A Comparison of TA Training Programs Across Multiple Institutions

Ms. Haley Briel, University of Wisconsin - Madison

Haley Briel is an instructional design consultant with the Collaboratory for Engineering Education and Teaching Excellence (CEETE) within the Center for Innovation in Engineering Education (CIEE) at UW - Madison's College of Engineering. Her work focuses on promoting inclusive, evidence-based best practices in teaching for instructional staff and faculty. She is particularly passionate about teaching assistant training as a foundation for graduate students as they begin careers in academia.

Dr. Deesha Chadha, Imperial College London

I currently work as a senior teaching fellow in the department of chemical engineering at Imperial College London having previously worked in academic development for a number of years at King's College London

Mx. Erica Jean Hagen, University of Wisconsin - Madison

Director of the Collaboratory for Engineering Education and Teaching Excellence, part of the Center for Innovation for Engineering Education at the University of Wisconsin - Madison.

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Introduction

Graduate students hold many different and simultaneous roles during their time at higher education institutions (HEIs): student and instructor, mentor and mentee, and University employee and prospective employee for other institutions. This paper explores and compares institutional models for one specific role: teaching assistant (TA), also known as GTA (graduate teaching assistant). While many aspects of graduate life offer discipline specific development and training, teacher training transcends disciplinary boundaries and provides an opportunity to advance broader professional skill development of participants. Advancing institutional models for TA training not only benefits the graduate students employed in those roles, but also lessens the burden on the faculty of record and enhances the quality of undergraduate engineering education.

Nationally, TAs have shouldered an increasing portion of HEI instructional roles over the past several years. At the University of Wisconsin-Madison, for example, the number of TA roles and the percentage appointments held have both increased. From 2022 to 2024, the total number of graduate students employed under the job title "Teaching Assistant" increased from 220 to 240 – an approximate 9% increase in two years (Data Steward Information Request, University of Wisconsin-Madison). The total number of FTE (full-time equivalent) positions increased from 83 to 91[1]. "Many institutions are confronting the challenges of teaching ever-increasing numbers of undergraduate students, whilst coping with serious and mounting resource constraints" (Park, 2004). Over the past 20+ years, graduate students have played a critical role in meeting this instructional need.

Further exacerbating this challenge is that many graduate students prefer research assistantships due to better funding and enhanced opportunities to work with faculty mentors (Shannon, 1998). This phenomenon is referred to by C.J. Sykes as "the historic escape from teaching (THEFT)", in which teaching becomes a secondary faculty pursuit (Shannon, 1998).

Undergraduate students expect high quality instruction, particularly in high enrollment introductory courses where they interact more frequently with TAs than with the faculty Instructor of Record. The relationship between TAs and their undergraduate students offers them a more relatable role model in their discipline and, when a level of mentorship is established, increases a sense of belonging for those students (Clements, 2022).

[1] Note that the number of full time positions is fewer than the total number of individuals employed, as most teaching assistants work under a lower percentage appointment of 33 or 50%.

Effective TA training also helps graduate students develop skills such as self-efficacy in management, student involvement, and instructional strategies (Young, 2008), and has been shown to improve TAs' personal sense of achievement (Brown, 2013). The learners themselves, particularly students in active learning environments, feel more supported when they have access to knowledgeable TAs rather than relying on primary instructors alone (Bent, 2020). When TAs are provided with robust training in teaching and learning, they are being developed into lifelong academics equipped with strong pedagogical skills that they will carry into faculty positions.

Therefore, TA training can serve as a powerful intervention point to alleviate many challenges faced in academia and improve the learning experience for TAs and their undergraduate students. The time to share and establish best practices is now.

Training models vary widely by institution; some rely on regular interactions between an instructor and the single TA, akin to a traditional apprenticeship. Others have college-level training programs, conducted in condensed workshops, facilitated by a team of staff, and presented to hundreds of TAs per semester. Others have ongoing programming throughout the year with a larger sustained time commitment. Each approach requires differing levels of resources and reflects the differences between institution types.

Given the variability of TA training models, the authors sought to gain insight into the current state of training across multiple institutions. In doing so, we demonstrate that there may not be one universally applicable approach to train our teaching assistants, but there is value in sharing knowledge of possible strategies, content and models to localize general practices and suit various academic contexts.

Methodology

This paper contains insights from eight training teams at seven engineering schools. These programs were identified for this study based on existing professional connections and contacts made at the 2024 American Society for Engineering Education conference in Portland, OR and the 2024 POD Network Conference in Chicago, IL.

1. The University of Wisconsin-Madison's College of Engineering
2. Imperial College London's Department of Chemical Engineering
3. Stanford University's Bioengineering and Mechanical Engineering departments
4. Penn State College of Engineering
5. Georgia Institute of Technology
6. Michigan State University
7. Cornell University College of Engineering.

The authors conducted 60-minute interviews with trainers from each institution using a semi-structured interview with a common set of questions (see Appendix A). The purpose was to compare approaches and seek effective practices, needs, and challenges. Interviewees were also provided with an informational sheet explaining how the interview would be conducted, what the expectations were, and how their responses would be shared (Appendix B).

We are most interested in the following categories at each institution:

- Who are the key players of TA training?
- What is the primary program content?
- What are your primary training goals?
- What is the format of your training ?
- What kind of incentives do you use to motivate participation?
- What are your core challenges?

Summarizing and disseminating this information can help other institutions and inform future projects pertaining to ongoing developments in TA training particularly institutions with limited resources. Table 1 summarizes the key facets of this work and full details are included below.

Who are the key players of TA training?

Of the eight programs reviewed for this project, three are administered by a Center for Teaching & Learning (CTL), whether it be at the University-level or College-level, supplemented with some level of graduate student facilitation. An additional three are directly run by graduate students trained by CTL staff. Imperial College London and Michigan State are run by department teaching fellows or the Graduate School, respectively. The greatest takeaway here is that all programs except for Imperial College London (whose training is admittedly shorter and for a small number of participants) do involve current graduate student TAs in training the new cohort of TAs.

Cornell, Michigan State, and Georgia Tech have robust programs to train experienced TAs to develop and run sessions themselves, with support from full-time staff. At Georgia Tech, breakout sessions during the training are facilitated by experienced CTL faculty as well as CTL Graduate Teaching Fellows. Additionally, these Graduate Teaching Fellows facilitate a Spring Orientation Panel. At Cornell, eight graduate students are employed as TA consultants in a year-long appointment to develop workshops for the fall TA training. They work five hours per week distributed throughout that year, with the most intense engagement over the summer. During that time, they are given a framework of required elements for the workshops they will run in the fall: metacognition, active learning, reflection, and so on: “We develop them as

educators and professionals and leaders[...]and they develop the workshops with a rubric of things that need to be in them." Cornell's training workshops are always on the same four topics: Active Learning, Fair & Effective Grading, Group Dynamics & Processes, and Universal Design for Learning. TA consultants, in pairs, choose the topic they want to champion and spend the summer developing a workshop that incorporates the most recent literature. This allows workshops to evolve over time and address pressing needs, but still be offered on standardized topics identified by full-time staff. They are required to create multiple choice questions as "knowledge checks" for participants and to identify learning objectives.

Involving experienced graduate TAs in the training process not only increases buy-in for participants, but gives those facilitators the opportunity to gain experience in developing workshops, designing lesson plans, and creating a community of their own. At Cornell, their trainer considers this a key strength of the program: "I'm really proud of the way our TA consultants come together. They build a community that they don't necessarily get in their engineering programs."

What is the primary program content?

Generally, we found that the topics covered in TA training by our study institutions were remarkably similar. Most programs focus on practical strategies for use in the classroom, rather than theoretical pedagogical frameworks. Graduate students are interested in transferable skills: Stanford's Bioengineering training course, BIOE 296, is marketed informally as such: "we're going to teach you about teaching, but it could apply to any career you pursue, from mentoring undergrads to running a meeting in industry". Popular training topics include grading, inclusive teaching, and leading successful discussion sections. Grading in particular is an essential skill across all TA roles, so most programs have a session dedicated entirely to that topic. At Michigan State, their grading workshop is typically led by a senior level graduate student with multiple semesters of teaching experience. Focusing on transferable skills such as communication and time management serves to combat a challenge that came up in many interviews: because TAs hold such a diversity of roles, it is difficult to create content that every participant finds relatable and valuable. According to our interviewee at Georgia Tech, "We stress that good teaching is good communication, and the knowledge, skills, and competencies they receive at our training are transferable beyond the classroom to other domains".

However, some training programs do feel strongly that presenting foundational concepts in instructional design is essential– even if TAs don't currently have the ability to design courses of their own. Penn State's ENGR 888 course thoroughly discusses learning objectives, backwards design, and strategic course planning. Their 12-week program was developed with early career faculty in mind: "We kind of used what we would want new faculty to know about and then

abbreviated and pivoted and geared it a little more toward students […] it's a lot of the same content". Even if this information isn't directly applicable in most TA roles, TAs may need this information as they mature into faculty roles. However, our interviewee at Penn State did acknowledge that the module they offer on strategic course planning is anecdotally less popular than other content: it is "always one of the least favorites because again, students don't do anything with strategic course planning". A fundamental question exists as to whether TA trainers are responsible for setting the groundwork for TAs' entire careers in academia, or if they should focus on the scope of current job responsibilities.

Cornell's approach is perhaps a balance between these models. While they may not explicitly teach backwards design or how to design learning objectives, they model these practices and call them out directly as they arise during the training sessions: "We articulate why we are using learning objectives, I share the literature [...] they see that modeled in every workshop and I talk about it explicitly."

Many trainers also stressed the importance of inclusivity and accessibility in their sessions. High quality teaching is, inherently, inviting. Students learn best when they feel safe and connected to their instructors and peers. Cornell's trainer shared how she explains this concept to her TAs: "If you are welcoming, if you make them feel valued, if you never make them feel like they are asking something stupid […] remembering what it was like to be a novice learner […] empathy, inclusion, all of that– if you do nothing else right, no other pedagogical tricks, they're gonna open up, they're gonna come back, and you're gonna be there for them. It's not window dressing, it is critical to what you are doing."

Larger, more supported TA training programs offer some required essential sessions attended by everyone, but are supplemented by periods of time during which TAs can choose from several session options, akin to a conference keynote and break-outs. This allows TAs to decide what is most relevant to their current position or interests, and may serve to increase buy-in for participation. The University of Wisconsin-Madison has recently revamped their training requirement for returning TAs (beyond 1 semester of classroom experience). Previously, they were all required to attend the same virtual training session, but now have the option to attend one of 4 total workshop options, or to complete a reflection essay after shadowing or being shadowed by another TA. Michigan State's University-level training offers different tracks for different TAs, including a track geared most specifically toward international TAs and one for new TAs, both international and domestic (called the New Graduate Teaching Assistant Institute). If capacity allows, a mix of required and optional activities can ensure that TAs get some standardized messaging, but also feel like they have agency in determining their own training trajectories.

What are your primary training goals?

All of our institutions were very closely aligned in their goals for the training. One goal that was consistently discussed was creating a sense of community. Stanford University's Mechanical Engineering training course, ME 492, shared two key goals. First, they want their graduate students to be familiar enough with pedagogy-informed practices that they feel a sense of autonomy in the course they are involved with and therefore feel comfortable advocating for themselves and their students. Secondly, they wanted to build a sense of community among TAs.

While the importance of mental health and work-life balance in academia have become more recognized, it remains problematic that graduate students can have dramatically different experiences from one another, largely contingent on the support structures at their institution and the quality of mentorship they receive from their advisors. While some graduate students thrive in highly supportive environments characterized by open channels of communication with faculty and their peers, other graduate students report feeling isolated and lonely as they navigate their degree programs (Kalubi, 2020). TA training can provide an environment to combat those challenges. Stanford's Mechanical Engineering trainer shared that "TAs should know that there are other people in their position, and that there are options for support". Stanford's Bioengineering department trainer echoed this sentiment: "we felt it was really important to have a space where folks could come together and talk about teaching more frequently". Enhancing graduate student empowerment and feelings of agency in their instruction was another frequently referenced theme. Our interviewee at Georgia Institute of Technology said "I am proud that our TAs take away a sense of professional empowerment, knowing that they can (and most do) foster impactful student learning at Georgia Tech".

What is the format of your training?

While goals and content were congruous between institutions, the format of trainings fell into two categories: trainings that were shorter and held before the semester begins, versus trainings that stretch throughout the semester, involving weekly meetings supplemented by a course website. The University of Wisconsin-Madison, Imperial College London, Georgia Tech, Cornell, and Michigan State provide events that are contained to either pre-semester or very early on in the semester, although all of them also offer optional workshops during the semester for just-in-time support. Michigan State hosts teaching professional development events specifically tailored for graduate students every other week. Michigan State and Georgia Tech shared similar models of training design, with a longer in-person version before the Fall semester and a shorter virtual version in the Spring. Stanford's departments and Penn State offered for-credit courses involving weekly meetings, although Penn State only requires three

in-person sessions with asynchronous activities on their course website in between. All institutions used a pass/fail grading system other than Penn State, which uses a letter grading system. A shorter pre-semester training is more logistically achievable for institutions with fewer staff and resources, but a full semester course may be beneficial in its ability to work with TAs as issues arise. The University of Wisconsin-Madison piloted a teaching fellowship for its Electrical and Computer Engineering department in Fall 2024 to provide a weekly, semester-long community for selected TAs to delve more deeply into pedagogy; eight PhD TAs were chosen to participate in that fellowship after submitting an application and were compensated with a stipend.

What kind of incentives do you use to motivate participation?
A troubling finding is that some training programs are not strongly regulated or overseen by higher authorities at their HEIs; they rely on graduate students themselves to determine content, manage administrative tasks such as advertising training and enrolling participants, and actually develop lessons. Stanford's Mechanical Engineering and Biomedical Engineering training programs rely heavily on passionate, internally motivated graduate students. While peer-to-peer learning is an appropriate addition to training and can motivate engagement, a model that uses graduate students as administrators and team leads rather than support facilitators presents an additional burden on individuals who already experience a high workload. Graduate students should not be performing these tasks without mentorship and appropriate financial compensation. There is a clear need for support at the department or college level, not only financially but even in verbal or written acknowledgement that these activities are valuable and celebrated. Our trainer from Stanford's Bioengineering department expressed this sentiment: "I often felt like it would have been useful to have some kind of staff member who can actually oversee [...] As grad students we are limited in how much power we have and what we can actually do. [...] We're not the ones making the TA appointments [...] If a TA is really struggling with the class we have to find the right person to talk to to get them the support they need".

Two institutions differ distinctly from the Stanford experience above, and have authority even beyond their individual institution requiring TA training. Imperial College London is based in the UK and therefore has a national government mandate for training via the Dearing Report of 1998, which established a formal blueprint for teacher preparedness in the UK. Georgia Institute of Technology is a public institution that is a part of the University System of Georgia (USG), whose governing body is the Board of Regents. This group requires training of teaching assistants before they can begin their classroom appointments. The University System of Georgia (USG) Board of Regents states in Policy 8.3.5.2: USG institutions employing graduate assistants shall develop procedures to:

1. Provide appropriate training to support and enhance these assistants' teaching effectiveness;
2. Conduct regular assessments of and annually evaluate, based on written procedures and including results of student and faculty evaluations, of each assistant's teaching effectiveness and performance; and,
3. Assess competency in English and, if needed, provide training in English language proficiency.

Pressing Challenges

Common challenges for TA trainers were: lack of higher level support, lack of participation from faculty, and the difficulty of cultivating buy-in from graduate students, particularly for non-required activities. While University of Wisconsin-Madison, Penn State, Georgia Tech, Cornell University, and Imperial College London have required training sessions and therefore a guaranteed audience, the Stanford courses BIOE 296 and ME 492 are not required and consequently only serve 8-16 graduate students per term. To recruit for BIOE 296, trainers leveraged their own status as PhD students and reached out to peers as well as spreading the word during required first-year bioengineering courses. Students who did enroll appreciated the option to actively prepare for future TA positions: “As first years there is a lack of clarity; ‘I know I have to TA at some point but I am nervous about that, I don’t know what we are going to do, I don’t know when that is going to happen’”. Reaching out to graduate students in-person and in spaces they already occupy, while taking advantage of existing peer relationships seems to be an effective recruitment strategy. The issue of motivating attendance does not only exist for the non-required trainings; The University of Wisconsin-Madison sees decent attendance for their required training, but participation steeply drops off for non-required activities during the semester. Trainers there emphasize the difficulty of recapturing the TA audience once the semester has begun. In Spring 2024, University of Wisconsin-Madison began offering “TA Office Hours” in a heavily trafficked campus building once a week, but attendance has been meager.

A cultural shift in which teaching and learning is valued at our HEIs, particularly R1 institutions, is essential to the success of our TA training programs. While our facilitators express this value during training, it does not carry as much weight when that isn’t reflected in graduate student experiences in other spheres of the University. If tenured faculty are unwilling or unable to participate in activities to develop their teaching skills, it is difficult to expect graduate students to do so. Cornell’s trainer expressed hope and frustration surrounding this topic: “More and more of the new faculty are more interested [in teaching] than they used to be, which is really cool, a really positive thing, but we can only work with faculty when they say ‘I want your help’.”

Recommendations and Conclusions

From the data gathered from the interviews conducted for this paper, we conclude and make the following key recommendations for TA training programs:

1. **Where possible, involve a Center for Teaching & Learning (CTL)** or other full-time staff dedicated to teaching & learning in conjunction with graduate students serving in more facilitative or advisory capacity . Participants respond well to the presence of graduate student facilitators as a relatable source of information, and graduate students have the best knowledge of what other graduate students may need to learn. Michigan State and Cornell University offered excellent models here, in which graduate students are paid a stipend to develop TA training sessions. At Michigan State, these graduate students choose topics they identify as valuable for their peers, whereas Cornell has standard topics they present every year but allow graduate facilitators to choose from those topics and tailor them to account for the newest research. At Michigan State, international graduate students are also heavily involved in international TA orientation as facilitators and panelists.
2. **Offer program options and choice**: Providing an element of participant choice may improve buy-in where TAs have options for certain required sessions that all participants attend along with choices for other sessions that are directly applicable to their individual needs and interests. Short, highly interactive sessions are best received and reflect best practices in classroom activity design.
3. **Focus on community building:** A TA community can counter the isolation felt by many graduate students. TA training can encourage a sense of belonging and peer camaraderie. The most effective sessions are those in which TAs can share challenges, celebrate successes, and brainstorm with one another. This is particularly fruitful when TAs with different levels of experience are able to share real world experiences from their teaching.
4. **Provide feedback:** Graduate students benefit from opportunities to receive feedback on their presentation skills and teaching styles through micro-teaching sessions or peer observations. The opportunity to provide peer feedback is also an important professional skill that can be nurtured through TA training opportunities. The University of Wisconsin-Madison, Imperial College London, Cornell University, and Penn State all use peer feedback activities in some form and have received positive responses from participants. Michigan State has teaching fellowship cohort opportunities for similar interactions.
5. **Ensure ongoing access to materials:** Establish an organizational infrastructure such that TAs have access to asynchronous materials to revisit when issues arise during their teaching appointments. This can also alleviate issues related to TAs being offered

positions after formal training has occurred as it is not uncommon for TAs to be hired right when the semester begins.

Future work will include exploring more about models that involve faculty more closely in the training process. Imperial College London's program is the only one that we reviewed that is run by full-time faculty. Georgia Tech utilizes faculty for breakout sessions at their training, but they don't play a strong role in informing the content that is shared. Minimally, faculty should be aware of and engaged with the content that their TAs are receiving. There exists an interesting opportunity for future programs to offer workshops combining the TAs with new faculty to enhance mentorship opportunities and alignment.

Lastly, we were struck by the passion that these trainers across all institutions have for their graduate students. It was truly inspiring to hear how they spoke about their roles and about the impact their training programs have. One interviewee remarked, "I love the work; it's just so rich and multivariate and complex [...] I think it's really fun work."

Despite no formal requirements, these trainers are responsive to the needs expressed by their students, they seek out new content and materials, and they continue to advocate for these training programs. TA training is a labor of love. There are dedicated individuals who have created high quality content; if they are given the staff capacity, recognition, and financial support, their HEIs will undoubtedly benefit from higher quality instruction and more skilled, more satisfied, and more self actualized graduate students.

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Ms. Sonia Martin, PhD Candidate, Stanford University
Dr. Stephanie Cutler, Penn State University
Dr. Deesha Chadha, Dr. James Campbell, and Dr. Umang Shah, Imperial College London
Dr. Chris Dakes and Erica J Hagen, University of Wisconsin-Madison

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Appendix A: Interview Questions

Below is the document that was shared with interviewees prior to their interviews with our project team.

TA Trainers: Interview Questions

Thank you for being a part of our TA Training project! Below are the questions we would like to discuss during our interview. The questions in **bold** are those of most interest to us.

If you are able to complete the demographic questions ahead of time and email them to Author 1 (email address redacted for anonymity), that would save us time during the interview. However, if time doesn't allow, we will address them during our time together.

Demographics (ideally completed ahead of time):

1. What is your title and department at your institution? What role do you play in your TA training?
2. Who is your training audience? (returning TAs, new TAs, from one course/department or the entire college?)
3. How many people attend your training per semester?
4. How often do you offer your training?
5. What is the format and duration of your training?

A. Training Design:

1. What was the impetus for developing your training? From where did the demand come?
2. **Who or what informs your decisions surrounding what content to include in your training?**
3. **What, in your words, are the key goals of your training?**
4. **What topics are covered in your training?**
5. What materials are provided to the participants, and in what format?

B. Training Management:

1. Who is involved in running the training program? What role do external partners play?
2. **How do you motivate participation in your training program? Is it required?**
3. How do you track attendance, if this program is mandatory?
4. **How do you evaluate the success of your program?**

C. Training Highs and Lows:

1. **What, in your opinion, are the greatest strengths of your program?**
2. **What are your greatest challenges?**
3. **What, if anything, would be helpful to learn from other TA training programs?**

Appendix B: Informational Document

Participants were provided with the following information prior to interviews.

Principal Author: Haley Briel, Instructional Design Consultant, College of Engineering at the University of Wisconsin-Madison

Project Team: Dr. James Campbell, Dr. Deesha Chadha, Erica Hagen, Dr. Umang Shah

Institutions: University of Wisconsin-Madison, Imperial College London

Contact Information: Haley Briel, hbriel@wisc.edu

Introduction: You are being invited to participate in an interview as part of a project conducted by a partnership of University of Wisconsin-Madison and Imperial College London. Your participation is entirely voluntary, and you may choose to withdraw at any time!

Purpose of Study: Our goal is to gather information about how various institutions implement a training program for teaching assistants (TAs). Teaching assistants are the primary point of instruction for many courses in higher education, particularly those with large enrollments; undergraduate students rely on TAs not only for learning subject matter in their disciplines, but also for social support and mentorship. While this role is undoubtedly important, there is little formalized guidance from a higher regulatory authority for how to most effectively train TAs.

We hope to learn how TA training occurs at other higher education institutions, namely:

1. How the size and organizational structure of an institution informs their strategy for training
2. What topics, delivery methods, and resources are most impactful to the TA experience
3. How training is tracked and enforced if required, or how it is incentivized if not required
4. What challenges are faced by trainers, which may inform future research projects or bring light to opportunities for resource sharing between individuals doing this work

Procedure: As an interviewee, you will receive this consent form as well as a list of the questions that will be posed during the interview 2 days prior to the scheduled interview. If possible, you can complete the "Demographics" questions on the question list ahead of time and send them to Haley Briel via email.

The interview will take place via Zoom and last anywhere from 30-60 minutes. The interview will be recorded so that members of the project team who are not present can review it later, and so that direct quotes can be used for the body text of our paper. No one outside of the project team will view the recording.

Due to the small number of interviewees, broad anonymity cannot be guaranteed. However, if an individual requests anonymity for a particular quote or topic, we are happy to discuss that option.

Sharing of Publication: Both the draft paper and final will be shared with interviewees prior to publication and open for comments. Interviewees will be recognized in the "Acknowledgments" portion of the paper.

We will be presenting this paper at the 2025 American Society for Engineering Education (ASEE) Conference in Montreal.

Benefits to Participation: This interview is intended to be a conversation between trainers. Those conducting the interviews actually facilitate training themselves, so interviewees will potentially learn from those models. We hope that this process will allow us to troubleshoot and share relevant resources to improve all of our programs!

We would love to see you at the 2025 ASEE Conference in Montreal! We plan to create space for TA trainers attending our session to meet one another and potentially arrange communication channels for future resource sharing.

	Players Involved	Training Format	Key Topics	Participant Incentives	Greatest Strengths	Pressing Challenges
University of Wisconsin-Madison	College-level CTL with some grad student facilitation	College level training. Pre-semester in-person required sessions, optional supplemental workshops throughout semester.	Engaging students, grading/feedback, professional boundary setting, presentation skills, implicit bias.	Required for both new and returning TAs, but enforced at the department level. Optional University level teaching certificate available.	Highly interactive, involvement of experienced TAs as facilitators. Flexible options for returning TA training.	Motivating participation beyond required activities, difficulty tailoring content to a variety of TA roles, small staff involved in running training.
Imperial College London	Department teaching fellows	Department level training. Pre-semester in-person required sessions, optional supplemental workshops throughout semester.	Presentation skills in an educational environment, giving and receiving feedback.	One session is required. HE Academy accreditation available but optional.	Opportunities for TAs to receive and provide feedback, development of critical awareness.	Time and resources– this is an add-on task for staff that is not allocated into usual teaching expectations.
Stanford University, Department of Bioengineering	Graduate students trained by University-level CTL	TAs attend University level training. Department runs a short orientation training, optional course offered throughout the quarter.	Rubrics, universal design for learning, culturally responsive teaching, transferable skills e.g. feedback.	No formal/external incentives for the optional quarter-long course.	Designed and created by graduate students. Relatable peer-to-peer learning experience.	Lack of departmental support and full-time staff, lack of requirement for training.
Stanford University, Department of Mechanical Engineering	Graduate students trained by CTL with faculty advisor oversight.	Department level training. Non-required course offered during the winter quarter. Attendance at University-level training is not enforced.	Facilitating lab based classes, project based learning, running discussions, inclusive classrooms	No formal/external incentives.	High engagement by participants in the course and strong support from the graduate student community.	Lack of departmental support, lack of requirement for training, difficulty tailoring content to a variety of TA roles.

Penn State, College of Engineering	College-level CTL with some graduate student facilitation	College level hybrid training held throughout the semester (12 weeks).	Parallel topics to University of Wisconsin-Madison, but also addresses strategic course design such as backwards design.	Required, but no strong enforcement mechanism.	Teaching concerns activity and well structured reflection prompts.	Buy-in, when to give information, relevance to future career, getting engagement in hybrid setting, connections between new TAs and faculty/experienced TAs
Michigan State, College of Engineering	The Graduate School with robust graduate student facilitation.	University level training. Fall training is 2.5 days in-person before semester begins, abbreviated version offered virtually in the Spring.	Student success, grading, communication, boundary setting, how to lead lab sections and recitations, FERPA, international TA special interest topics.	University-level teaching certificate available but optional. Training is not mandatory.	Strong partnerships with graduate students who are compensated to run sessions, many options provided for flexibility and enhanced participant buy-in.	Last-minute appointments made for TAs means that some folks are hired after the pre-semester training has ended.
Georgia Institute of Technology, College of Engineering	University-level CTL with robust graduate student facilitation.	University level training, half day before the fall semester begins. Virtual TA panel in spring. Optional supplemental workshops offered throughout the semester.	Communication skills, supporting student well-being, FERPA and other important legal policies, grading, inclusive teaching, tips for remote education, international TA orientation.	The University System of Georgia (USG) requires that all TAs receive training before their position begins. Strong name recognition for the program.	Focus on evidence-based practices, professional empowerment of TAs.	Communicating to partners and the broader Georgia Tech Community the significance and value of training TAs.
Cornell University, College of Engineering	Graduate students trained/mentored by College-level CTL.	College-level training; 2 4.5-hour sessions before semester begins with asynchronous components.	Implicit bias, active learning, fair & effective grading, group dynamics & processes, and universal design for learning.	Dean requirement for PhD TAs to be trained, but enforced by departments.	Robust training for graduate consultants, community building, a process that is iterative and data driven.	Buy-in from faculty, TAs, and higher institutional forces.