

National Trends and Models for Teaching-Track Faculty in Chemical Engineering

Dr. Stephanie Butler Velegol, Pennsylvania State University

Stephanie Butler Velegol is a Teaching Professor in Chemical Engineering at Penn State University. She pioneered the use of Flipped classes to increase active learning in the classroom and works on water treatment.

Dr. Lisa G. Bullard P.E., North Carolina State University, Raleigh

Dr. Lisa Bullard is an Alumni Distinguished Undergraduate Professor in the Department of Chemical and Biomolecular Engineering at North Carolina State University. She obtained her BS in Chemical Engineering at NC State in 1986 and her Ph.D. in Chemical Engineering from Carnegie Mellon University in 1991. A faculty member at NC State since 2000, Dr. Bullard's research interests lie in the area of educational scholarship, including teaching and advising effectiveness, academic integrity, chemical engineering instruction, and organizational culture.

Taryn Melkus Bayles, University of Pittsburgh

Taryn Bayles, Ph.D., is a Teaching Professor of Chemical Engineering in the Chemical and Petroleum Engineering Department at the University of Pittsburgh, where she incorporates her industrial experience by bringing practical examples and interactive learning

Dr. Katie Cadwell, Syracuse University

Katie Cadwell is an Associate Teaching Professor in the Department of Biomedical and Chemical Engineering at Syracuse University, where she has taught Chemical Engineering core courses since 2011. She holds a BS in Chemical Engineering from the University of Missouri-Rolla (now the Missouri University of Science & Technology) and PhD in Chemical Engineering from the University of Wisconsin-Madison, where she also was a postdoctoral fellow in Engineering Education & Outreach. She has previously taught at Madison College.

Trends in US Chemical Engineering Teaching-Track Faculty

Most chemical engineering departments in the United States have at least one faculty who is not on the tenure track. These faculty serve important roles that can include advising AICHE and other student groups, increased advising or administrative responsibilities, and/or focusing on engineering pedagogy. In March 2022, the Education Division of AICHE created a new group for Chemical Engineering teaching-track faculty. This group now has grown to 60 members. The group has met monthly on Zoom since then and discussed professional development topics such as how to get promoted, how to get involved in AICHE and ASEE, how to publish research, and how to improve inclusive teaching. In addition, this group has served as support for faculty who might be the only one or one of a few faculty in their position in their department or institution. Through this group, we have found that there is much variation in the support, guidance, and promotion pathways depending on their individual institutions and departments. The purpose of this paper is to explore these differences and provide examples of policies and procedures at a number of institutions to be used as a potential model.

This paper has two specific objectives: (1) Discuss the results of a survey given to the faculty in this group. This survey asks questions about the length of their service and contract, their title and opportunities for promotion, support given to them for professional development, their journey to take a teaching-track position and the level of support they feel in their departments; and (2) Provide examples of teaching-track policies at four institutions that may serve as potential guide for other departments and/or institutions.

Introduction

Although accurate numbers of teaching-track faculty (TTF) in chemical engineering are challenging to obtain because of the ways that institutions categorize these positions differently, estimates show that there are a few hundred of these faculty who teach our chemical engineering students. The IES (Institution of Educational Science)/NCES (National Center for Educational Statistics) report report¹ shows that 42% of all full-time instructional staff employed by degree-granting postsecondary institutions are nontenured faculty. Of these 308,194 faculty, 53% have annual contracts, 26% have multi-year contracts, 6% are on indefinite contracts, and the rest on less than annual contracts or without faculty status. In engineering, there were a total of 5026 non-tenure track faculty, or 14.4% of the total according to the latest ASEE (American Society for Engineering Education) report². Finding the numbers of teaching-track faculty in chemical engineering is not as easy to find. The 2021 ASEE report breaks down only the tenured or tenure-track faculty per discipline with 2110 Tenure or Tenure-Track faculty in Chemical Engineering. If there are still 14.4% non-tenure-track faculty, this would indicate that there are approximately 350 non-tenure-track faculty in chemical engineering. In 2018, Taryn Bayles found that there were a total of 2323 US Chemical Engineering faculty with 185 on the teaching-track.³ This number was obtained by looking at the departmental websites. Unfortunately, there is not a more clear way of finding the number of teaching-track faculty members employed in Chemical Engineering. This points out the importance of being able to track these faculty.

Much attention has been given to teaching-track faculty.^{4,5,6,7,8} Teaching-track faculty are non-tenure track faculty who are typically on fixed term contracts. They typically are not required to perform research, although some do. A recent article in PLOS one⁶ showed that women are disproportionately represented in teaching-track STEM academic jobs. Although 21% of both male and female PhD students go into tenure-track positions, 20% of women versus 13% of men go into teaching-track jobs. Their results show that, compared to faculty on the tenure-track, teaching-track have lower salaries 7 - 9 years after graduation (\$63,000 vs. \$72,000) and have lower job satisfaction with their opportunities for professional development and job security.

Another recent article⁹ makes specific suggestions for supporting teaching-track faculty in professional development that include institutional changes and culture. The article states:

“First, perhaps the most important takeaway was that without a systems perspective that addresses the needs of NTTF (non-tenured teaching faculty), including the ways that the institution can minimize or enable their participation, planners will be limited in their success.”

“working across campus to create a culture where growth and development are expected is critical to obtaining the resources, priority setting, and structures to support professional development that is inclusive of NTTF. When professional development is

an expectation rather than a perk, it will also be valued and recognized much more so than it is otherwise.”

For engineering faculty, these institutional changes include clear pathways for promotion and titles. In addition, this could include support for professional development such as financial support for attending national meetings (e.g. ASEE (American Society for Engineering Education), AIChE (American Institute for Chemical Engineering), and/or support for improving teaching and learning, and being a part of communities of other teaching-track faculty.

The Education Division of AIChE created a virtual community for teaching-focused faculty in Chemical Engineering in 2022. There are currently 60 members of this community invited to meet virtually once a month. The purpose of the meetings is both to create community and to convey information about promotion opportunities and professional development. For example, during one meeting, members heard from ASEE and AIChE officers about ways to get involved in both organizations and how to present education-based research. Another meeting allowed faculty to communicate potential engineering education research ideas. This allowed for potential collaboration as well as brainstorming. Finally, in one meeting, the members discussed their own advancement opportunities at their universities. We found that there is variability in the guidelines for promotion and professional development opportunities given to teaching-track faculty depending on their institutions. Professional development opportunities could include financial support to attend conferences, mentoring programs, recognition and availability of awards. This variability inspired the writing of this paper. In this paper, we discuss the results of a survey given to teaching-focused faculty in Chemical Engineering and provide examples of teaching-track policies at four institutions to serve as a guide for other departments and institutions.

CHE Teaching-Track Faculty Survey Results and Analysis

The survey was sent out through our networks in the AIChE Education Division and ASEE Chemical Engineering Division. We had three main goals of the survey: 1. To determine what roles these faculty are playing in their department, 2. To determine what support they are or are not receiving toward their professional development, 3. To get a sense of their belonging in their department, university and nationally. There were 41 faculty members who filled out the survey (including the authors). The authors developed the survey after consultation with the AIChE teaching-focused faculty group. Most of the respondents (71%) were already a part of the AIChE teaching-focused faculty group. In addition, 78% are members of AIChE, and 67% are members of ASEE. Half of the respondents have presented at AIChE and/or ASEE. We recognize that this gives us a skewed sample set of faculty who are already involved both in their department and in national organizations. We hope to expand this network through this presentation. Out of the 41 respondents, 23 identified as female or woman (56%) while 2 identified as non-binary or gender non-conforming. 12 identified as male, and 4 did not answer. The percent that identify as women is much higher than the percent women in tenure/tenure-track positions (21%) in the United States². Although these numbers are small, this could

indicate that more women are in non-tenure track positions vs. tenured/tenure-track positions. More data should be collected.

The faculty members who filled out the survey ranged from just starting out in the past year (~20%) to those who have been teaching chemical engineering for more than 10 years (27%). The faculty members were asked about their titles. There were 41% at the Assistant level (Assistant Teaching Professor, Assistant Professor of Practice, Adjunct Assistant Professor, Lecturer), 16% at the Associate Level (Associate Teaching Professor) and 37% at the senior level (Teaching Professor, Senior Lecturer). The “other” titles included Professor-in-Residence and Instructional Professor. Figure 1 shows the breakdown of rank of the respondents. The faculty were asked how they were hired into their current position. Most (64%) applied for a posted job while 24% had a position created for them based on people whom they knew in the department.

The respondents were from 30 institutions that are mostly R1 institutions (3 were from R2 institutions). We were delighted to learn that the majority of universities represented in the survey have a documented process for promotion. Above half of the respondents said that the policy has been in place for either 3 - 5 years (21%) or over 5 years ago (29%). Most of the respondents were hired with the process already in place. 21% of the faculty had been promoted more than once, 24% had been promoted once, and 45% had not yet gone through the process. Two respondents came into their positions at the top level. The length of contracts range from 1 year (22%), 2 - 3 years (44%) to 4 - 5 years (32%). Only one respondent has a contract for more than 5 years.

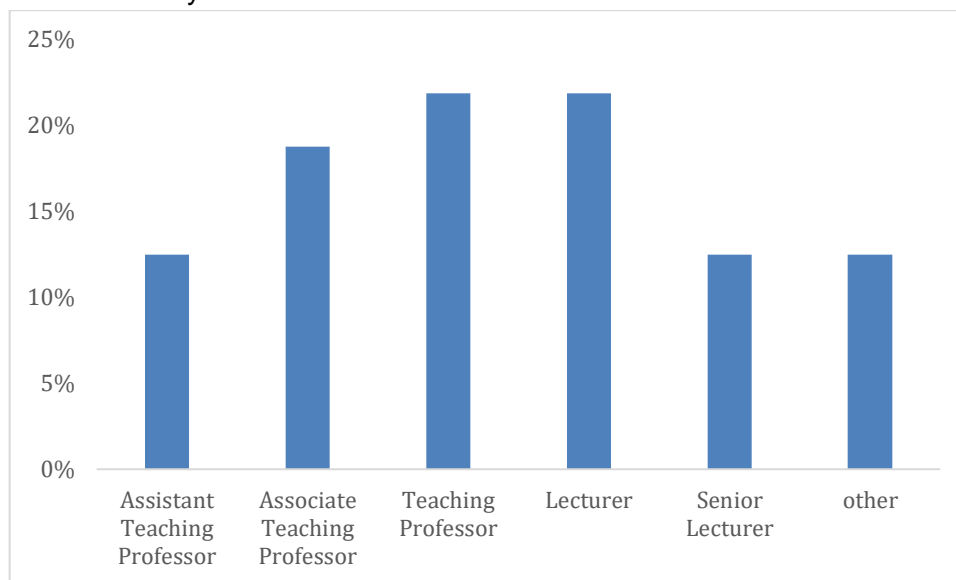


Figure 1: Percent of survey respondents at various levels of promotion on the teaching track. (other includes Assistant Professor of Practice, Adjunct Assistant Professor, Professor-in-Residence and Instructional Professor)

Teaching faculty serve in many different ways in chemical engineering departments (Figure 2). For example, two-thirds of the respondents serve as an academic advisor and one-third serve

as the undergraduate program coordinator (UPC) of the department. Almost half of the respondents are responsible for ABET, and over one third advise the AICHE student chapter. This shows the critical role that these faculty play in their chemical engineering departments.

These faculty are hired primarily for teaching. Of those surveyed, 93% teach “core” courses that including Material Balances, Thermodynamics, Transport and Kinetics. A bit more surprisingly, 63% teach a lab course and 39% teach design. Many may be hired to specifically teach these courses. Finally, 41% of those respondents teach electives in chemical engineering.

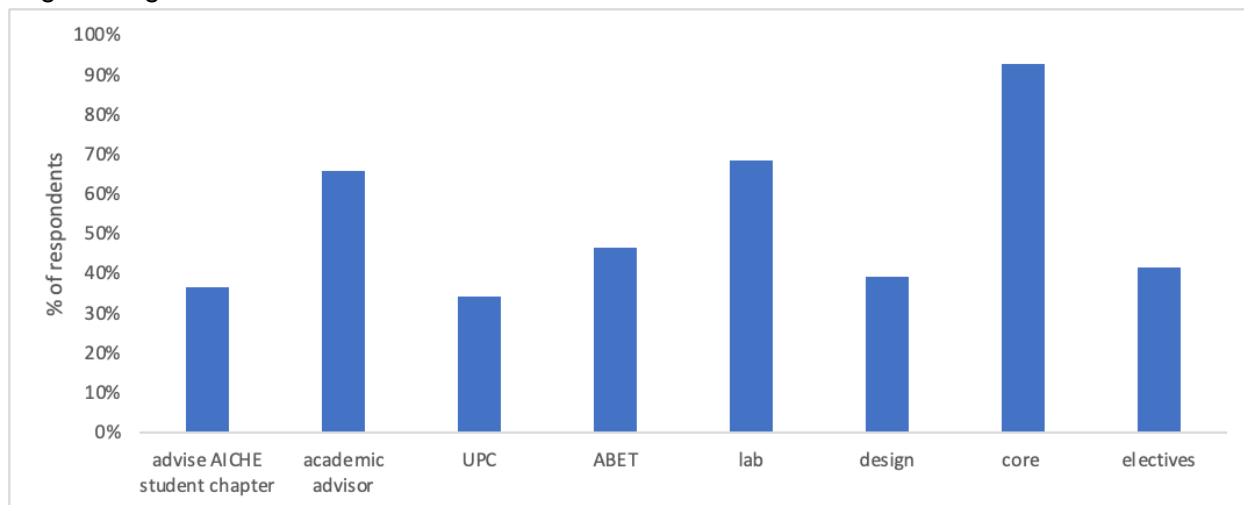


Figure 2: Teaching and service roles of teaching faculty in CHE.

In addition to teaching and service, many teaching faculty also contribute in the area of scholarship and research. We found that 45% of the respondents have received internal funding and 19% have received external funding for engineering education research. In addition, just under half work on engineering education (but not with student contributors), with 19% working with undergraduate students on engineering education-based research. In addition, 4 respondents (~10%) work with graduate students on engineering education. We also found that about 12% of the respondents work on scholarship outside the realm of engineering education. We didn't ask in the survey if scholarship and research are expected as part of their job duties. This will be an important question that should be asked in the next survey.

It is important for teaching faculty to be able to grow professionally. One way is to be given the opportunity to attend conferences. According to the survey, 76% of the respondents said that they have support to go to at least one professional conference per year. Only 3 respondents stated that they don't have funding or not enough funding for travel. We are aware that the respondents to the survey came from the AICHE education division as well as ASEE. There are likely many teaching-focused faculty who do not attend these conferences and did not fill out the survey. We asked the faculty for specific ways that they would like to be supported or are currently being supported professionally. The responses are listed in Table 1 and categorized based on financial support, mentoring, teaching relief, recognition and community.

Table 1: Ways in which faculty are being and would like to be supported professionally.

Topics	Suggestions for supporting faculty professionally
Financial support	Support to attend conferences (ASEE, AICHE) and CHE Summer School Provided with a budget and/or start-up funds with space for research
Mentoring	Advice for promotion Time for networking with senior faculty Support to become administrators
Teaching relief	Low teaching load for first year Teaching relief to do scholarship in education Sabbatical equivalency
Recognition	Nomination for awards Valued as a faculty member by tenure-track colleagues Non-negative title (e.g. “teaching track” instead of “non-tenure track”) Longer contract length Input in what to teach Voting rights in departmental decisions
Community	Involved in AICHEs VCPs (Virtual Communities of Practice) Involved in university center for teaching and learning

We also asked the faculty if they have opportunities and support for professional development (Figure 3) and how if they feel like they belong (Figure 4). Most faculty members indicated that they have opportunities and support in their department, institution and outside of their institution. Five or fewer respondents indicated that they do not have opportunities for support for professional development at each level queried. This number might increase as we increase our respondents to include faculty members who are not as involved in ASEE and AICHE. The suggestions in Table 1 can be helpful to those outside of this community.

We were curious if these faculty had a sense of belonging inside and outside their institution. Almost all the respondents agreed or strongly agreed with the statement “I feel a sense of

belonging to..." for the department, institution and outside the institution. There were 5 respondents who do not feel like they belong outside of their institution. Three of these have never presented at a AICHE or ASEE. This is a good reason to find ways to encourage our teaching focused faculty to attend these conferences and get involved.

Check which one applies to the statement "I have opportunities and support for professional development in...."

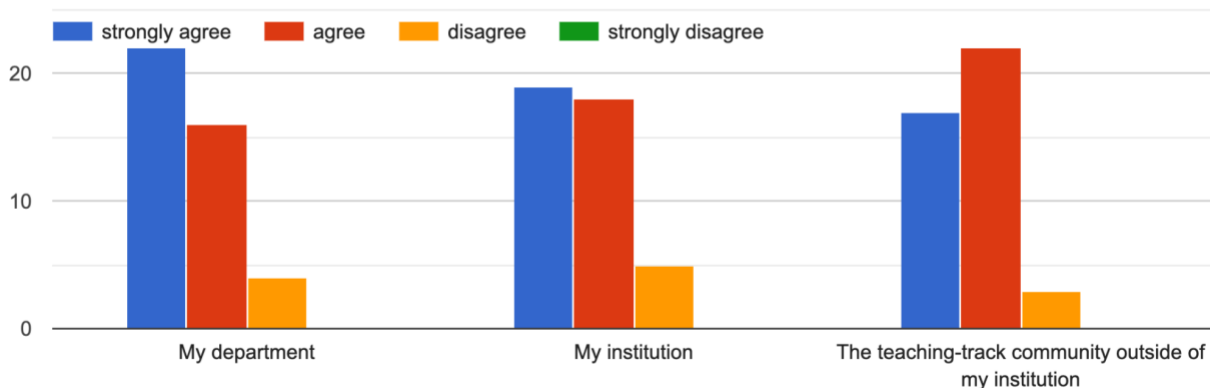


Figure 3: Faculty were asked if they have opportunities and support for professional development in their department, institution, and the teaching-track community outside of their institution.

Check which one applies to the statement "I feel a sense of belonging to..."

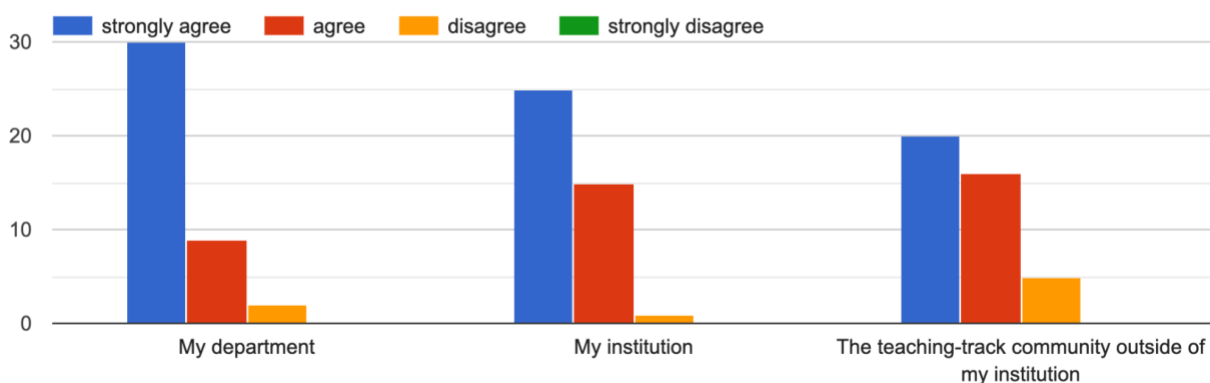


Figure 4: Faculty were asked if they have a sense of belonging in their department, institution, and the teaching-track community outside of their institution.

In conclusion, most teaching-track faculty in chemical engineering departments around the country who answered the survey are at institutions with clear guidelines for promotion and have been hired into specific teaching-track positions. Many of them teach the lab and/or the design course. In addition, they serve in many roles such as academic advisor, AIChE advisor, undergraduate program coordinator, and ABET coordinator. This makes them extremely valuable parts of a chemical engineering department. There are many ways to support these faculty, including financially, mentoring, and recognition. In the next section, we will describe the promotion guidelines for four different institutions.

Description of Teaching-Track Promotion Process at Four Institutions

The authors of the paper come from four different R1 institutions. These are the institutions of the authors and were chosen to give examples of promotion guidelines for teaching-focused faculty. Three are public institutions and one is private. The number of faculty in the College of Engineering ranges from 110 - 480, and the percent of those faculty who are teaching-track ranges from 14% - 23%. As expected, the number of teaching faculty is higher at the lower ranks. The date for the introduction of guidelines for teaching-track promotion varies from 2003 to 2017. The purpose of this section is to provide a guide for other schools and to compare these policies and guidelines. We recognize that these 4 institutions are not representative of all institutions that have chemical engineering programs. Further work will consider adding how the duties and support may be different at different institutions (e.g. Historically Black Colleges (HBCUs), Predominantly Undergraduate Institutions (PUIs), etc.)

Table 2: Summary of four institutions with promotion guidelines for professional track teaching faculty. All of these institutions are classified as R1.

Institution	Full Time Engineering Faculty	# of full-time professional track teaching faculty	When did professional track start?
Penn State University	480 32 in CHE	73 (15%) 3 (~10%) of CHE 6 Lecturer 34 Assistant Teaching Professor 21 Associate Teaching Professor 12 Teaching Professor	2017
North Carolina State University	355 32 in CHE	49 (14%) 3 (~9%) of CHE 21 Assistant Teaching Professor 11 Associate Teaching Professor 9 Teaching Professor 7 Lecturer	2003

		1 Senior Lecturer	
University of Pittsburgh	178 20 in CHE	36 (20%) (Appointment stream) 3 (15 %) of CHE 19 Assistant Professor 11 Associate Professor 6 Professor	1998 (Promotion policy 2013)
Syracuse University	110 20 in department that includes CHE	21 (19%) 3 (15%) of department 10 Assistant Teaching Professor 11 Associate Teaching Professor 0 Teaching Professor	2016

Details of promotion policies at each school are described below. Key elements of these policies are summarized in Table 3.

Penn State University

Penn State University is public, R1 institution, with a total of 76,000 undergraduates (with 40,000 at this campus) and 14,000 graduate students. This institution created a policy for non-tenure-line (professional track) faculty in August 2017. This policy was approved by the Faculty Senate and then the president. Recent changes at the University level include removing all references to “fixed-term and standing” and replacing “his/her” with gender-inclusive language. Each college was asked to create guidelines for promotion within the ranks and was asked to determine if they would use an Instructor or Lecturer for the lowest level. This level is for faculty who do not hold a terminal degree. There is a recommended time of five years between promotion from the first position to the second position. There is no fixed time for promotion to the third rank.

Each college within the school establishes a committee for that college. If the committee has less than seven full-time non-tenure-line faculty members, at least two members can be drawn from another college’s non-tenure-line committee. Only full-time faculty can serve on the committee and can only vote if they are of higher rank. There should be recommendations from the department committee, the department head, the dean of the college and the senior vice president for research. All promotions come with a salary raise. The contract length can vary based on budget models, need, etc.

The College of Engineering at Penn State currently has 73 non-tenure-line (professional track) teaching faculty among the 480 total faculty members. The titles for professional track faculty are either teaching faculty (Lecturer or Instructor, Assistant Teaching Professor, Associate Teaching Professor, Teaching Professor.) or research faculty (Researcher, Assistant Research Professor, Associate Research Professor, Research Professor).

The College of Engineering chose to use “Professional Track Faculty” in all communication to create a more positive view of these faculty. This language is not official at the University level. The timeline for professional track faculty promotion within the College of Engineering includes a workshop in September followed by distribution of promotion guidelines to department heads in November. The department head then submits a list of candidates to the college and requests at least three letters of recommendation for the dossier. These letters can be internal or external. These letters are distributed to the departmental promotion committee. They review the dossier and write a recommendation to the department head. The candidate prepares the dossier, and the department head submits this along with their own letter of recommendation in January. In March, the College Professional Track Faculty Review Committee completes the review and makes recommendations to the dean in March. The final decisions are announced in May.

It is preferred that faculty serve on either a departmental or college level committee. The College of Engineering committee has five members, with three or more being at the top level. Committee members serve for two years. Three of the members are elected from the professional track faculty in the College of Engineering, and two are appointed by the Dean. The departmental committees can have between three and seven members, with two-thirds being elected by the professional track faculty in the department and the other two being appointed by the department head. Guidelines are outlined here:

<https://www.engr.psu.edu/faculty-staff/faculty-resources.aspx>

North Carolina State University

In 2003 North Carolina authorized the establishment of “special faculty appointments” that addressed non-tenure track fixed-term appointments for positions that were limited in duration. These appointments included modifiers such as Clinical, Extension, Practicum, Research, and Teaching. In 2010 the title was changed from “special faculty” to “non-tenure track faculty” to reflect current usage at that time. In 2020 the Governance and Personnel Policy Committee of NC State’s Faculty Senate proposed several significant changes in the NC State policy, which were approved by the Provost: (1) changing the term “non-tenure track” to “professional faculty”; (2) requiring that departments define standards for professorially ranked faculty in professional tracks; (3) redefining the departmental voting faculty (DVF) for initial and subsequent contracts to include appropriate full-time professional faculty at that level or higher; and (4) redefining the DVF for promotion of professional faculty with professorial rank to include professional-track faculty. Note that while the DVF can include teaching faculty, the College of Engineering and University Reappointment, Promotion, and Tenure (RPT) Committees do not include any professional-track faculty and consist of five tenured Full professors.

Professional-track faculty contracts are limited and based on (1) the purpose for which the individual is appointed, (2) the availability of funding, or (3) other valid institutional reasons. Faculty contracts may not exceed five years. A recent (2019) survey of teaching faculty in the NC State College of Engineering showed a wide variety of contract lengths across departments, including nine months, one year, two years, three years, and five years. Although it is not

required, the policy mentions, “As a courtesy, departments may provide notice to faculty on multiple-year contracts similar to that provided to EHRA Professionals, e.g., 1) during the first year of service, not less than 30 days’ notice prior to discontinuation of employment; 2) during the second and third years of service, not less than 60 days’ notice prior to discontinuation of employment; and 3) during the fourth and all subsequent years of service, not less than 90 days’ notice prior to discontinuation of employment.”

There is no minimum or mandatory year for promotions in rank for professional faculty members, unlike reviews of tenure-track faculty for tenure and promotion from Assistant to Associate professor. They may request to be considered based on consultation with or recommendation from the department head and/or DVF. The Dean of each College at NC State determines whether external letters are required for promotion. In the College of Engineering, letters are not required for promotion from Assistant to Associate teaching professor, but five external letters are required for promotion from Associate to Full teaching professor.

Full-time teaching faculty (as well as tenure-track faculty) are required to submit annually a Statement of Faculty Responsibilities (SFR) that details the approximate percent effort expected of the individual faculty member in each realm of responsibility (e.g. teaching, research, service, administration) and general description of the activities to be undertaken in each realm. This document is a key element of promotion to determine the candidate’s eligibility for promotion based on their performance in the agreed-upon realms of contribution.

Professional-track faculty at the Assistant level are not required to pursue promotion to associate, unlike the tenure-track position. So, if the faculty member is doing everything that the department needs them to do based on their SFR and funds are available, their contract as an Assistant teaching professor could be renewed indefinitely.

Guidelines on promotion and contracts for professional track faculty at NC State can be found here: <https://provost.ncsu.edu/faculty-excellence/reappointment-promotion-and-tenure/roles-and-responsibilities/professorially-ranked-professional-faculty-member-being-promoted/>

University of Pittsburgh

In 2013, the College of Engineering at the University of Pittsburgh (a public, R1 institution, with 23,000 undergraduate and 9,300 graduate students) created a promotion policy for its appointment stream (AS) faculty who provide specific functions in education and research, as well as education-related service and research-related service functional needs. The policy was updated in 2016 and 2020. The policy changes were proposed by the Associate Dean of Academic Affairs, the Chair of the Appointment, Promotion, Tenure, Review Committee (APTRC) and a senior AS Professor. These changes were reviewed by the APTRC and approved by the Engineering Dean.

Appointment Stream faculty with the rank of Lecturer, Senior Lecturer, Assistant Professor, and Associate Professor are eligible for one to two year contracts. The maximum duration of Lecturer is three years, and if they are not promoted to Senior Lecturer or AS Assistant

Professor during their third year, they must be notified in writing at least five and a half months prior to termination at the end of the third year. Senior Lecturers must undergo a major departmental evaluation after no more than six years and can be promoted to AS Assistant Professor or AS Associate Professor after a successful APTRC review. If the Senior Lecturer is not promoted, they will be allowed to continue in that position on one-year, renewable contracts as deemed by the Department. An AS Assistant Professor must undergo a full evaluation by the APTRC no later than the end of the fifth year in rank. At that time, they will either be promoted to AS Associate Professor, serve out the final year (6th) of the contract before being asked to leave, or continue to be annually reappointed as an AS Assistant Professor. In order to be promoted to the rank of AS Professor, an Associate Professor will undergo a full evaluation by the APTRC (typically after three to five years in rank), and the candidate is required to develop the substance required in a dossier to merit promotion. Once an AS faculty member is promoted to Professor, they are eligible for appointments with one to five year contracts.

The departmental evaluation committees consist of all tenure-track tenured faculty and AS faculty who outrank the candidate. The APTRC committee consists of two tenure-track Full professors from each department, all Full AS Professors in the college, and one AS Associate Professor from each department (if there is not an AS Professor in the department). The APTRC committee for each AS case will be made up of members of the APTRC who are not from the home department of the candidate, and three member APTRC subcommittee (who prepare the detailed review document) are made up of at least two AS APTRC members. At the end of the review process, the Dean meets with the Full APTRC (and often attends the APTRC review meetings) and then meets with the candidate's Department Chair to provide his/her final decision. The Dean sends all positive recommendations to the provost with the full dossier and all other necessary documentation. In all promotion cases (Lecturer to Senior Lecturer to Assistant to Associate to Professor), internal department letters are required from all tenured faculty and AS faculty who outrank the candidate. External letters are also required for all AS promotion considerations. A minimum of three external letters is required for the promotion of Lecturer to Assistant Professor; and a minimum of six external letters is required for the promotion of AS Assistant Professor to Associate Professor and AS Associate Professor to Professor.

The guidelines for the University of Pittsburgh are not public (they are hosted on sharepoint and available only to faculty within the college).

Syracuse University

Syracuse University is private, R1 institution, with a total of 15,000 undergraduate and 7,000 graduate students. In 2016 Syracuse University eliminated the titles of Lecturer and Assistant Professor, Associate Professor or Professor for non-tenure-track faculty, converting existing appointments and making new appointments on a promotion-available teaching-track line from Assistant to Associate to Full Teaching Professor.

Assistant Teaching Professors' contracts may be up to three years in length, up to five years for Associate Teaching Professors and Full Teaching Professors, and all are renewable. Notice of

non-renewal of contracts depends not upon rank but rather upon years of continuous service, with one semester's notice required for non-renewal of teaching track faculty with at least two but fewer than three years' service, and two semesters' notice for teaching track faculty with three or greater years' service. Promotion to Associate is available after six year's service in rank or after five years to Full but is not mandatory: promotion and contract renewal are each separate processes, neither being sufficient nor necessary for the other.

As defined at the university level, for promotion from the Assistant to Associate rank, teaching faculty must provide evidence of excellence in teaching and pedagogy and may include a record of service at various organizational levels within the university. For promotion from Associate to Full, the requirement is for continued excellence in these activities plus leadership in the field of teaching where such opportunities exist. The full description may be found at <https://academicaffairs.syracuse.edu/faculty-affairs/policies-and-procedures/faculty-manual/2-28-non-tenure-track-faculty/>. The university expects for individual schools and colleges to further define the meaning of these terms as appropriate to their respective disciplines. The College of Engineering and Computer Science (ECS) amended the ECS bylaws in 2020 to specify that promotion from Assistant to Associate teaching faculty must have demonstrated both "very high-quality teaching" and secondarily "high quality service," and for Associate to Full, demonstration of "excellence" in teaching and "very high quality service" in addition to leadership where opportunities exist. The bylaws note that teaching may encompass various professional activities relating to undergraduate or graduate education, including classroom effectiveness, lecture and laboratory course development, and adoption of more effective teaching practices, whereas service includes program administration, committee participation, student and student organization advising and organization of pedagogical professional development activities on campus. Neither broader service to the profession nor scholarly activities are required, but they may be considered at the discretion of the candidate. As of spring 2023 a college ad hoc committee was working on additional guidelines for teaching-track faculty and their department and college tenure and promotion committees as to how to evaluate the demonstration of these activities as "high quality," "very high quality," or "excellent."

In the Biomedical and Chemical Engineering Department, all full-time teaching-track and tenure-track faculty participate in all promotion and tenure meetings, and all such faculty with rank are eligible to vote on teaching-track promotion cases. The college tenure and promotion committee is composed of one teaching faculty at any rank, two Associate tenured, and four Full tenured Professors. All with rank are again eligible to vote on teaching-track promotions. However, as of manuscript preparation, there are no Full Teaching Professors in the college, and so the first cohort to apply for this promotion will be voted on solely by four Full tenure-track faculty. The final decision for promotion of teaching-track faculty rests with the Dean. Currently, teaching-track faculty submit similar application packages to tenure-track faculty; however, neither internal nor external letters are required at the college committee level. The ad hoc committee in progress is likely to make recommendations to further differentiate the teaching-track versus tenure-track promotion packages.

Table 3: Comparison of promotion policies across four schools

Institution	Contract duration	Are letters required for promotion	Who votes on promotion	Minimum timetable for promotion	Are guidelines publicly available
Penn State University	Varies based on need	3 letters (can be internal or external)	<i>Department:</i> Departmental Professional track committee <i>College:</i> College Professional Track Promotion Committee Decision by Dean	5 years from Assistant to Associate, no timeline to third rank Promotion not mandatory	Yes
North Carolina State University	Varies (from 9 months to 5 years)	No letters from Assistant to Associate; 5 external letters from Associate to Full	<i>Department:</i> tenured and professional-track faculty with equal or higher rank <i>College:</i> all tenure-track faculty	No minimum timetable. Promotion not mandatory	Yes
University of Pittsburgh	1-2 years for Assistant and Associate ; 1-5 years for Full Professor	3 external letters from Lecturer to Assistant; 6 external letters from Assistant to Associate and Associate to Full	<i>Department:</i> tenured faculty with equal or higher rank; all AS faculty with higher rank. <i>College:</i> All tenure track faculty members and AS faculty on the APTRC who are not from the candidate's department.	3 years for Lecturer to Senior Lecturer or to Assistant. 6 years from Senior Lecturer or Assistant to Associate; 3-5 years from Associate to Full	No
Syracuse University	Up to 3 years for Assistant, up to 5 years for Associate and (Full) Teaching Professor	No letters required at college level (may vary by department)	<i>Department:</i> tenured and teaching-track faculty with higher rank; <i>College:</i> members of T&P committee of 6 tenured and 1 teaching-track faculty with higher rank	6 years from Assistant to Associate 5 years to Full; Promotion not mandatory	Yes

Conclusion

The purpose of this paper was to explore differences and similarities between teaching-focused faculty in chemical engineering departments around the country. We accomplished this through sending a survey to teaching-track faculty and specifically looking at the policies and procedures at four different institutions. Overall, we found that most chemical engineering teaching faculty feel connected and valued and have pathways for promotion. A large number of them teach lab and design, and many serve as advisors, ABET coordinators, undergraduate coordinators, and advisors to AIChE student groups. At least half of these faculty are involved in scholarship (many in engineering education) in addition to their teaching and service responsibilities.

It is critically important that teaching-focused faculty have opportunities for professional development and promotion. Suggestions for professional development support from the surveyed faculty include financial support, mentoring, teaching relief, recognition and opportunities for community building. We also show four examples of promotion pathways for these faculty. There are some differences between contract length, required letters, who votes and timeline for promotion. These may serve as examples to institutions that might not have clear guidelines.

Our hope is that this paper begins a larger conversation about the presence of the teaching track faculty in chemical engineering. We would like to see these faculty clearly counted in national surveys. We would also like to be able to contact faculty who might not be attending AIChE and ASEE conferences so we can include them in our virtual community. Our next steps are to gather more names of teaching-focused faculty in CHE that were not included in this survey and to use a validated tool to address belonging and professional development support.

¹ <https://nces.ed.gov/ipeds/TrendGenerator/app/trend-table/5/51?trending=column&rid=165>

² <https://ira.asee.org/wp-content/uploads/2022/11/Engineering-and-Engineering-Technology-by-the-Numbers-2021.pdf>

³ Bayles, Taryn Melkus. "Alternatives to the tenure track." *Chemical Engineering Education* 54, no. 1 (2020): 14-21.

⁴ Lord, Mary. "Rumbling in the Ranks." *ASEE Prism* 29, no. 2 (2019): 28-32.

⁵ <https://www.insidehighered.com/news/2018/10/01/scores-full-time-non-tenure-track-instructors-were-promoted-last-year-under>

⁶ Rennane, Stephanie, Hannah Acheson-Field, Kathryn A. Edwards, Grace Gahlon, and Melanie A. Zaber. "Leak or link? the overrepresentation of women in non-tenure-track academic positions in STEM." *PloS one* 17, no. 6 (2022): e0267561.

⁷ Doty, Heather, Shawna Vican, and Robin Andreasen. "How to Promote Faculty Advancement for Nontenure-track Faculty." In 2021 ASEE Virtual Annual Conference Content Access. 2021.

⁸ Fitzmorris, Cliff, Deborah A. Trytten, and Randa L. Shehab. "The career pathways of non-tenure-track full-time engineering faculty." In 2018 ASEE Annual Conference & Exposition. 2018.

⁹ Culver, K. C. "Six strategies to support non-tenure-track faculty in professional development." Academic leader (2022).