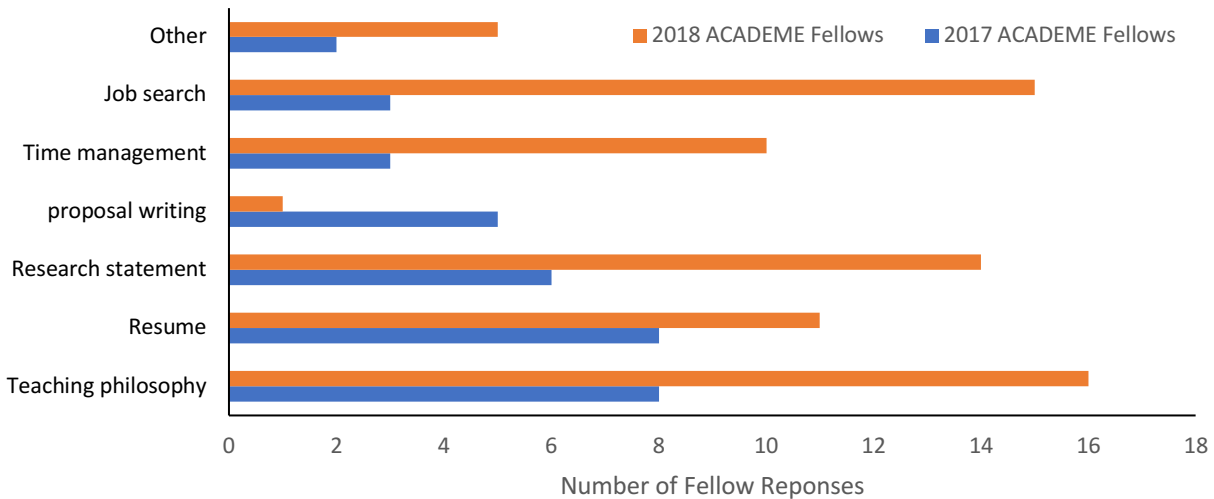
Figure 3. Focus of mentoring activities from ACADEME Fellows surveys

Fellows perceived the weakest area of the mentoring program to be the assistance with networking (Table 7). However, Fellows from both the 2017 (66%) and 2018 (80%) cohorts had strong agreement that the feedback from their mentor was constructive and honest. Researchers have found that two of the most desirable mentor traits are that they are honest and respectful [15], [16]. Furthermore, 58% of the 2017 Fellows and 42% of the 2018 Fellows strongly agreed that their mentor was a role model.

The 2018 cohort had reached out to more than one ACADEME faculty as mentor to a slightly higher degree than the 2017 cohort. San Miguel and Kim's [17] study of successful Latina women found that all the women interviewed had access to mentoring throughout their career and that multiple mentors were often the most beneficial approach at addressing a specific issue. Mentoring can potential provide "counterspaces" (i.e., safe spaces outside of mainstream) to women of color [18]. Having access to safe spaces and mentors outside of the home institution may help remove barriers for them to succeed when started and advancing in an academic position [19].

Exceeding the minimum number of interactions in a year, interacting with more than one mentor, continued interaction with mentor past the first year of activities, and the quotes shown below are all corroborating evidence of the beneficial impact of the mentoring activity. The approach used for mentoring, excluding the stipend as a 'carrot' can easily be adapted at other institutions. Informal feedback from Fellows that used the mentoring activity the most often forgot about the second half of the stipend.

*"We frequently communicated. With regular scheduled meetings, we also texted/emailed each other with any issues and concerns, shared progress and messages. My mentor gave me a lot of encouragement and guidelines for my future career." (*2017 Fellow*)*

Table 7. Mentee satisfaction with the Mentoring Experience
(SD=strongly disagree, D=disagree, N=neither agree/disagree, A=agree, SA=strongly agree)

Statement	2017 ACADEME Fellows					2018 ACADEME Fellows				
	SD	D	N	A	SA	SD	D	N	A	SA
Feedback was:										
Timely	0%	8%	0%	50%	42%	0%	0%	12%	28%	60%
Useful	0%	8%	0%	25%	66%	0%	4%	8%	16%	72%
constructive & honest	0%	8%	0%	25%	66%	0%	0%	8%	12%	80%
My mentor:										
was available & responsive	0%	8%	0%	25%	66%	0%	0%	4%	16%	80%
was an active listener	0%	8%	0%	25%	66%	0%	4%	4%	20%	72%
helped me set goals	0%	8%	0%	42%	50%	0%	4%	16%	42%	38%
helped develop strategies to reach those goals	0%	8%	8%	33%	51%	0%	4%%	16%	42%	38%
helped with networking	0%	8%	42%	33%	17%	8%	13%	42%	29%	8%
was a role model	0%	8%	8%	25%	59%	0%	8%	17	33%	42%
I reached out to my mentor	0%	8%	8%	50%	33%	8%	0%	4%	40%	48%
My mentor reached out to me	0%	0%	0%	34%	66%	0%	0%	4%	36%	60%
The format was helpful	0%	8%	0%	26%	66%	4%	12%	4%	32%	48%
I benefited from participating in mentoring activities	0%	0%	8%	34%	58%	4%	8%	8%	20%	60%
I reached out to other ACADEME faculty	0%	25%	17%	42%	16%	0%	12%	12%	36%	40%
I connected with other ACADEME fellows	0%	33%	25%	25%	17%	0%	8%	12%	40%	40%

"The mentoring program helped me in the transition from a post-doc to a faculty position. It gave me the insights of improving my confidence in addition to my technical skills. The whole ACADEME helped me thrive during my first year in the academic environment." (2018 Fellow)

Where the cohorts are now

The 2017 ACADEME Fellows were all PhD students at the time of the program activities. As of now, three (25%) are working in industry (Figure 4a); of which one also is an adjunct professor at Ohio State University. Seven of the Fellows will soon finish their Ph.D.'s., with one actively looking for a tenure track position. Two of the Fellows (17%) secured tenure track assistant professor positions directly after completing their PhD; one at University Wisconsin-Platteville and one at Bucknell University. One 2017 Fellow credited her ability to interview and present a lesson during the job search process to the skills learned during the summer professional training.

At the start of the 2018 summer professional development, 20 of the Fellows were PhD students and 7 were post-docs. Since then, four (15%) of the 2018 Fellows decided to work in industry and seven (18%) are still working on their Ph.D. Five of the post-docs are currently interviewing for tenure track positions. One Fellow secured a non-tenure track position at the University of Kentucky-Paducah. Twenty-two percent (6) Fellows have secured tenure track positions (Figure 4b). They are teaching at Texas A&M-Kingsville, Carnegie Mellon, University of Nebraska-Lincoln, San Francisco State, University of Minnesota (starting Jan 2020) and SUNY-Binghamton. One of the 2018 Fellows that secured a teaching position also spoke to the 2019 cohort about her experience. She told the new group that the program helped increased confidence for interviewing. Others Fellows said:

"I received four job offers and I think the ACADEME program was supper helpful in setting me up for success."

"Being an ACADEME Fellow has also opened doors for me, for instance I got accepted to a 3-month long teaching course in my university, thanks in part to being an ACADEME Fellow and demonstrating my commitment to teaching and my continued development as an academic."

"The ACADEME Fellows program was an amazing and invaluable experience. There is no other singular setting or program that provides the level of comprehensive information on academia and tenure-track faculty positions that we gained from ACADEME. I am so grateful for the experiences I had and the connections I made to like-minded peers in other disciplines. "

"There many aspects of professional identity formation that occur during the doctoral and postdoc phases. It can be difficult to develop concrete philosophical ideas before the
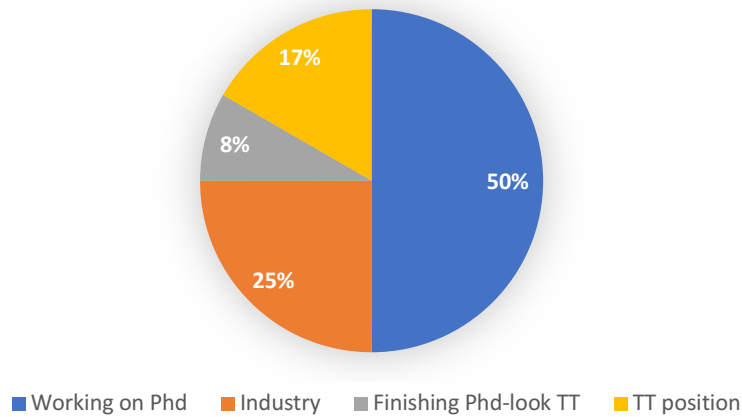
conclusion of those processes. Nonetheless, the summer training was transformative in my career training and many aspects discussed have guided my career in positive ways! Loved it!"

"One of the best parts of ACADEME was making connections with my cohort and supporting each other during the job search. I continue to draw from the on-site programming as well."
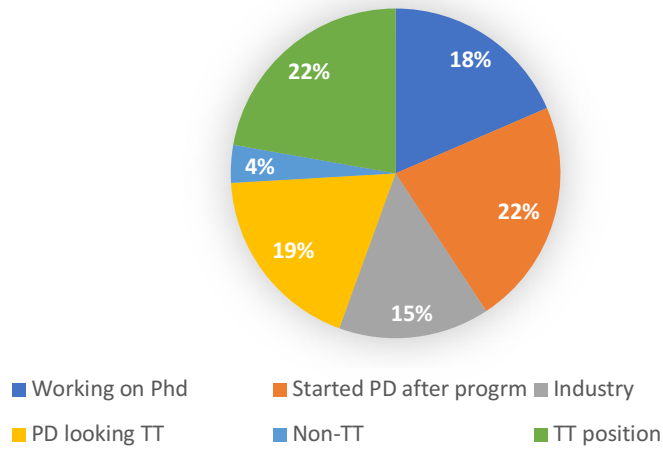
The 2019 ACADEME Fellows had 15 PhD students and eight post-docs. Seven of the PhD students (30%) are working on their Ph.D. degree; with one currently searching for a tenure track position and one for a post doc. One of the PhD students and one of the post-docs have accepted industry positions. Two of the Fellows have accepted non-tenure track positions (Villanova and University of Toledo). Five of the post-doctoral Fellows (22%) are actively interviewing for tenure track positions (Figure 4c).

"I wanted to tell you that the insight you provided during the workshop on becoming a professor was absolutely amazing. I knew that becoming a professor was something I was interested in but that first week made me realize how much of a dream job it could be for me."

Current Position 2017 Fellows

Pie chart: 50% Working on Phd (blue), 25% Industry (orange), 8% Finishing Phd-look TT (gray), 17% TT position (yellow)

■ Working on Phd   ■ Industry   ■ Finishing Phd-look TT   ■ TT position

Current Position 2018 Fellows

- Working on Phd — 18%
- Started PD after progrm — 22%
- Industry — 15%
- PD looking TT — 19%
- Non-TT — 4%
- TT position — 22%

Current Position 2019 Fellows

- Working on Phd — 30%
- Started PD after progrm — 17%
- Industry — 9%
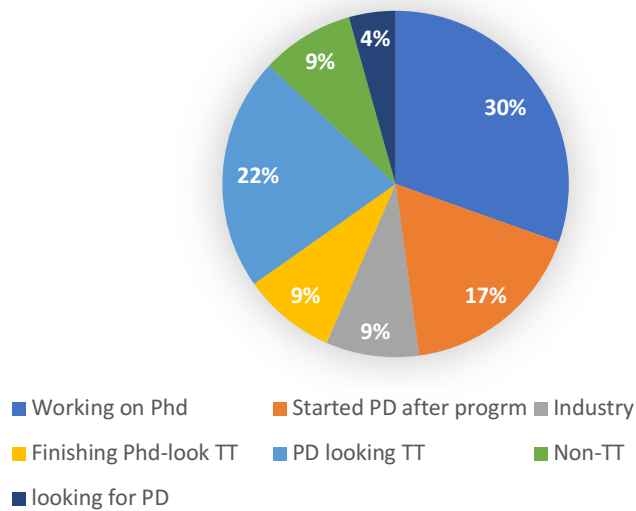- Finishing Phd-look TT — 9%
- PD looking TT — 22%
- Non-TT — 9%
- looking for PD — 4%

Figure 4. Current positions of ACADEME Fellows

Conclusions

Fellows have provided direct feedback as to the benefit of the program activities. Several have indicated that they had received little information from their academic advisors about teaching or the job application process. Although the summer professional development training is highly beneficial, a key component has been the mentoring activities during the academic year. Providing the Fellow's with a mechanism to receive feedback on application packages, negotiation strategies, start-up packages, deciding between multiple job offers has been

instrumental in Fellows' securing an academic position. The Fellows continued participation in the mentoring program is corroborating evidence to the programs benefits. To date, eight of the Fellows have secured an assistant professor tenure track position, two have non-tenure track positions, one is an adjunct professor and 11 are actively looking for a tenure track position. A comprehensive assessment across all three years will be completed in June 2020. We will also assess possible mechanisms for implementing the approach on a larger scale.

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