Engineering Education Transformations Institute
UNIVERSITY OF GEORGIA

The Engineering Education Transformations Institute

The University of Georgia

Application for the Regents' Teaching Excellence Award for Department or Program

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USG Regents' Teaching Excellence Awards for Department or Program Committee
270 Washington Street SW
Atlanta, GA 30334

Dear Members of the Teaching Excellence Awards for Department or Program Committee,

It is a pleasure to write this letter of support on behalf of the Engineering Education Transformations Institute (EETI) in the College of Engineering (CENGR) for the USG Regents' Teaching Excellence Awards for Department or Program. Since 2016, EETI has served as a central unit within the College of Engineering to promote instructional excellence, collaborative professional development opportunities, and innovative education research initiatives. Today, EETI is a dynamic, welcoming institute that supports engineering education through engagement with faculty, staff and students. For these reasons and more, I believe that EETI is highly deserving of the Teaching Excellence Awards for Department or Program.

Fundamental to the mission of EETI is the integration of engineering education research and practice. To achieve this goal, EETI not only assists faculty in the implementation of effective instructional strategies but also offers rewards and assistance for engineering education research. In collaboration with the Center for Teaching and Learning, EETI hosts Faculty Learning Communities, providing a space for discourse on topics such as SoTL methods or student metacognitive awareness. EETI faculty are also invited to participate in the Engineering Education Research Incubator, or "EETIncubator," in which faculty, staff, or students can join a supportive cohort to develop an engineering education project and receive research initiation grants or travel fellowships.

Another highlight of this exceptional institute is its devotion to the student engagement with engineering education. For instance, EETI invites undergraduate students to work on nationally funded engineering education projects. Additionally, EETI offers the only Engineering Education doctorate program in Georgia. Students in this program benefit from the teaching and learning course for new graduate teaching assistants and the Dean's Engineering Education Fellowship award.

EETI's inventive programming has earned the program national recognition. In 2019, the American Society of Engineering Education (ASEE) awarded the program the "Best Paper Award" for the description of EETI's vision and impact on faculty development. The program was also awarded a NSF EHR core award ($1M) to increase capacity in STEM education research methods. Based on these recent accolades and EETI's local impact on engineering education, I believe that this program is highly deserving of the Teaching Excellence Awards for Department or Program.

Sincerely,

S. Jack Hu

Narrative Statement

Purpose and Philosophy

Seeing an opportunity to bolster student success through a focus on teaching and learning in its newly minted College of Engineering, UGA founded the Engineering Education Transformations Institute (EETI) in 2016. While the proliferation of engineering education (ENED) graduate research programs over the last 15 years have successfully made ENED into a viable research discipline, these research programs often lack the integrated infrastructure with local engineering departments to systemically improve undergraduate ENED. By contrast, EETI functions as a center of (ENED) research that builds capacity for engineering education by actively engaging faculty, staff, and students in teaching and learning projects. EETI's six ENED research faculty work closely with personnel across the College to cultivate interest and community around ENED work, culminating in personnel-led projects that contribute toward teaching excellence in UGA's College of Engineering. EETI is a first-of-its-kind program in the United States that aims to fully integrate a multifaceted ENED research program with technical engineering departments, ultimately improving student experience through local innovations in teaching and learning.

Goals of the Institute

In order to support student success through excellence in teaching and learning throughout the College, EETI was founded with three overarching goals:

1. Integrate engineering education research and practice by providing encouragement and support for faculty, staff, and students to engage in the Scholarship of Teaching and Learning (SoTL)—ENED research designed to assess and improve teaching and learning initiatives—in their UGA work.
2. Build capacity in engineering education by developing and nurturing a College-wide community of engineering personnel engaged in educational innovation and research.
3. Establish and grow an incentive structure that rewards faculty members who demonstrate an interest in teaching and learning, and provides resources that enable them to pursue innovative engineering education projects.

Key Strategies

To achieve our goals, EETI's semesterly programming includes activities that help translate faculty interests in teaching and learning into actionable learning, teaching, and ENED research projects. These activities include building active learning and support communities among faculty, offering our research expertise to advance faculty SoTL projects, providing other resources and rewards to encourage faculty engagement with research-based teaching and learning, and including students in engineering education projects.

Faculty-Facing Initiatives

EETI's primary means of improving teaching and learning excellence is through faculty development initiatives. These activities are attended primarily by faculty, but are also open to and attended by several staff and students.

Engineering Education Forums. EETI's Engineering Education Forms (EEFs) are our flagship engineering education capacity-building events in the College of Engineering. They are large,

interactive, monthly seminars that bring together 30 or more personnel in the College to learn about key topics in engineering teaching and learning such as equity, diversity, inclusion, assessment, motivation, and educational technology. They allow opportunities for faculty workshops, interactive discussions around topics of faculty interest, and guest lectures. In addition to faculty-led seminars, we have hosted invited speakers from The National Academies and cutting-edge educational technology companies, in addition to internationally renowned educational scholars. EEFs are well-attended by faculty across all schools in the College of Engineering, and also attract staff members who work in the areas of undergraduate advising, student success, and institutional assessment, as well as graduate students interested in engineering education.

Faculty Learning & Support Communities. In addition to our flagship EEFs, EETI also hosts several formal and informal activities to cultivate smaller, more focused engineering education communities. Some of the most popular activities are the **faculty learning communities** (FLCs) that EETI leads in collaboration with UGA's Center for Teaching and Learning. These FLCs bring together faculty and graduate students from the College of Engineering and beyond every two weeks to have research-based discussions around teaching and learning topics of interest, such as educational theory, SoTL methods, and providing metacognitive support for students. These FLCs have resulted in numerous classroom innovation projects in which faculty apply what they learned in the FLC to their own teaching.

Informal community-building activities are led by College faculty rather than EETI leadership. They include weekly **peer mentoring meals,** which are particularly popular with instructional faculty, and monthly **book club meetings,** which provide books around educational topics to interested faculty and support progress through those books via regular discussions of chapters.

Research Initiation Grants and Travel Fellowships. EETI provides funding to College personnel to reward and support individuals who desire to pursue engineering education projects and connect with national educational communities. Our **research initiation grants** are internal mini-grants ranging from $2,000 to $4,000 that support lecturers, tenure track faculty, instructors, and staff in initiating SoTL research and innovation efforts. Through these grants, EETI has supported twelve engineering faculty members to initiate SoTL projects, most of which are still ongoing, and two of which have culminated in funded NSF grants. Our **travel fellowships** are competitive internal grants that provide full funding for lecturers, instructors, tenure-track faculty, and staff applicants to attend major educational conferences, such as the American Society for Engineering Education (ASEE) Annual Meeting and the Teaching Professors Conference. These fellowships have funded 21 attendees over the past three years, many of whom would not have been able to afford attendance otherwise.

Engineering Education Research Incubation. As a complement to our research initiation grants, EETI hosts a weekly "EETIncubator" in which faculty, staff, and students who are working on a specific idea in engineering education can develop their projects as part of a supportive cohort that leverages the methods and grant-writing expertise of EETI's engineering-education-focused faculty. The EETIncubator has served over 20 College personnel in this capacity, and many of these projects have received internal or external funding to continue to make an impact on local students. For example, two faculty participants applied for and successfully received funding from UGA's Office of Institutional Diversity to engage in recruiting and mentoring efforts for underrepresented groups from local K-12 schools.

Student-Facing Initiatives

EETI also features several activities and resources directed toward graduate and undergraduate students to engage them in ENED practice and research. In addition to faculty-and-staff-oriented programming, EETI offers diverse opportunities to engage students in engineering education. For example, EETI houses the state of Georgia's first and only **Engineering Education Ph.D. program**, providing an affordable, unique graduate experience in a burgeoning research area for Georgia residents. We also support graduate students outside our own program by leading the College's **teaching and learning course** for new graduate teaching assistants. Additionally, this year, we will begin offering the **Dean's Engineering Education Fellowship**, an award for technical-oriented graduate students who want to gain experience in engineering education research and practice via engaging in a local SoTL project. Finally, we work to include undergraduate students as well, with EETI hiring several undergraduate students to work with our leadership on nationally funded engineering education research projects.

Assessment and Continuous Improvement

We define quality in terms of the development of communities and resources that support faculty, staff, and student engagement with engineering education. We have intentionally allowed the activities in EETI to grow organically. This has allowed EETI to take an iterative and adaptable approach to our selection of activities, ensuring the needs of College faculty, staff, and students are held paramount. For example, when our members expressed an interest in student peer- and self-grading, we built an engineering education forum (EEF) around the topic.

However, as participation has grown to a critical mass, we have implemented more formal processes for assessing our programing through surveys of faculty and staff. For example, a survey of College personnel in Spring 2019 indicated a strong interest in topics around inclusion and diversity, and we have accordingly structured our Fall 2019 engineering education forums around this theme. Also, a call to College personnel at the beginning Fall 2019 semester resulted in several faculty expressing interest in engineering education research, prompting us to offer our EETIncubator more frequently. We also employ a College advisory board consisting of faculty and department chairs to receive regular feedback on our programming.

As EETI continues to grow, we are in the process of developing a network-based assessment method to better determine our systemic impact on the College's faculty, staff, and student communities around teaching and learning. Such systems-level assessments are rare, and much needed in engineering education centers, and we are excited to learn what our results will yield.

Summary

The Engineering Education Transformations Institute (EETI) is a unique program that integrates the expertise of an engineering education research program with the student impact of technical engineering departments to improve teaching and learning experiences for students. Through a blend of large and small community-building activities, support via expertise and resources, and student-oriented programs and practices, over the past three years EETI has successfully and sustainably engaged faculty, staff, and students across UGA's College of Engineering in the continual improvement of teaching and learning practices in the College. Our flexible approach in responding to faculty, staff, and student interests has led us to build a passionate community of engineering educators, creating an environment that embodies the commitment of UGA and USG to student experience and teaching excellence.

Fact Sheet

Creation: The Engineering Education Transformations Institute was formally approved in the Fall of 2016 and provides a home for the excitement, diverse discussions, and ongoing initiatives around engineering education. We focus on building community and shared capacity around the scholarship of teaching and learning that will allow us to improve our own teaching, innovate in our courses and curricula, and conduct empirical investigations to better understand our students' experiences.

Leadership: EETI is led by Joachim Walther, Director, Nicola Sochacka, Associate Director for Research Initiation and Enablement, and John Morelock, Associate Director for Educational Innovation and Impact. Three tenure-track faculty members, Nathaniel Hunsu, Racheida Lewis, and Dominik May contribute expertise based on their own research areas; and Virginia Bacon Talati, institute manager, coordinates various activities.

Activities: EETI provides several professional development activities including

- Engineering Education Forums: Monthly venues with a featured speaker or panel exploring key topics in engineering teaching and learning.
- Teaching and Learning Communities: Biweekly formal and informal settings to discuss teaching and learning as well as the scholarship of teaching and learning. Two of these, peer mentoring meals and book club, are led by EETI participants rather than leadership.
- Research Initiation Cohorts: A thriving ecosystem of engineering education researchers through the mentorship of technical staff who wish to pursue ENED or SoTL research. The cohorts are supported through regularly scheduled meetings and grant opportunities.
- Travel Fellowships: Supports technical faculty to travel to engineering education conferences. Participants share their experiences with the college community.

Membership and participation: To promote a welcoming and inclusive environment, no formal membership process exists, but participation is recorded. The tables below show the overall role demographics of our participants, as well as the percentage of faculty and staff from each of the College's three schools that have participated in at least one EETI initiative.

2018-2019 EETI Participation Data

Participant Demographics by Role	
Tenure Track Faculty	24%
Lecturer Faculty	20%
Professional Track Faculty [a]	9%
Staff	18%
Student/Post-Doc	20%
[a] Clinical faculty and research scientists	

Participation rate of each school and staff	
Environ., Civil, Agricultural, & Mech. Faculty	60%
Electrical & Computer Faculty	48%
Chemical, Materials, & Biomedical Faculty	50%
Student-Facing College Staff [b]	65%
[b] Staff whose roles interface directly with students or have a direct impact on student success.	

SoTL Research Participation by Technical Faculty: Approximately 20 technical faculty (i.e., faculty specializing in technical engineering disciplines, not ENED) have participated in 3 semesters of the EETIncubator. EETI has awarded $78,000 in research initiation grants. Collaborations with technical faculty have also resulted in several conference papers, 2 peer-reviewed journal articles, and $550,000 of NSF funding.

Collection of Evidence: Faculty Impact

EETI offers several regular events that help faculty build communities around best practices and innovations in engineering teaching and learning, and that ensure high-quality formative experiences for our students via faculty engagement in educational research. While most participants are faculty members, we intentionally design initiatives to be of broad interest to College of Engineering staff and students. The intermingling of these participant groups has led to the rise of robust and evolving cohorts of pedagogically engaged faculty, staff, and graduate students whose efforts have impacted dozens of courses at UGA. The table below summarizes these initiatives.

Overview of faculty-facing programming

Opportunity	Structure	Community Size	Frequency	Focus
Engineering Education Forums	Formal	Large	Monthly	Teaching/Learning
Faculty Learning Communities	Formal	Small - Medium	Biweekly	Teaching/Learning
Peer Mentoring Meetings	Informal	Small	Every 1-2 weeks	Teaching/Learning
Book Clubs	Informal	Small	Monthly	Teaching/Learning
EETIncubator	Informal	Small	Weekly	ENED Research

Additionally, in order to ensure that the education of our students remains a top priority in the College of Engineering, EETI offers competitive programs to reward faculty who engage with engineering education with unique opportunities and financial incentives, summarized in the table below.

Overview of faculty-facing reward and incentive programs

Opportunity	Purpose	# Annual Awards	Award Amount
Research Initiation Grants	Piloting new ENED research	2 to 7	$2,000 - $13,000
Travel Fellowships	Travel to educational conferences	4 to 9	$2,000 - $2,250

Engineering Education Forums

The engineering education forums are EETI's flagship educational development events, comprising the most well-attended and diversely attended activities in EETI's programming. The forums are interactive, monthly seminars that bring in local, national, and international speakers to kickstart conversations about important issues in engineering education and share valuable resources and teaching innovations to improve undergraduate education. As EETI tailors its semesterly programming to address member needs and interests, forums have covered a multitude of topics, including equity, diversity, inclusion, assessment, motivation, educational technology, and both traditional and nontraditional engineering career paths. The diverse participation in forums—including faculty from tenure, lecturer, and professional tracks, as well as staff and graduate students—is indicative of the unique community EETI has established around teaching and learning, and allows new educational topics and ideas to be explored from many angles to improve student experience in multiple ways.

Descriptions and Participation Data from Select Forums

Forum Date	**Description (from invitation to Forum distributed to members)**						
2/12/2018	Avneet Hira from Purdue's School of Engineering Education will facilitate an interactive workshop on ***"Teaching for Equity in Engineering Education"***. We are very excited to offer a workshop on this topic that connects with many of our prior conversations and initiatives in EETI and is broadly relevant for faculty, staff, and interested graduate students.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	6	7	4	7	2	3	**29**
2/27/2018	For this interactive workshop, we have the pleasure of welcoming Amy Hermundstad Nave from the Department of Engineering Education at Virginia Tech. The workshop on ***"Preparing Professional Engineers: What's needed? What's missing? And how do we fill the gap?"*** connects to ongoing conversations and activities in EETI and will also offer practical insights for faculty and staff.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	9	6	2	6	2	4	**29**
3/5/2018	This forum features a highlight of our programming this semester and we are fortunate to have J. Rashad Small, Senior Coordinator at the UGA LGBT Resource Center, and Stephen Secules (EETI) facilitate **an interactive workshop on LGBT identities in engineering**. We will learn about the experiences of LGBT engineering students and brainstorm ways to make our educational spaces welcoming for them.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	6	3	3	12	2	3	**29**
3/27/2018	The **Engineering Education Showcase** is in its third installment and has been the definitive highlight of EETI programming in past semesters. During the showcase, a group of College of Engineering faculty and educational innovators will share some of their ideas and initiatives. This is a great opportunity to hear about exciting developments in the College, get inspired to try new things, and celebrate our shared passion for student learning and development.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	4	6	3	9	3	3	**28**
10/1/2018	In this interactive forum, you will be invited to engage with 20 **Classroom Assessment Techniques (CATs)** that ALSI participants are using in their classrooms. We will also be giving out a range of materials (books, timers, whiteboard markers…) gifted to the College from the CTL because of our high rate of participation in the "Active Learning Snapshot Survey," which was conducted in the Spring. Come prepared to interact with other members of EETI, learn about CATs, and have fun!						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	6	5	3	1	4	4	**23**

10/29/2018	We would like to invite you to a **distinguished seminar and workshop** by an internationally renowned, remote laboratory expert, **Pablo Orduña**, Co-founder & CEO at LabsLand. Pablo Orduña will speak about recent developments, current trends, and future opportunities in the area of remote labs from the research and development perspective. Furthermore, this Forum will offer the opportunity for individual hands-on experiences with a diverse set of existing remote labs and joint reflection on future opportunities to include this innovative laboratory learning approach in the College						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	3	6	3	1	5	2	**20**
1/29/2019	In this interactive forum, John Morelock will introduce five variables from Brett Jones' **MUSIC Model of Motivation** that have been shown in research to affect students' motivation to learn and excel in class. Forum attendees will have the opportunity to reflect upon and share how these variables have manifested in their own lives and classes, brainstorm low-cost ways to further improve student motivation in their courses, and discover methods of assessing student motivation. This workshop topic was selected by EETI members in a recent survey.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	3	8	3	3	1	2	**20**
4/22/2019	We would like to invite you to a **distinguished speaker seminar by Dr. Beth Cady**, Senior Program Officer at the National Academy of Engineering. During this seminar, Beth will (1) present information from recent NAE projects that examined how engineering professional societies can better engage with undergraduate engineering education, the educational and career pathways of engineers, and furthering diversity and inclusion in the engineering workforce; and (2) how this information can be incorporated in engineering education.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	7	5	5	3	2	4	**26**
9/30/2019	In this interactive forum, a panel of College experts and activists on the important and timely topic of **diversity and inclusion in engineering education** will share their knowledge and experiences. The panel will feature Dr. Robert Baffour (leader of DeLTA project teams in the College of Engineering), Dr. Racheida Lewis (engineering education scholar and former NSBE National Vice Chair), and Mr. Devin Shelton (undergraduate Vice President of UGA's NSBE chapter). This is an excellent chance to learn about and engage with some of the excellent work on diversity and inclusion currently taking place in our College, and to inquire about how we can make the College a more diverse and inclusive place for all our students.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	6	9	4	3	6	1	**29**

Faculty Learning Communities

While EETI's forums serve as spaces to introduce ideas and build large-scale community, our faculty learning communities (FLCs) cultivate smaller communities that explore a particular topic in greater depth each year. FLCs typically meet biweekly, are led by an engineering education faculty member who finds and distributes relevant readings, and involve discussions of these readings **with the goal of applying the knowledge gained to improve education in the College of Engineering**. Below is a list of FLCs to-date and associated participation data.

Descriptions and Participation Data from FLCs to-date

Year	Description (from EETI flyer)						
2017-2018	The purpose of this FLC will be to collectively explore the notion of **SOTL as a set of "habits of mind"**. We will do this by engaging with relevant literature and sharing efforts to improve our teaching practices. The goal of the group will be to articulate a discipline-specific understanding of SOTL habits of mind, and to provide examples of them from our shared practice. We will aim to publish our process and findings in a conference paper and/or journal article. The long-term goal of the FLC is to lay the foundation for a College-wide transformation to a culture of SOTL. Membership will be open to faculty members from across the three schools in the CENGR.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	3	6	3	--	--	2	**14**
2018-2019	John Morelock will run an FLC that meets for breakfast every other week on Tuesday mornings from 8-9am. The topic of this FLC is **educational theory and how to apply it to teaching**. Each FLC will include one pre-reading around a particular theory (no longer than a journal article) and involve a guided discussion about the reading and how to apply the theory or framework to practice. The first meeting will take place on February 6, where the topic will be Bloom's Taxonomy and Kolb's Learning Cycle.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	2	4	4	1	1	1	**13**
2019-2020	EETI will run an FLC in conjunction with UGA's Center for Teaching and Learning that meets for breakfast or lunch every three weeks. The topic of this FLC is learning how to **incorporate metacognition into your classroom**, helping your students examine their learning strategies to improve as lifelong learners. Participants in this FLC will learn about key facets of metacognition as a concept and helpful classroom tools for promoting metacognition, and have opportunities to apply and process results from metacognition-promoting tools in their classrooms under the wing of a supportive community of colleagues.						
Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	4	6	5	1	1	4	**21**

Peer Mentoring Meetings

Peer mentoring meetings are informal gatherings over breakfast or lunch that occur every 1-2 weeks. Like the book clubs, peer mentoring meetings are organized and led entirely by EETI members, and are particularly popular with lecturers. Peer mentoring provides an opportunity for new faculty to **acclimate to teaching excellence at UGA**, and for experienced faculty to vet new ideas and **innovate to improve undergraduate education**.

Several early and mid-career faculty in the College of Engineering meet for informal peer mentoring breakfast/lunch every week and you are invited! The first such breakfast this semester will be at **Mama's Boy** on **08/20** (Tue) at **8:00 am**. *This is completely voluntary - faculty attend these breakfasts as frequently as they wish.* ***Please let me know if you wish to be added to the emailing list****.*

An example of an invitation to peer mentoring breakfasts sent to College faculty

2019 Participation in Peer Mentoring breakfasts

Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	5	8	3	--	1	1	**18**

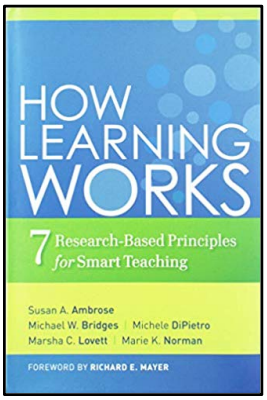
Book Clubs

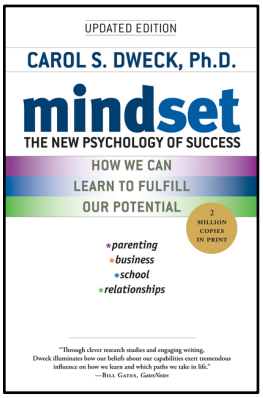
EETI's book clubs offer an alternative opportunity to connect with smaller communities around teaching and learning by delving deeply into particular works around educational theory or practice. Book club meetings are organized and led entirely by EETI members rather than EETI leadership, and are a testament to the excitement of EETI members to **further their development as educators and bolster engineering student experience**. Book clubs meet monthly, and members have thus far read three books around the topics of learning theory, academic mindset, and college teaching strategies.

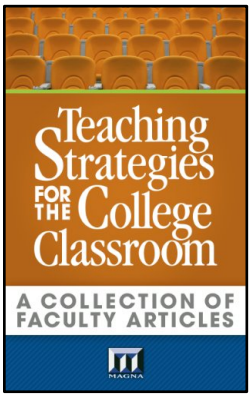
2019 Participation

Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	3	5	3	--	1	1	**13**

Books discussed to-date







EETIncubator

EETI hosts a weekly "EETIncubator" in which faculty, staff, and students who are working on a specific idea in engineering education can develop their projects as part of a supportive cohort that leverages the methods and grant-writing expertise of EETI's engineering-education-focused faculty. The purpose of the EETIncubator is to build the community's shared capacity to empirically investigate novel teaching and learning approaches as well as initiatives that support other important strategic directions of the College, such as our commitment to diversity and inclusion. In these ways, the EETIncubator makes an important contribution to ensuring that our faculty provide high quality and evidence-based professional formation experiences for our students.

2019 Participation

Participation Data	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
	2	4	3	1	1	1	**12**

Results of Incubation

Many EETIncubator projects have received internal or external funding to continue to make an impact on local students. A list of funded projects that have come out of this initiative is provided below. These projects are led by faculty whose primary area of research is not in engineering education, that is, they are projects that have emerged as a result of EETI's community and capacity-building efforts.

Internally funded projects

"Expanding Diversity in STEM through a Recruitment, Preparation, and Outreach Program for African American Community in the Atlanta Metro Area" Led by Dr. Robert Baffour, a professor of practice in the School of ECAM, UGA Office of Institutional Diversity (OID), $10K, 2017.

"Recruitment of local underrepresented groups through local STEM clubs with undergraduate mentors from the UGA chapter of the National Society of Black Engineers (NSBE)" Led by Dr. Ben Thomas, a lecturer in ECAM, in collaboration with Dr. Joachim Walther, the director of EETI, and UGA NSBE Club president, Andrea Duncan, $10K, 2017.

Externally funded projects

"A Mixed Methods Approach to Examine and Foster Academic Resilience in Undergraduate Engineering Students" Led by Dr. Peter Carnell, a professor of practice in ECAM in collaboration with Drs. Nicola Sochacka and Nathaniel Hunsu, a research scientist in ECAM and assistant professor in ECE, respectively, National Science Foundation (NSF), $200K, 2019.

"An Investigator Development Plan for Building Capacity to Explore Diverse Microcultures in Graduate Engineering Research Laboratories" Led by Dr. Cheryl Gomillion, an assistant professor in CBM, in collaboration with Drs. Nicola Sochacka and Joachim Walther, NSF, $350K, 2019.

Other Example Initiatives

While the EETIncubator has been successful in attaining internal and external funding, EETI is careful to frame the success of the EETIncubator program as function of the diversity of both its participants and projects. Below we provide evidence of this diversity through a list of other example initiatives that have been a focus of the EETIncubator program:

"The Impact of Goal-Setting during Student Advisement Sessions on Academic Performance, Study Skills, and Happiness in Major" Led by Carlie Cooper, an advisor in the School of ECE in collaboration with Dr. Fred Beyette, the ECE School Chair.

"An Empirical Investigation of the Impact of the Engineering/ German program on Students' Professional Formation" Led by Drs. David Stooksbury and Tom Lawrence, a full professor and professor of practice, respectively, in the School of ECAM.

"Integration of Technical Writing and Capstone Design" Led by John Brocato, a lecturer in technical communications in the School of CMBE.

Conference participation and awards

EETI's efforts to support a vibrant culture around scholarly teaching and learning has resulted in a high level of participation at American Society for Engineering Education's (ASEE) annual conference and exhibition (College of Engineering had more than 20 attendees ASEE in both 2018 and 2019).

Academic Change from Theory to Practice: Examples from an Engineering Faculty Development Institution
Drs. John Morelock & Nicola Sochacka
Best paper, Faculty Development Division, ASEE 2019

Facilitating Collaborative Engineering Analysis Problem Solving in Immersive Virtual Reality
Mr. Alex Tuttle, Drs. Siddharth Savadatti & Kyle Johnsen
Best paper, Computers in Education Division, ASEE 2019

In addition, at ASEE 2019, EETI members received two best paper awards, which reflects CENGR's growing reputation as an engineering college that is at the cutting edge of engineering education.

Research Initiation Grants

EETI's research initiation grants are internal mini-grants ranging from $2,000 to $13,000 that support EETI members in initiating SoTL research and innovation efforts. Since the inception of EETI in 2017, we have given out 9 grants to 12 faculty across the three Schools in the College totaling $78,000. These projects have impacted student experiences in seven undergraduate courses. These in-class impacts have ranged from increasing student awareness of professional skills in core engineering courses, to developing augmented reality experiences to help students design renewable energy solutions. These grants have also provided the funds to investigate underrepresented, graduate students' experiences in research labs, as well as the experiences of undergraduate students who transition from other colleges across the state to our engineering programs.

Year	Awardee	Amt	Outcomes
Spring 2017	Peter Carnell, Professor of Practice	$2K	A conference paper, 2 x journal articles that are under review, and an NSF RIEF award of 200K in 2019.
Fall 2018	Cheryl Gomillion, Assistant Professor	$4K	NSF EHR award of 350K in 2019.
Fall 2018	Eliza Banu, Lecturer	$4K	A conference paper and the initiation of a College-level team, including the Associate Dean for Academic Affairs, to improve the experiences of students who transfer to study engineering at UGA.
Spring 2019	Adel Alweshah, Lecturer	$10K	Developed, applied, and evaluated augmented reality lab for circuit building in introduction to electrical engineering course
Spring 2019	Brock Woodson, Associate Professor & Eliza Banu, Lecturer	$13K	Developed, applied, and evaluated interactive remote laboratory for energy loss in pipe systems
Spring 2019	Sudhagar Mani, Associate Professor	$12K	Developed, applied, and evaluated remote lab for ENGR 4490 - Renewable Energy Engineering course
Spring 2019	Grace Pokoo-Aikins, Lecturer	$10K	Developed, applied, and evaluated remote lab for an experimental module on one-dimensional, unsteady-state diffusion of liquids
Spring 2019	Mark Trudgen, Lecturer	$10K	Developed, applied, and evaluated remote lab for visualizing control theory in electrical engineering

Spring 2019	Kyle Johnsen, Associate Professor; Robert Baffour, Professor of Practice; & Stephan Durham, Associate Professor	$13K	Developed, applied, and evaluated fully immersive virtual reality setting for land surveying lab

Travel Fellowship Awards

An important factor to continual improvement for our faculty is continued engagement with the national engineering education research and practice communities that innovate and evaluate new teaching practices. Accordingly, EETI sponsors a competitive travel grant program for faculty to attend national educational conferences, including the American Society for Engineering Education's (ASEE's) Annual Conference and Exposition, and the annual Teaching Professors Conference. All faculty are welcome to apply for this award, though EETI prioritizes applications of lecturers and professional-track faculty that would otherwise by unlikely to attend these conferences due to a lack of external funding. Below are data on the growth of the travel fellowship program from 2017 to 2019.

Award Recipient Data

Award Year	Tenure-Track	Lecturers	Prof. Track	Staff	Students	Other	**Total**
2017	--	2 ($4K)	2 ($4K)	--	--	--	**4 ($8K)**
2018	1 ($2K)	5 ($10K)	2 ($4K)	--	--	--	**8 ($16K)**
2019	2 ($4.5K)	6 ($13K)	1 ($2.2K)	--	--	--	**9 ($19.7K)**

Faculty Teaching Awards by EETI Members

Faculty participants in EETI activities have won several teaching awards, exemplifying excellence in undergraduate education that EETI seeks to promote through the communities we cultivate. Below are examples of such awards.

EETI Member Teaching Awards

Award	**Awardee**	**Relationship to EETI**
UGA Creative Teaching Award	Dr. Siddharth Savadatti	Frequent participant in forums and FLCs; leads peer mentoring meetings
UGA Creative Teaching Award	Dr. Brock Woodson	Frequent participant in forums, FLCs, and peer mentoring meetings
College Instructional Excellence Award	Dr. Tom Lawrence	Frequent participant in forums and EETIncubator
College Instructional Excellence Award	Dr. Stephan Durham	Recipient of EETI research initiation grant

Collection of Evidence: Student Success and Impact

Undergraduate program and course feedback

The purpose of EETI's programming is to bolster student success through continual improvement of teaching and learning throughout the College of Engineering. Our collection of programmatic evidence on pages 7 through 21 detail the multitude of ways we accomplish this goal. One of our primary levers to enhance student success is by cultivating a cohort of engineering faculty engaged in conversations and projects around teaching and learning. The success of our approach is evident in student feedback—such as senior exit surveys—which show a positive response to the quality of instruction and faculty interaction they receive in the College of Engineering, as demonstrated in the table below.

> The college of engineering has its head on straight. **The professors are what make the degree, college, and work worth my time, money, & effort.**
>
> *-A computer systems engineering student about the engineering program in general*

Fall 2017 - Spring 2019 undergraduate student exit survey data

Prompt	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied
Quality of instruction	29%	60%	11%	0%
Knowledge & experience of faculty	55%	41%	2%	2%
Quality of faculty mentoring	42%	49%	9%	0%

> [He is] an excellent teacher. He explains the material in a way that is easy to understand. He also provides real-world examples to help relate the material to what we will actually be doing in our careers. **You can easily see that he spends a lot of his time thinking of ways to improve his classroom and help his students.**
>
> *-An engineering student about one of the professors teaching general engineering courses*

Undergraduate Job Placement Data

While the College of Engineering began in 2012, it has evolved drastically since those early years, including the creation of EETI in early 2017. While graduation rates of recent cohorts are not yet available, job placement data reflects the continued success of our undergraduate students in reliably finding work or continuing education beyond graduation. The most recent survey of 2018 graduates found that unemployment in the year following graduation had reached a five-year low at 4%, and that 90% of the College of Engineering graduates were either employed full-time or engaged in graduate-level.

Job placement rates, 2016-2018

Employment Status	2016	2017	2018
Employed Full-Time	68%	69%	78%
Self-Employed	1%	2%	0%
Attending Graduate School	15%	17%	12%
Internship/Postdoc/Residency	4%	4%	5%
Employed Part-Time	2%	2%	0%
Not Seeking	0%	1%	0%
Seeking	10%	5%	4%

> [He was] one of my favorite professors I've ever had. He ALWAYS responded to me in less than 6 hours regardless of how much he had going on. He was super helpful on all projects and assignments and **he genuinely wants the students to learn and grow as engineers.**
> *-A biochemical engineering student about one of their professors in the program*

This job placement data reflects growing relationships between the College of Engineering and local industry partners that employ engineers. EETI has played a direct role in cultivating these relationships, as the engineering education projects EETI conducts that relate to the development of professional skills—such as empathy and resilience (Page 12 lists examples of research projects)—have been popular selling points for the College with industry partners.

In addition to supporting student success along the measures above, EETI impacts student experience by directly involving undergraduates in educational research projects (Page 19)

Graduate program feedback

While the bulk of EETI's programming affects primarily undergraduate student success through faculty engagement with teaching and learning, several faculty who participate also teach graduate courses. Excellence in graduate faculty and instruction is captured in the positive feedback of students from the College's graduate program exit surveys, displayed in the table below.

Fall 2017 - Spring 2019 graduate student exit survey data

Prompt	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Quality of instruction	35%	54%	5%	5%	--
Knowledge & experience of faculty	43%	54%	--	--	3%
Accessibility of faculty to students	54%	38%	5%	--	3%
Faculty involvement in students' educational experience	30%	57%	8%	3%	3%

In addition to supporting graduate student success along these measures, EETI has several programmatic elements directly geared toward graduate students, including a graduate-level pedagogy course (Pages 16 & 17), an Engineering Education Ph.D. program (Pages 17 & 18), and a graduate student fellowship program (Pages 18 & 19).

Teaching Assistant Course: "Preparing to Be an Effective Engineering Educator"

In addition to the College's faculty and staff, graduate students can also play an important role in shaping teaching excellence in the College, especially those in teaching assistant (TA) positions.

Accordingly, EETI runs a course each Fall entitled "Preparing to Be an Effective Engineering Educator" to help prepare graduate TAs prepare to be high-quality teachers. The course is mandatory for all new TAs, and has seats for voluntary participation from other interested graduate students. Using the book *How Learning Works* by Ambrose and colleagues as its text, this course focuses on helping TAs learn the science behind learning and how to apply this knowledge to teaching to **improve undergraduate experience and success at UGA and beyond**.

Course Description
ENED 7010 is a teaching support course intended to help you discover who you are as a teacher, understand general principles that underlie effective teaching practices, and explore how teaching fits into your future goals and career path. The course will serve as a learning community to aid you in building a foundation of pedagogical knowledge and developing a repertoire of engineering teaching practices that can be adapted to a variety of teaching contexts you might encounter, both in academia and in industry. You will also become familiar with UGA resources that you can leverage as a teaching assistant.

Learning Outcomes
At the completion of this course, you will be able to:
1. Select and evaluate effective strategies to efficiently complete teaching-related tasks;
2. Identify and appropriately use UGA resources, policies, and the D2L gradebook;
3. Apply evidence-based teaching practice to your current TA roles; and

Articulate how teaching knowledge can play a role in achieving your career goals.

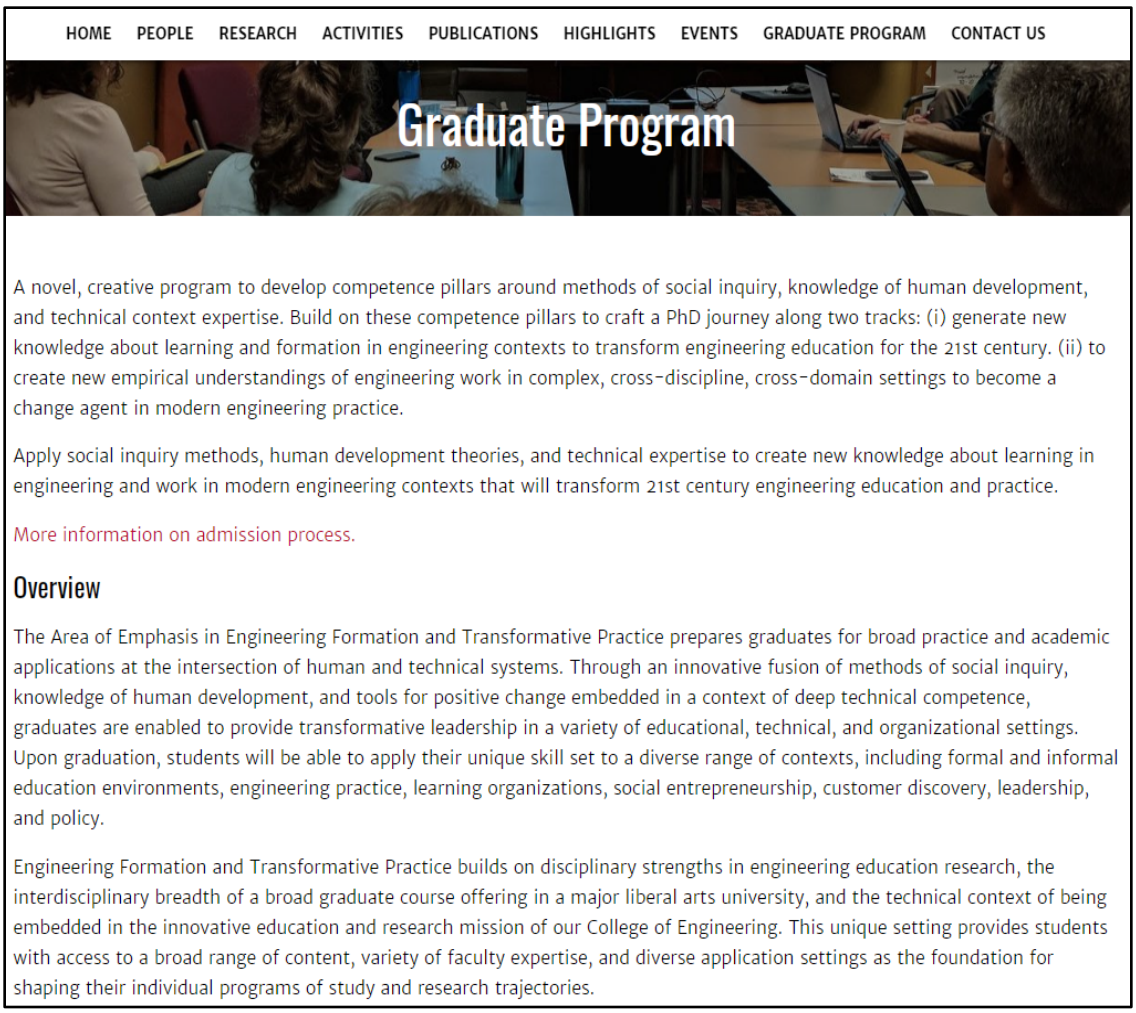
Description and learning outcomes of course from syllabus

- Students' inputs are valued & discussions are open - we can all comfortably express our ideas.
- I like that we talk about diversity and equity.
- 5 and 15 minute micro-teaches are good experiences for the [student] instructor and audience.
- I like that [the instructor] put the most valuable information to help with our TA roles in the beginning.
- Everything [we have learned] is useful and interesting.

Anonymous student feedback on course from Fall 2019 mid-semester formative evaluation

Engineering Education Ph.D. Program

In addition to engaging technical faculty, staff, and technical graduate students with engineering education research, EETI also hosts **Georgia's first and only dedicated engineering education Ph.D. program**. This program provides a unique opportunity for graduate students to develop as engineering education scholars along two emphasis areas: (1) *Engineering Formation*, which focuses on the complex processes that underpin the learning and professional socialization of engineers; and (2) *Engineering Epistemologies*, which focuses on investigating and understanding engineering knowing and doing in contemporary engineering practice settings. Students in both of these emphasis areas seek **to grow as scholars while also making important impacts on local educational institutions and industry**.



An Excerpt describing the ENED Ph.D. program from EETI's website, eeti.uga.edu

Current Students

EETI currently supports three Engineering Education Ph.D. students. Their research projects range include (1) validation of assessment instruments to study resilience, linking with one of the EETIncubation projects that recently received external funding; (2) identifying ways to reduce student attrition in engineering, which has direct implications for engineering student success at UGA; and (3) studying communication systems in engineering workplaces to inform professional communication instruction at the undergraduate level, which has direct implications for the successful professional formation of engineering students.

Alumni

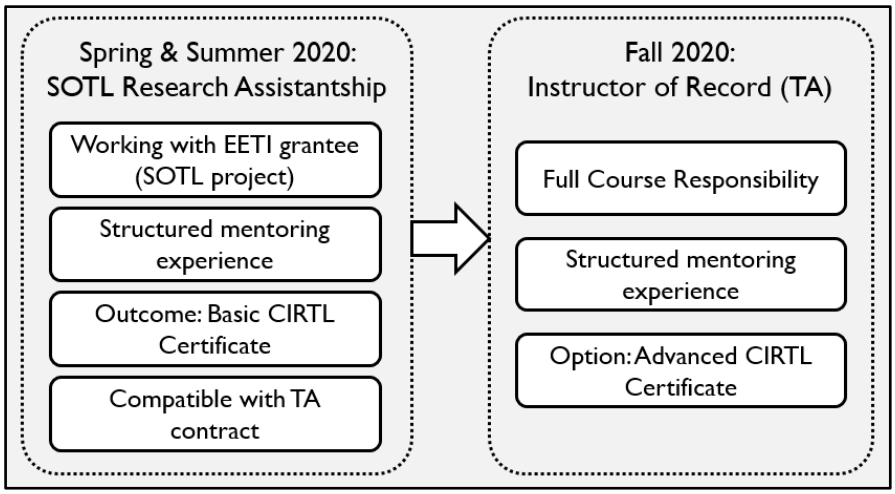
Presently, one student has successfully completed EETI's Ph.D. program, and this alumnus has become a lecturer in the School of Electrical and Computer Engineering in UGA's College of Engineering, and is an active contributor to EETI communities as a faculty member.

Dean's Engineering Education Fellowship (DEEF)

Noting a lack of opportunities for technical engineering graduate students to develop identities as engineering educators, which is important for graduate students pursuing teaching-focused careers. Accordingly, EETI worked with College administration to develop the Dean's

Engineering Education Fellowship (DEEF), a year-long, competitive opportunity in which two technical engineering graduate students are fully funded each year to engage with engineering education. The fellowship involves two terms acting as a research assistant to an engineering education project currently being conducted via EETI's research initiation programming, and one term acting as an instructor of record for a 1st- or 2nd-year engineering course. The latter opportunity did not exist prior to the DEEF, and is a valuable opportunity for graduate students to gain experience as fully fledged instructors prior to entering the job market.

The first annual DEEF will begin in Spring 2020, with the first year of applications currently under review. The concept of the fellowship was well-received by graduate students; we received six applications this year, and will select two applications to receive the award.



Graphic used to market and explain the DEEF to College of Engineering graduate students

Undergraduate Student Partnerships on Teaching and Learning

The above efforts around research initiation and incubation have provided numerous opportunities for undergraduate students to get involved in research projects. Since 2016, faculty and staff associated with EETI have worked with **over 40 undergraduate research assistants** on educational research projects**.**

As part of these projects, students have learned how to conduct and made substantive contributions to literature reviews, quantitative, qualitative, and mixed methods data collection and analysis, and conceptualizing and writing internal and external grant proposals. In addition, EETI faculty and staff have worked closely with undergraduate students to ensure that their perspectives are considered in the design of research projects. This type of involvement has ensured that our educational research designs have the potential to, both, contribute to the relevant body of knowledge and directly benefit the students who we survey/interview etc.

These experiences **contribute to the College's goal of educating well-rounded engineers who recognize the importance of life-long learning**. The educational nature of these research experiences also exposes undergraduate students to ways of knowing that are fundamentally different to how knowledge is produced in STEM fields.

Student Awards by EETI Participants

Students involved in EETI activities have won awards in both teaching and service. Like their faculty counterparts, these students exemplify the excellence in undergraduate education that EETI seeks to promote. Below are examples of such awards.

Student Awards

Award	Awardee	Relationship to EETI
College Graduate Teaching Assistant Award	Chris Herring	Engineering Education Ph.D. student
College Graduate Teaching Assistant Award	Ryan Devine	Graduate researcher with EETI
College Award for Undergraduate Service	Andrea Duncan	Undergraduate researcher with EETI

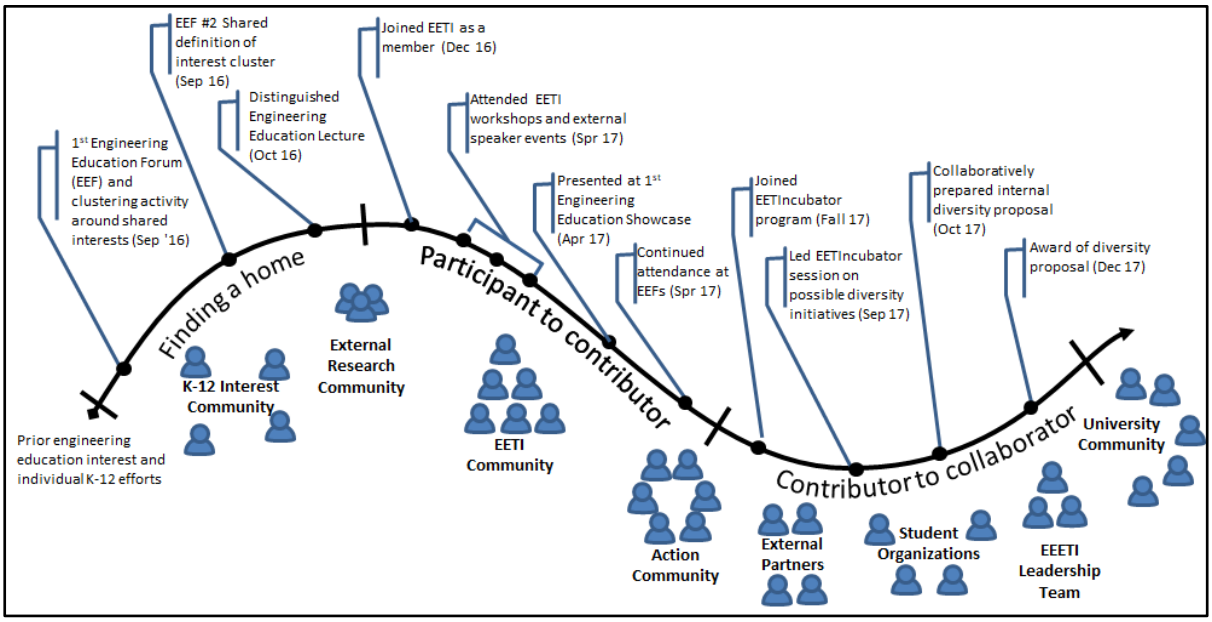
Collection of Evidence: Assessment & Responsiveness

In designing our semesterly programming, EETI leadership continually strives to understand the experiences and needs of our members in order to improve and provide more impactful opportunities with which our communities can engage with teaching and learning. We have used a multitude of tools to collect data that can help us derive this understanding, including collection of participation data outlined in previous sections and the data collection examples listed here.

Journey Maps

In EETI's founding year, EETI leadership wanted to analyze experiences that led faculty members to join and lead the teaching and learning communities that EETI strives to build. We collected this data using **journey maps** to capture the defining moments in members' evolving engagement in EETI programming.

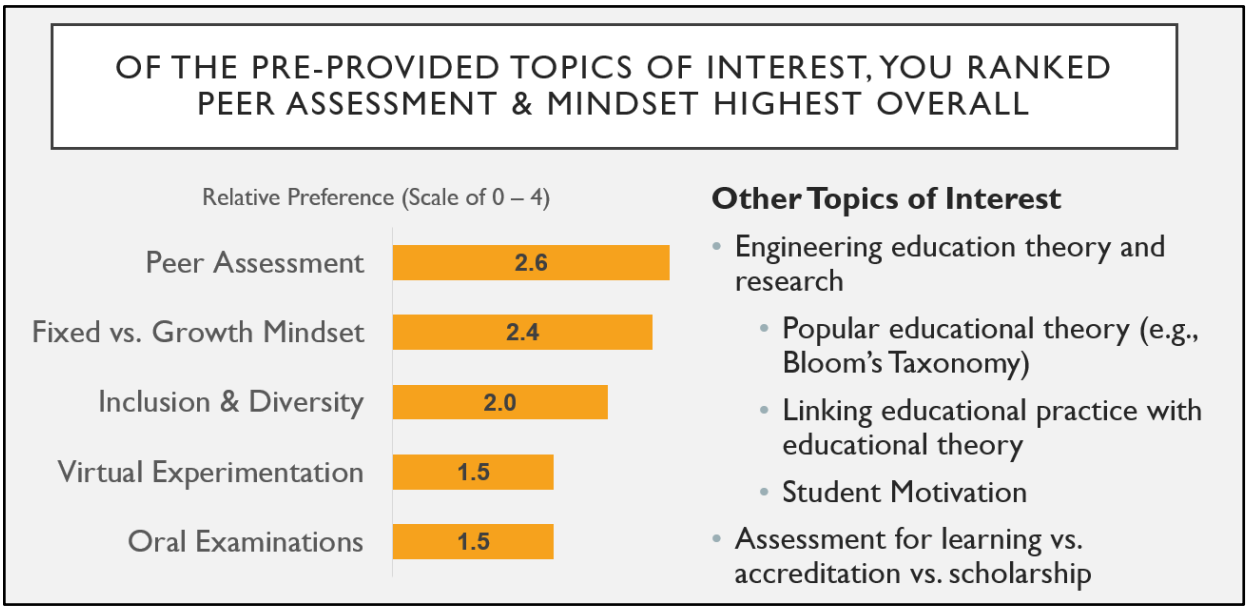
Below is one such journey map, illustrating how one faculty member transitioned from the periphery of the community to an active collaborator with other community members. He began with an interest in engineering education and experience in educational outreach, and attended a handful of forums before taking advantage of EETI's research initiation program, which ultimately culminated in an internal grant to improve diversity within the College. This map and others like it helped us determine how EETI members came to participate in the community, and helped us design programming accordingly.



An example of an EETI member journey map created in 2017

Annual Survey

In addition to understanding member journeys, EETI leadership also seeks to understand the shifting interests and needs of its members. We do so via an **annual survey** sent to EETI members to help guide our programming each year and determine on which topics to focus. This year, for example, members indicated a desire for programming around peer assessment and educational theory, as indicated in the slide below. Accordingly, we organized a forum on peer assessment and an FLC around educational theory, both of which were well-attended.



A slide used to communicate a subset of 2019 survey results to members at an EETI Forum