The University of Georgia

University Council
Athens, Georgia 30602

October 14, 2016

UNIVERSITY CURRICULUM COMMITTEE – 2016-2017
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Dear Colleagues:

The attached proposal for a new Engineering Education Transformations Insitute will be an agenda item for the October 21, 2016, Full University Curriculum Committee meeting.

Sincerely,

William K. Vencill

William K. Vencill, Chair
University Curriculum Committee

cc: Provost Pamela S. Whitten
Dr. Rahul Shrivastav

OVERVIEW

Name: Engineering Education Transformations Institute (EETI)

Need: Capitalize on timely internal and growing external opportunities for engineering education work to inform the growth and continued improvement of our engineering programs and garner extra-mural support and visibility.

Purpose: Promote and sustain a culture of engineering education scholarship and innovation that reaches across all programs in the College of Engineering and promotes educational excellence and institutional diversity.

VISION

The Engineering Education Transformations Institute (EETI) will serve to infuse a culture of engineering education (ENED) scholarship, research, and innovation throughout all administrative units and the fifteen degree programs in the College of Engineering (CENGR). Appendix D provides a letter of support from Dean Leo describing the college's commitment to establishing and supporting this institute. Through building capacity and social capital around engineering education innovation and engineering education research, this approach offers a unique way to integrate and advance the research and teaching missions of the university while embedding principles of diversity and inclusion in all aspects of operation.

In the engineering context, the creation of an innovative, embedded engineering education institute responds to national calls for increasing the number and diversity of engineering students combined with the recognized need for novel and creative ways to educate engineering students to adequately prepare them for the complex, global challenges of the 21st century[1].

Reaching across multiple engineering disciplines and positioned at the nexus of educational practice and research[2], EETI will leverage synergies between a vibrant culture of local educational innovation and extramurally funded engineering education development, diversity, and research projects to improve the educational experience of our students and promote diversity in our programs. Figure 1 below illustrates the mutually beneficial relationships between the described aspects of the institute vision.

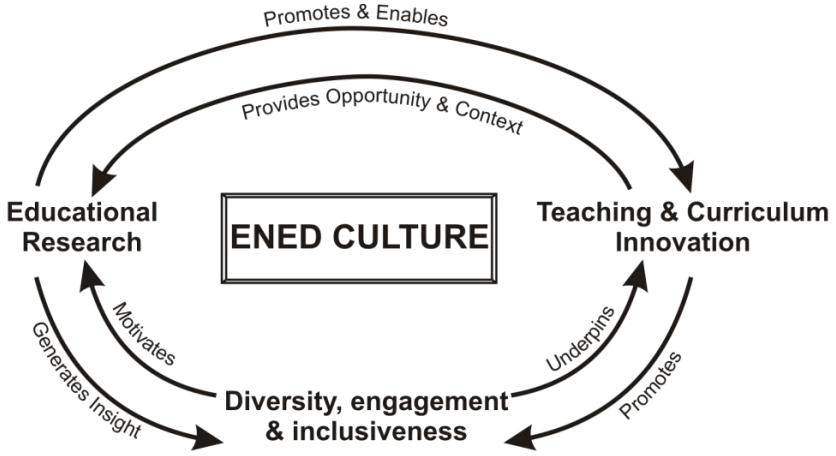

FIGURE 1: INSTITUTE VISION AND SYNERGISTIC ACTIVITIES

[1] National Academy of Engineering. (2005). *Educating the Engineer of 2020: Adapting Engineering Education to the New Century*. Washington, DC: National Academies Press.

[2] Jamieson, L. H., & Lohmann, J. R. (2009). *Creating a Culture for Scholarly and Systematic Innovation in Engineering Education: Ensuring US Engineering Has the Right People with the Right Talent for a Global Society*. Washington, DC: American Society for Engineering Education.

NATIONAL CONTEXT AND OPPORTUNITY

The proposed institute will capitalize on a range of current opportunities that emerge from the national STEM discourse and from the developments in the growing engineering education research community.

STEM education has been identified as a national priority[3] as reflected in a range of significant funding opportunities through the National Science Foundation[4], other national agencies (e.g., DOE), and foundations (e.g., SLOAN). In the engineering context, this recognition of the importance of STEM education parallels national and international discussions around the need to substantially transform engineering education systems to respond to the rapidly shifting demands that the grand challenges of the 21st century place on the profession[5].

Accordingly, the NSF provides substantial funding sources for engineering education research (see Appendix A for a description of the RFE program) that is expected to provide the empirical evidence base to inform and underpin the educational transformation. Other programs that have traditionally focused on educational innovation (see Appendix A for a description of the TUES program) are, without exception, increasingly emphasizing fundamental educational research as a component of engineering education innovation projects. This development requires that project teams possess significant educational research expertise and limits the potential funding success of engineering educators who do not have a collaborative network to provide this expertise. In response, a recent focus of funding programs has been on expanding the engineering education research community to integrate a broader range of engineering educators in this shared endeavor (see Appendix A for a description of the RIEF program). Building such shared capacity will, through the proposed institute, in the long-term, enable CENGR to successfully compete for larger scale educational transformation projects (see Appendix A for a description of the RED program).

Leveraging prior, distributed ENED work in CENGR, EETI will foster these collaborative structures and build shared research capacity to make use of the full range of funding opportunities spanning educational innovation, fundamental engineering education research, and research initiation efforts. These activities will leverage prior local investments (e.g., UGA STEM mini grants, CENGR learning technology grants) and further develop such local projects to lead to competitive extramural funding applications across the above described programs.

PRINCIPLES AND ASSOCIATED GOALS

The following articulates the three core principles that guide the implementation and subsequent operation of the EETI. These principles underpin specific institute goals and are subsequently mapped to measures of success that provide the basis for evaluation of the institute.

Promote CENGR Mission

The institute is strategically positioned to support a number of key areas of the college's mission. More specifically, EETI will leverage existing efforts to:

1. Expand and promote engineering scholarship of teaching and learning (SOTL) efforts.
2. Increase extramurally funded engineering education development and research projects.
3. Improve our growing programs and the educational experiences of our students.

3 Committee on STEM Education, National Science and Technology Council. (2013). Federal science, technology, engineering and mathematics (STEM) education: 5-year strategic plan (www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf)

4 See Appendix A for examples of relevant programs and solicitations.

5 National Academy of Engineering. (2008). Grand Challenges for Engineering.

Promote People

With its integrated and embedded approach, EETI will focus on building capacity and social capital around engineering SOTL. More specifically, the institute will support diverse activities and programs to:

4. Create a community around engineering SOTL in the college and empower engineering faculty to improve and conduct research on their own teaching.
5. Promote a cadre of research active or research engaged lecturers that currently play a key role in the instructional delivery of our programs.
6. Engage graduate students and future faculty in engineering SOTL as a key aspect of their preparation for the professoriate.

Promote Culture

Aligned with its mission and goals, EETI will explicitly pursue and foster the following aspects of its collaborative culture. The activities in the institute will be underpinned by:

7. A focus on impact where educational research and development concretely improve educational practice locally and nationally.
8. Collaboration and interdisciplinarity as a mode of operation that purposefully engages all partners in CENGR, across UGA, and at other institutions.
9. A shared commitment to the principles of diversity and inclusiveness to inform daily operations and underpin work conducted in the institute.

GOALS AND MEASUREABLE IMPACT

	Goal	**Measure**
1.	Increased SOTL activity within CENGR	Number and diversity (in terms of focus, scale, and scope) of engineering education activities in the college.
2.	Increased ENED funding	Number of ENED funding proposals submitted and funded. Number and range of faculty (core, affiliate) to submit ENED proposals.
3.	Improve educational programs in CENGR	Number of courses impacted by ENED innovations and diversity of the scope of projects (part of course, course-level, curriculum level). Impacts on overall curriculum development.
4.	Faculty engagement and professional development	Number and range (rank, discipline, etc.) of faculty engaged in ENED activity. Number of professional development activities offered by the institute.
5.	Research-active or engaged lecturers	Number of lecturers actively engaged in ENED activities at various scales. Level of ENED activity located in the context of core engineering courses.
6.	Graduate engineering SOTL education	Number and disciplinary range of graduate students engaged in ENED activities or programs offered by the institute. Impacts on career paths of engineering graduate students.
7.	Focus on impact	Degree to which ENED projects are linked to innovations in engineering courses or impact on the field nationally.
8.	Collaboration and interdisciplinary	Number and diversity of partnerships to pursue ENED projects.
9.	Diversity and inclusiveness	Diversity of faculty and student members of the institute. Number of projects and initiatives directly related to diversity. Degree to which principles of diversity and inclusiveness are integrated in ENED activities and projects. Internal and external recognition of diversity work and impact.

TABLE 1: INSTITUTE GOALS AND SUCCESS METRICS

MEETING INSTITUTE REQUIREMENTS

The following details how EETI contributes to the mission of the university in ways that cannot be accomplished through existing administrative units alone.

UNIVERSITY MISSION-RELATED ACTIVITIES

Interdisciplinary research

The proposed institute is positioned to reach across all administrative units in the College of Engineering. In the context of our growing undergraduate programs, core and member faculty will represent all administrative units in the college as well as our fifteen degree programs and infuse a culture of engineering education innovation and research into educational and curriculum development. In the context of research in the college, EETI is, through its expertise in educational and social methods of inquiry, ideally positioned to support and augment research projects in other CENGR institutes[6] whose foci inherently contain social and educational facets. In addition to infusing educational or engagement components into technical engineering research projects, the institute will also offer all engineering faculty opportunities to initiate engineering education research or innovation activities in the context of their own teaching.

Continuing education and professional development

The focus on promoting individuals and on building shared capacity offers unique opportunities for continuing education and professional development of our graduate students and faculty. The institute activities will provide graduate students across our programs with avenues to develop expertise in engineering education, a qualification that is increasingly recognized as crucially important in the competitive academic job market. The focus on developing engineering education opportunities for lecturers, who are significant contributors to our core undergraduate courses, provides exciting avenues for professional growth and for more broadly framing their increasingly important role at a research university.

Expand extramural funding

As detailed above, the formation of the proposed institute will enable the College of Engineering to capitalize on significant funding opportunities in the engineering education and STEM education areas while, at the same time, adding significant value to the development and improvement of our engineering programs. This unique way of integrating our research and teaching mission across units and engineering disciplines stands to significantly benefit both our research mission and our students.

VALUE ADDED TO CENGR

Integrated efforts across engineering units and reach beyond CENGR

The proposed institute responds to two key challenges in the development of the College of Engineering. First, as the number of faculty continues to grow, administrative sub-units become necessary to organize scholarly activities, but do not inherently promote broadly collaborative and cross-cutting activities. Engineering education offers an opportunity for cross-cutting work to engage faculty and graduate students across disciplinary or administrative lines. The proposed institute will purposefully promote these activities and serve as their recognized home. This recognition and level of visibility will also strengthen and continue to grow partnerships between CENGR and other

6 New Materials Institute, Institute for Resilient Infrastructure, Informatics Institute

units on campus. Examples of prior collaborative efforts between engineering and social work[7] or engineering and art[8] provide the basis for the institute to expand collaborative educational efforts across campus.

Focal point for distributed ENED activity
In line with the needs, opportunities, and goals discussed above, EETI will provide a crucial focal point for existing, distributed ENED work in the College of Engineering. A wide range of faculty are currently engaged in ENED-related activities, some of which are supported by local funding. The impacts and growth potential of these activities are currently limited by their distributed nature that risks a lack of connection between related efforts. Through building social capital and shared capacity around ENED activities, EETI will focus and purposefully connect existing activities with a view to elevating efforts to a nationally competitive level.

Cross-cutting graduate education offerings
Drawing on the expertise and activities of its members, the proposed institute will develop educational offerings that infuse engineering education content into the graduate experiences of students across the college. These educational program and initiatives will co-evolve with the forming structures and needs of CENGR. Plans for an integrated initiative to infuse engineering SOTL into all aspects of the graduate experience in the college are outlined in the section on educational programs below.

Integrated structure to support diversity efforts
With the shared capacity in educational research and development and the core principle of promoting diversity, the EETI can serve as a key home for purposeful efforts to promote diversity at all levels in the college. Engineering education as an emerging discipline inherently focuses on attracting and retaining underrepresented groups in a field that that is characterized by persistent challenges in the diversity area. Building on activities in the college, EETI can serve as a contact point and conduit to link to and integrate with larger efforts to promote diversity across UGA. In developing this strand, EETI can leverage prior ENED efforts in the college that focus on both investigating diversity issues in engineering[9] and infusing the engineering perspective in larger diversity efforts in the STEM context[10]. To promote this focus in context of diversity efforts across campus, the institute will build on existing collaborations with the Office of Institutional Diversity (see letter of support from Dr. Cook in Appendix D) and the Graduate School (see letter of support from Dean Barbour in Appendix D). Dr. Cook and Dean Barbour have agreed to support the formation of the institute by serving on its advisory board during this crucial phase of formation.

Delineation of Institute Focus From Existing Efforts at UGA

The proposed institute will be formed within and supported by the College of Engineering to address specific internal educational, professional development, and research needs in an integrated fashion. As such, the center of gravity of institute activities will lie in the college with promising opportunities to connect to and leverage synergies with ongoing efforts at UGA. The following provides some additional context of the vision for engineering education work proposed here that will help to delineate the proposed efforts from the work of other units on campus.

Need to foster local ENED community that connects educational research to practice
As outlined above, the proposed institute responds to specific local needs and opportunities within the college. The vision outlined herein promises to connect discipline-based educational research in engineering to the practice of engineering instruction to achieve a sustained cultural and organizational transformation in our college. As such the activities proposed are synergistic with the focus of UGA's STEM Office on the quality of undergraduate instruction

7 NSF Award 1463829: "The Empathy Project: An Interdisciplinary Research Effort to Develop a Transferable Theory of Empathy in Engineering" ($340k) – collaboration with UGA School of Social Work.
8 NSF Award 0837173: "The Synthesis of Engineering and Art for Innovative Education" ($150k) and NSF Award 1025190: "Making Connections: A Theory of Synergistic Learning in Engineering" ($400k) – collaborations with UGA Lamar Dodd School of Art
9 NSF Award 1531947: Understanding and Reshaping Systemic Communication Patterns in Engineering Education ($338k).
10 Dr. Walther serves in various functions on the UGA teams for the NSF INCLUDES, AGEP, ADVANCE efforts.

in the STEM fields and the mission of the Center for Teaching and Learning (See letter of support from Dr. Watson in Appendix D) that provides instructional leadership and professional development. In its focus on discipline-based educational research, the institute's activities also offer synergies with activities in the College of Education (see letter of support from Dean Kennedy in Appendix D) as evidenced by prior collaborative, nationally funded work[11].

However, the institute's focus on building local and contextual community and capacity within the college and addressing specific graduate education needs can inherently not be addressed by the aforementioned units.

Engineering education and its relationship to other disciplinary education

Engineering education builds on a long-standing tradition of discipline-specific scholarship of teaching and learning[12] and has more recently developed as a research discipline in its own right[13]. This discipline-specific orientation of the field that is also reflected in the vision for the proposed institute is owed to the specific location of engineering education at the nexus of other educational fields.

More specifically, engineering as part of the STEM disciplines shares a body of educational knowledge with the sciences through its grounding in the engineering sciences. These educational interests around the engineering fundamentals courses provide fertile ground for collaboration with other science educators as represented in the SEER Center at UGA (see letter of support from Dr. Lemons, the Director of SEER in Appendix D).

At the same time, the focus of engineering as a professional degree with the aim of preparing practitioners puts the field in relationship to other professional education endeavors in disciplines such as medicine, social work, or nursing. Such educational research and development focuses on the role of the practitioner in society, educating for professional ethics or, more broadly, aspects of professional socialization. The prior nationally funded engineering education work that this institute builds on [14] reflects this focus on inter-professional education. The proposed institute, in collaboration with the School of Social Work (see letter of support from Dean Scheyett in Appendix D), will work on strengthening and broadening the inter-professional education efforts at UGA. A framing of the institute's efforts through the lens of STEM education only would thus be limiting the scope of impact and synergistic activities in the inter-professional education space.

In addition to the engineering science and professional formation foci, engineering education also comprises significant components of design that are based on a distinct body of knowledge and research. Some of the educational considerations in this domain are shared with disciplines such as landscape architecture, architecture, or art. Prior interdisciplinary engineering education efforts at UGA have explored such interdisciplinary efforts focused on aspects of creativity and disciplinary identity[15].

In summary, engineering education shares features with **STEM education**, **professional education**, and **design education** that are the focus of other activities at UGA. The proposed institute will pursue these three aspects of engineering education in an integrated fashion within the specific engineering context and within the setting of CENGR. This context-specific combination of the above-described educational facets can inherently not be supported comprehensively by either the Center for Teaching and Learning, the UGA STEM Office, or the SEER Center. The Engineering Education Transformations Institute provides, and will pursue, the mutually beneficial

[11] NSF Award 1542531: "A Long Way Coming"--Understanding Engineering Educators' Transformations to Student-Centered Teaching ($344k) – collaboration with UGA College of Education.

12 Froyd, J. E., Wankat, P. C., & Smith, K. A. (2012). Five major shifts in 100 years of engineering education. Proceedings of the IEEE, 100 (Special Centennial Issue), 1344-1360.

13 Radcliffe, D. F. (2006). Shaping the discipline of engineering education. Journal of Engineering Education, 95(4), 263.

[14] NSF Award 1463829: "The Empathy Project: An Interdisciplinary Research Effort to Develop a Transferable Theory of Empathy in Engineering" ($340k) – collaboration with UGA School of Social Work.

[15] NSF Award 0837173: "The Synthesis of Engineering and Art for Innovative Education" ($150k) and NSF Award 1025190: "Making Connections: A Theory of Synergistic Learning in Engineering" ($400k) – collaborations with UGA Lamar Dodd School of Art

synergies with these units (see letters of support in Appendix D) while promoting the comprehensive and college-internal vision of engineering education outlined in this proposal.

IMPLEMENTATION

The following describes the implementation plan for the proposed institute and outlines administrative structures and processes.

STRUCTURE AND POLICIES

INSTITUTE HOME AND REPORTING

The Integrated Engineering Education Institute will be housed in the College of Engineering and will report to the Dean. CENGR commits to providing the infrastructure, funding, and personnel support as outlined in this proposal (see letter of support from Dean Leo in Appendix D).

ORGANIZATIONAL STRUCTURE

Figure 1 illustrates the organizational structure of the institute. The positions described in the organizational structure will be created and filled according to the growth of the institute and responding to strategic opportunities. The following details each role and outlines the composition and function of the advisory board. For appointment, evaluation, and membership procedures see the respective section below.

The institute will be led by the director in consultation with the advisory board. Due to the nature and goals of the institute, two assistant director positions will be created to (i) generate and promote local impacts on our educational programs and on faculty development and (ii) initiate educational research and development projects to enable faculty and instructors from technical backgrounds to establish extramurally funded engineering education initiatives. As the institute grows and more tenure-track faculty lines in engineering education research are established, those faculty members will serve as leads to facilitate activities under each of the distinct pillars of the institute. These pillars indicate the strategic growth direction of the institute and will provide the necessary shared expertise and capacity to become competitive in pursuing large-scale educational transformation projects in the STEM education area (NSF RED, TUES type 2, ADVANCE, INCLUDES, AGEP, etc.).

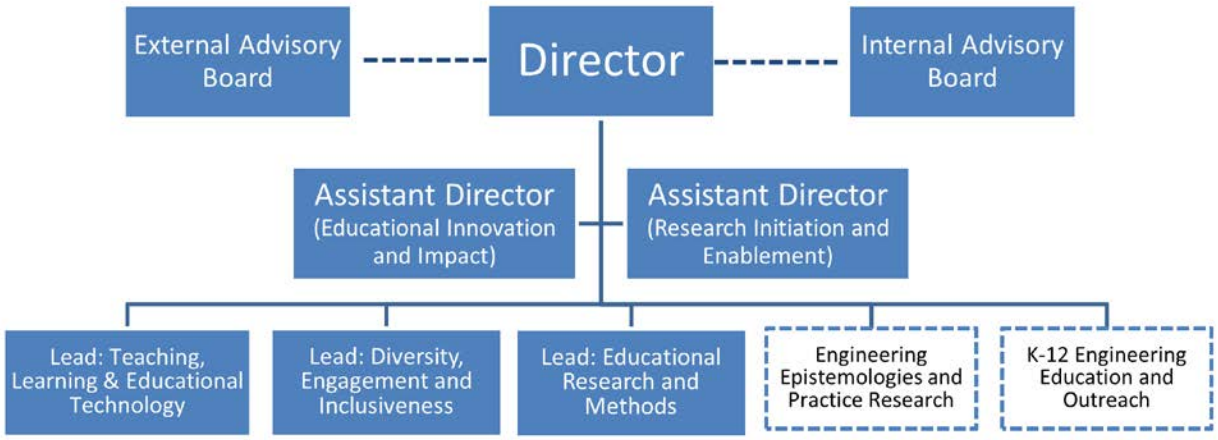

FIGURE 2: ORGANIZATIONAL STRUCTURE AND FUTURE GROWTH AREAS

1. **Director**

   The director of the institute will report to the dean of the College of Engineering and will be responsible

for all initiatives, operations, budgets, and strategic planning associated with the institute. The director will be a tenured faculty member appointed by the dean. The director will serve as a point of contact for all relationships and partnerships with other entities and act as a liaison between its members and the leadership team in the college in matters related to institute activities. Dr. Joachim Walther will serve as the founding director for an initial five-year renewable term.

2. **Assistant Director for Educational Innovation and Impact**
   This staff position promotes the institute's focus on impacts and local transformations through the propagation and broad implementation of educational innovations and research outcomes. To achieve systemic and cultural impacts across all academic units and degree programs in the college, the assistant director will lead and support purposeful efforts to adopt and implement (rather than merely "disseminate") educational innovations in our programs. Activities to achieve this goal will include programmatic and strategic development of related institute goals, professional development programming for faculty, instructors, and graduate students, and project support for teaching and learning projects. Such activities will be coordinated or collaboratively implemented with key partners across campus. The Assistant Director for Educational Innovation and Impact will report to the director of the institute.

3. **Assistant Director for Research Initiation and Enablement**
   This part-time staff position promotes the institute's focus on expanding externally funded engineering education or innovation work that specifically includes engineering instructors and engineering faculty from technical research areas. To this end, the assistant director will support engineering faculty in establishing a funded engineering education research or innovation program that builds on their experience in and passion for instruction and complements their technical research areas. This strategic direction is aligned with national funding trends[16] and institutional needs to provide faculty with opportunities to round out their existing research portfolios. The necessary support for research initiation needs to be centered around relevant educational theory, educational research methods, and the substantial body of education and engineering education literature and may take the form of content development and delivery of professional development activities for faculty or collaboration with individual faculty during project or program initiation phases. This effort to empower faculty and instructors to embark on a disciplinary transition can only in very limited ways be supported by tenure-track engineering education research faculty. Research initiation projects are often, and need to be, early explorations around a technical faculty member's teaching interest and are thus likely to be limited in their potential to contribute to the fundamental research programs tenure-track engineering education research faculty need to build at the national level.

4. **Lead: Teaching, Learning and Educational Technology**
   This pillar of the institute focuses on engineering education research and innovations in the context of teaching and learning in the classroom. Examples of potential foci include novel instructional strategies, student learning and conceptual understandings, strategies to innovate and integrate the middle years of engineering science courses, and student motivation and retention in engineering programs. This area also includes research and development activities in the context of educational technology. Work conducted in this context could focus on instructional technology, remote learning in engineering courses and laboratories, use of virtual or augmented reality in engineering teaching, or the use of learning analytics to support student development.

16 See overview of NSF Research Initiation in Engineering Formation program (RIEF) in Appendix A

5. **Lead: Diversity Engagement and Inclusiveness**
   This key thrust of the institute will focus on fundamental research to underpin efforts to promote diversity in engineering programs and create learning environments that foster inclusiveness and value the multiple perspectives that students and faculty from all backgrounds bring to the engineering context. Areas of focus could include research on attracting and retaining groups of students traditionally underrepresented in engineering; consideration of race, gender, ethnicity, first-generation status, age, disability, sexual orientation, or socio-economic status in the context of students' choices and experiences in pursuing an engineering career; and novel approaches to broadening participation in engineering through engaging the community and other stakeholder groups in the educational process.

6. **Lead: Educational Research and Methods**
   The focus of this research area is to provide and further develop the shared methodological competence of the engineering education institute through complementing existing strengths. The work conducted in this area would focus on the development, integration, and application of rigorous methods of inquiry in the engineering education context. Specific foci could include quantitative or mixed methods approaches to investigating student learning in engineering, integrating methods of inquiry across diverse methodological and epistemological perspectives to address the diverse needs and contexts of engineering education research. The application context of these methodological developments should be broad and could include questions of student learning and formation, faculty development, or investigations of engineering practice to inform novel educational approaches.

7. **Future Growth Areas**
   The above areas and faculty leads capture the initial areas of expertise developed through the institute to ideally leverage ongoing and prior work in the college. Beyond the three-year time frame outlined in the section "Growth Targets and Budget" below, the development of further pillars of expertise and activity is envisaged. More specifically, future faculty hires will occur in the area of **K-12 Engineering Education and Outreach**, a growing sub-discipline of engineering education that is concerned with improving and broadening the avenues for early participation in engineering education. A fifth pillar would comprise research in **Engineering Epistemologies and Professional Practice**. This area of investigation applies social and educational research methods to various areas of engineering practice to generate a fundamental understanding of engineering ways of knowing and practicing that can ultimately significantly inform educational content and approaches in engineering programs.

Roles and Responsibilities of Participating Units

The institute is primarily located in the College of Engineering, and a majority of activities are centered on educational activities in the college. Accordingly, the college will serve as the administrative and physical home of the institute. With its interdisciplinary focus and the history of prior interdisciplinary engineering education efforts, the institute will collaborate extensively with other units across campus. An initial set of these partners with preexisting relationships is listed below with a view to expanding the circle of partners as the institute grows.

College of Engineering

The Institute will be established and operate under the authority of the College of Engineering, with the college providing support in form of personnel, operating resources, and physical infrastructure as outlined in the budget plan below.

PARTNERS

The members of the institute will engage in collaborative efforts with other units across campus. F&A return to the institute is not mandated but can be negotiated in individual cases. The founding partners of the institute are:

- School of Social Work (see letter of support from Dean Scheyett in Appendix D)
- College of Education (see letter of support from Dean Kennedy in Appendix D)
- Office of Institutional Diversity (see letter of support from Dr. Cook in Appendix D)
- CTL - Center for Teaching and Learning (see letter of support from Dr. Watson in Appendix D)
- SEER – Scientists Engaged in Educational Research (see letter of support from Dr. Lemons, the SEER Director, in Appendix D)
- Graduate School (see letter of support from Dean Barbour in Appendix D)

STANDING EXECUTIVE COMMITTEE

This standing committee will be comprised of all core faculty and two member faculty. Core faculty will serve on a permanent basis, and member faculty will serve for renewable two-year terms. New rotating membership of the Standing Executive Committee will occur by nomination from institute members or self-nomination by the candidate and confirmed by majority vote of the present committee.

The Executive Committee will provide guidance, oversee, and develop institute activities with respect to personnel hiring, strategic planning, maintaining institute by-laws, managing membership, and planning of courses or instructional programs offered by the institute. As the institute grows, the executive committee can form further standing committees or appoint ad-hoc committees for specific purposes.

ADVISORY COMMITTEE

The strategic planning and operations of the institute will be guided by an integrated advisory board comprised of internal and external members. Faculty and administrators from within UGA will advise on internal organizational and strategic matters. National engineering education leaders and representatives from industry will guide the development of the institute from their respective perspectives. Members of the advisory board will be invited and appointed by the director for renewable multi-year terms.

<u>Proposed internal Advisory Board members:</u>

- Dr. Michelle Cook, Associate Provost & Chief Diversity Officer, Office of Institutional Diversity (see letter of support in Appendix D)
- Dr. Anna M. Scheyett, Dean, School of Social Work (see letter of support in Appendix D)
- Dr. Lawrence Hornak, Associate Dean for Research, College of Engineering
- Dr. Suzanne Barbour, Dean, Graduate School (see letter of support in Appendix D)

<u>Proposed external Advisory Board members:</u>

- Dr. Mave Houston (Director Capital One User Labs)
- Dr. Bevlee A. Watford, Associate Dean for Academic Affairs, College of Engineering at Virginia Tech and Director of the Center for the Enhancement of Engineering Diversity at Virginia Tech
- Dr. Wendy Newstetter (GA Tech, Director of Educational Research and Innovation for College of Engineering)

Administrative Procedures

Appointment of Institute Members

Director
The director of the institute will be appointed by the dean of the College of Engineering initially for a period of five years to oversee the formation and growth of the institute. Subsequent terms are for three years and renewable.

Core faculty
Faculty members with primary research responsibility in engineering education will be core faculty of the institute. The appointment and tenure home will be in the College of Engineering, and faculty will be evaluated by the dean in consultation with the institute director. Core faculty are expected to serve on the standing executive committee and contribute to the operation of the institute as part of their service expectation in the college. In addition, core faculty will participate in a majority of institute meetings and events and actively link their research program to the dissemination and integration efforts pursued by the institute.

Member faculty
UGA personnel of all ranks and appointment types can become members of the institute on a voluntary basis. Benefits of the membership include participation in the intellectual community around engineering SOTL, access to resources through the institute, and participation in institute professional development activities. While all institute activities are open and inclusive, members will receive priority when resources or participation are restricted.

Membership implies active participation and contribution to the goals and operation of the institute. Levels and scope of participation are expected to vary across individuals and over time. This diversity and openness of participation is a desired feature of the institute and no minimum expectations for membership are stated. For the purposes of providing opportunities for all members to participate in meaningful ways and to support assessment of institute impacts and reach, membership is renewable annually.

The renewal process will collect the following input from current or prospective members:

- Level and nature of participation in institute activity and perceived benefit over the past year.
- Outcomes, products, or initiatives related to institute activity over the past year.
- Intention to be/remain a member of the institute for another year.
- Individual goals and plans for the next year to inform institute strategic planning.
- Individual needs and potential support from the institute over the next year to inform institute strategic planning.
- Planned or potential individual contributions (of all levels and scales) to institute activities over the next year to inform institute strategic planning.

The executive committee will base the yearly strategic plan on this input and confirm individual memberships. New members will be able to join the institute at any point.

Review process

The institute will be reviewed every three years by the dean of the College of Engineering on the basis of the goals and measures of success defined in this proposal. The review will be based on the annual data collected for the success metrics in Table 1 and input from the director regarding the achievements and future directions of the institute.

GROWTH TARGETS AND BUDGET

Through its focus on cross-college integration, the institute, its activities, and number of members is expected to grow substantially over the next three years after an initial phase of building capacity and social capital around engineering SOTL in the college[17]. The institute goals presented in Table 1 have a substantive focus on qualitative measures around, for example, the range and diversity of participation and a variation in the scope and stage of ENED projects. These measures are intended to lead to the formation of a diverse and thus robust ecosystem of engineering education activities in the college with rich synergies and continuing opportunities for faculty or instructors to engage at various points or levels of expertise.

For the purposes of providing a sense of the scope of the intended institute development, the following provides a selection of quantitative targets for the first three years that outline levels of participation and activity:

- Core faculty: 3 additional core faculty with primary research assignments in engineering education (5 over the next five years)
- Member faculty: active participation of 8-12 faculty and instructors across schools and degree programs
- Courses impacted: Member activity is expected to have an impact (of varying scope) on 12-15 course sections.
- Research active lecturers: A group of 3-5 lecturers is expected to actively participate ENED activities within the institute
- Funding proposals: The institute activity is expected to lead to the submission of 7-9 competitive engineering education proposals at the national level (NSF) and a total of 10-12 smaller, local or regional funding applications.

The College of Engineering provides initial and ongoing support for the institute formation and operation in the form of personnel, infrastructure, and funds for operating, travel, and professional development, with an anticipated portion of overhead return to supplement the operating budget. Overhead return for members appointed in the College of Engineering will be negotiated in line with existing policy. There is no mandatory overhead return from non-CENGR members, and the partner units across campus are not expected to contribute funds to the institute.

INSTRUCTIONAL PROGRAMS AND INITIATIVES

The status of a UGA institute is sought to enable future development of instructional programs and initiatives. The following provides a number of examples of planned developments that will be updated and further shaped as the institute and the structures of the College of Engineering co-evolve. In line with the overall aim to foster a cultural change around the scholarship of teaching and learning within the College of Engineering, a focus of the educational programs and initiatives is on adding significant value to the graduate programs of the college and provide students with a wide range of opportunities to engage in professional development activities in the context of engineering education.

Figure 3 illustrates how the infrastructure, activities, and capacity of the proposed institute support a variety of graduate ENED experiences for a diverse range of students.

17 This effort is presently supported through a College of Engineering Strategic Research Initiative ($25k per year) through June 2018.

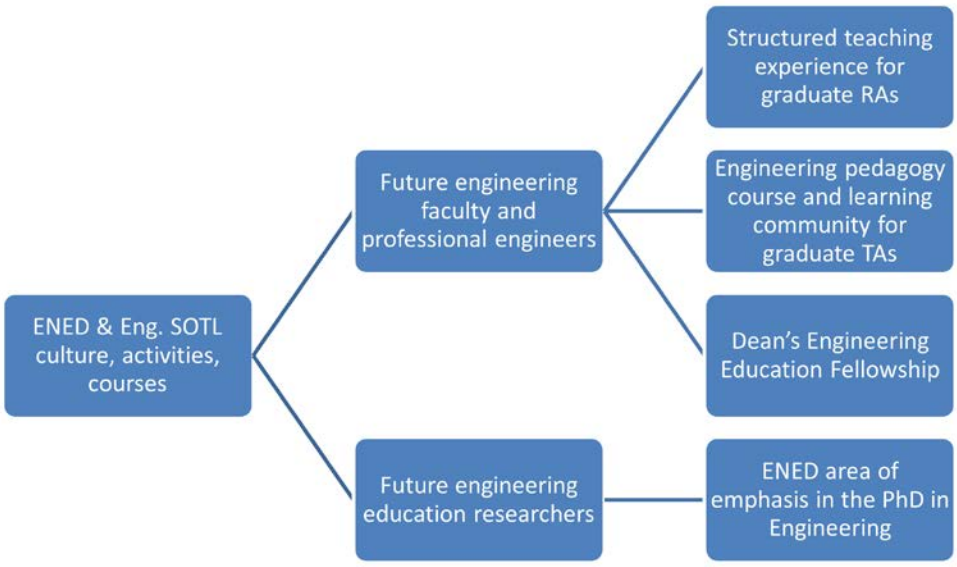

FIGURE 3: ENGINEERING EDUCATION OPPORTUNITITES FOR ENGINEERING GRADUATE STUDENTS

The following provide a more detailed description of the educational programs that may be offered by the proposed institute.

STRUCTURED TEACHING EXPERIENCE FOR GRADUATE RAS

This program addresses a need in the college to provide meaningful and structured teaching experiences to graduate students from technical engineering areas who are supported by and predominantly contribute to extramurally funded engineering research projects. The institute could develop and offer a course-based experience for those students to gain an introduction to engineering teaching and learning and prepare for a structured and defined contribution to a portion of a course under the additional mentorship of the faculty member teaching the course.

ENGINEERING TA COURSE AND LEARNING COMMUNITY

This program addresses a need in the college to provide graduate TAs with engineering context-specific pedagogical knowledge and techniques. Building on general pedagogical instruction, this program also draws on the considerable body of pedagogical knowledge and best practice that has been developed in the engineering context. The proposed program is built around a college-specific version of the GRSC 7770 offering listed as ENED 7010 in the UGA bulletin. Such a discipline-specific course would not only address the instructional needs of engineering fundamentals courses, but also the specific learning contexts of, for example, team-based design courses that are integrated as experiential learning opportunities throughout the College's engineering curricula. Building on participation in the course, a structured TA program would also include a professional learning community experience for engineering TAs to engage in regular debriefing, structured reflection, and a formal presentation of their contribution to and personal insight from their teaching assistantship.

DEAN'S ENGINEERING EDUCATION FELLOWSHIP

This fellowship program supported by the College of Engineering would provide a mentored professional development experience to prepare selected engineering graduate students for substantive teaching experiences in the college. The program would include alternating semesters of mentored teaching experiences (TA support by

CENGR) and SOTL project work (RA support by CENGR) under the guidance of members of the institute and with a view to benefiting CENGR instructional programs. In combination with selected educational course offerings, this program would prepare graduate students for a culminating substantive teaching role in the CENGR undergraduate programs (e.g., instructor of record).

PH.D. IN ENGINEERING WITH AREA OF EMPHASIS IN ENGINEERING EDUCATION RESEARCH

The growing research program in engineering education is expected to lead to a significant increase in graduate students in this area. To adequately prepare these graduate students for dissertation research in engineering education, an area of emphasis in engineering education may be developed under the umbrella of the Ph.D. in Engineering program offered by the College of Engineering. Such a program would provide students with the theoretical and methodological foundation to pursue fundamental engineering education research projects. The program of study would comprise a number of specific engineering education courses previously established[18] and draw broadly on UGA's rich graduate offering in the education area[19]. Such an area of emphasis would uniquely position the institute to attract high-quality graduate students. Drawing on course offerings from within the college and across UGA, the Ph.D. area of emphasis would offer a high level of flexibility and disciplinary depth compared to other institutions that either offer specific graduate programs in engineering education with limited in-house offering of courses or other institutions where students pursue Ph.D.s in engineering education under the umbrella of other disciplinary graduate programs.

18 See Appendix B for overview of and rationale for ENED courses.
19 See Appendix C for example program of study.

APPENDICES

APPENDIX A: TARGET NSF PROGRAMS AND SOLICITATIONS

RESEARCH INITIATION IN ENGINEERING FORMATION (PFE: RIEF)

The NSF Engineering (ENG) Directorate has launched a multi-year initiative, the Professional Formation of Engineers, to create and support an innovative and inclusive engineering profession for the 21st century. Professional Formation of Engineers (PFE) refers to the formal and informal processes and value systems by which people become engineers. It also includes the ethical responsibility of practicing engineers to sustain and grow the profession. The engineering profession must be responsive to national priorities, grand challenges, and dynamic workforce needs; it must be equally open and accessible to all.

Engineering faculty possess both deep technical expertise in their engineering discipline and the primary responsibility for the process of professional formation of future engineers. As such, engineering faculty are in a unique position to help address critical challenges in engineering formation. The Professional Formation of Engineers: Research Initiation in Engineering Formation (PFE: RIEF) program enables engineering faculty who are renowned for teaching, mentoring, or leading educational reform efforts on their campus to initiate collaborations with colleagues in the social and/or learning sciences to address difficult, boundary-spanning problems in the professional formation of engineers.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503603&org=EEC&from=home

RESEARCH IN THE FORMATION OF ENGINEERS (RFE)

The NSF Engineering (ENG) Directorate has launched a multi-year initiative, the Professional Formation of Engineers, to create and support an innovative and inclusive engineering profession for the 21st century. Professional Formation of Engineers (PFE) refers to the formal and informal processes and value systems by which people become engineers. It also includes the ethical responsibility of practicing engineers to sustain and grow the profession in order to improve quality of life for all peoples. The engineering profession must be responsive to national priorities, grand challenges, and dynamic workforce needs; it must be equally open and accessible to all.

As part of this initiative, the Research in the Formation of Engineers (RFE) program welcomes proposals that consider the construction of engineering knowledge, engineering identity, and the engineering profession, as well as interventions that expand the boundaries of each of these. Ultimately RFE aims to transform the engineering formation system, and thus the impact of proposed projects on this system must be described. PIs should provide a roadmap detailing how they envision the proposed research will eventually broadly impact practice within the engineering formation system, even if these activities are not within the scope of the submitted proposal.

Competitive proposals advance understanding in engineering formation by grounding the proposed work in theory as well as relevant prior work. Proposals should clearly address why the proposed research fills gaps in existing knowledge and address how evaluation will inform the research effort and allow assessment of the project's impact and effectiveness.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503584&org=EEC&from=home

BROADENING PARTICIPATION IN ENGINEERING (BPE)

The Broadening Participation in Engineering (BPE) Program is a directorate-wide initiative dedicated to supporting the development of a diverse and well-prepared engineering workforce. Across every educational juncture (e.g.,

elementary, secondary, and postsecondary levels), efforts to improve engineering interests, preparation, connections, experiences, and opportunities among underrepresented groups is of major importance to BPE.

In FY 2016, aligned with NSF-wide INCLUDES, BPE is interested in funding projects that bring together multiple groups (e.g., school districts, community colleges, engineering schools, industry, philanthropy, government) and offer the greatest return on investment by producing outcomes that are scalable, sustainable, and applicable to various contexts, settings, and demographics within the engineering enterprise. For example, it is interested research projects that help us to analyze and understand the problem of insufficient interest and poorly sustained participation in engineering across underrepresented demographic groups; insignificant preparation and scarce opportunities for members of underrepresented demographic groups to learn meaningful, relevant engineering and other STEM-related content; insufficient access to support systems and social networks that raises career awareness about different engineering pathways among underrepresented groups; and structural inequalities and biases within educational and workforce systems that may influence engineering persistence.

For FY 2016, BPE is equally interested in funding demonstration projects that focus on issues associated with diversity within the engineering professoriate, with a particular interest in proposals concentrating on racial and ethnic minorities. Such projects should be informed by the current theoretical and scientific literature as well as add to the extant knowledge base. Given the breadth of targeted groups, it is expected that all institutions of higher learning (i.e., 2-year and 4-year) have at least one if not more targeted demographics that they could propose a strategy for improving diversity (e.g., creation of a professoriate preparation program for graduate students, development of a postdoctoral program, or creation of a mentoring program for early career faculty). A successful proposal should, therefore, provide appropriate data to support selection of the targeted group(s), with specific and applicable objectives, demonstrate applicable knowledge of the relevant literature on underrepresentation, and describe a clear strategy for improving representation. These demonstration projects should also integrate assessment and evaluation protocols capable of measuring how well they achieve their stated objectives as part of the project management plans. The effectiveness of the proposed evaluation is one aspect of a project's intellectual merit. Similarly, there should be evidence of clear, measureable outcomes and consideration of how the strategy will work for disparate institutions. It is expected that proposed projects would advance our knowledge of this field in many ways.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504870&org=EEC&from=home

IUSE/Professional Formation of Engineers: REvolutionizing Engineering and computer science Departments (RED)

In FY 2016, the Directorates for Engineering (ENG), Computer and Information Science and Engineering (CISE) and Education and Human Resources (EHR) are continuing a program aligned with the Improving Undergraduate STEM Education (IUSE) framework: REvolutionizing engineering and computer science departments (herein referred to as RED). This funding opportunity enables engineering and computer science departments to lead the nation by successfully achieving significant sustainable changes necessary to overcome longstanding issues in their undergraduate programs and educate inclusive communities of engineering and computer science students prepared to solve 21st-century challenges.

In 2014, ENG launched an initiative, the Professional Formation of Engineers (PFE), to create and support an innovative and inclusive engineering profession for the 21st century. At the same time, in 2014, NSF launched the agency-wide Improving Undergraduate STEM Education (IUSE) framework, which is a comprehensive effort to accelerate improvements in the quality and effectiveness of undergraduate education in all STEM fields. The RED program was first offered in FY 2015 as a PFE initiative aligned with the IUSE framework. Additional programs have been created within the IUSE framework across NSF, such as the IUSE: EHR program within EHR.

Even as demographic and regional socio-economic factors affect engineering and computer science departments in unique ways, there are certain tenets of sustainable change that are common across institutions. For instance, the development and engagement of the entire faculty within a department are paramount to the process, and they must be incentivized. Departmental cultural barriers to inclusion of students and faculty from different backgrounds must be identified and addressed. Finally, coherent technical and professional threads must be developed and woven across the four years, especially (1) in the core technical courses of the middle two years, (2) in internship opportunities in the private and public sectors, and (3) in research opportunities with faculty. These and other threads aim to ensure that students develop deep knowledge in their discipline more effectively and meaningfully, while at the same time building their capacities for 21st-century and "T-shaped" professional skills, including design, leadership, communication, understanding historical and contemporary social contexts, lifelong learning, professional ethical responsibility, creativity, entrepreneurship, and multidisciplinary teamwork. It is expected that, over time, the awardees of this program will create knowledge concerning sustainable change in engineering and computer science education that can be scaled and adopted nationally across a wide variety of academic institutions. The research on departmental change that results from these projects should inform change more broadly across the STEM disciplines.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505105&org=EEC&from=home

Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (TUES)

The Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (TUES) program seeks to improve the quality of science, technology, engineering, and mathematics (STEM) education for all undergraduate students. This solicitation especially encourages projects that have the potential to transform undergraduate STEM education, for example, by bringing about widespread adoption of classroom practices that embody understanding of how students learn most effectively. Thus transferability and dissemination are critical aspects for projects developing instructional materials and methods and should be considered throughout the project's lifetime. More advanced projects should involve efforts to facilitate adaptation at other sites.

The program supports efforts to create, adapt, and disseminate new learning materials and teaching strategies to reflect advances both in STEM disciplines and in what is known about teaching and learning. It funds projects that develop faculty expertise, implement educational innovations, assess learning and evaluate innovations, prepare K-12 teachers, or conduct research on STEM teaching and learning. It also supports projects that further the work of the program itself, for example, synthesis and dissemination of findings across the program. The program supports projects representing different stages of development, ranging from small, exploratory investigations to large, comprehensive projects.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5741

Overview: Additional funding programs for ENED activities

NSF – Directorate for Engineering – Division of Engineering Education & Centers

- Improving Undergraduate STEM Education (IUSE): Exploration, ($150k over 2 yrs.)
- Improving Undergraduate STEM Education (IUSE): Deployment, ($300k over 3 yrs.)
- Improving Undergraduate STEM Education (IUSE): Transformation, ($3M over 5 yrs.)
- Nanotechnology Undergraduate Education (NUE) in Engineering ($200k over 2 yrs.)
- Research Initiation in Engineering Formation (PFE: RIEF), ($150k over 2 yrs.)
- Research in the Formation of Engineers (RFE), ($300k over 3 yrs.)
- Broadening Participation in Engineering (BPE), ($300k over 3 yrs.)

- Research Experience for Undergraduates (REU), ($330k over 3 yrs.)
- Research Experience for Teachers (RET) in Engineering and Computer Science, ($600k over 3 yrs.)
- Revolutionizing Engineering and Computer Science Departments (RED), ($2M over 5 yrs.)

NSF – Directorate for Education & Human Resources – Division of Research on Learning (DRL)

- EHR Fundamental Research in STEM Education: Level 1, ($500k over 3 yrs.)
- EHR Fundamental Research in STEM Education: Level 2, ($1.5M over 3 yrs.)
- EHR Fundamental Research in STEM Education: Level 3, ($2.5M over 5 yrs.)
- Advanced Technological Education (ATE): Planning, ($150k over 2 yrs.)
- Advanced Technological Education (ATE): Exploratory Research & Development, ($300k over 2 yrs.)
- Advanced Technological Education (ATE): Full Scale Research & Development, ($800k over 3 yrs.)
- Advancing Informal STEM Learning (AISL): Planning, ($150k over 1 yr.)
- Advancing Informal STEM Learning (AISL): Exploratory, ($300k over 2 yrs.)
- Advancing Informal STEM Learning (AISL): Practice, ($2M over 5 yrs.)
- Advancing Informal STEM Learning (AISL): Development, ($3M over 5 yrs.)
- Advancing Informal STEM Learning (AISL): Implementation, ($3M over 5 yrs.)
- Discovery Research PreK-12 (DRK-12): Level 1, ($450k over 3 yrs.)
- Discovery Research PreK-12 (DRK-12): Level 2, ($3M over 4 yrs.
- Discovery Research PreK-12 (DRK-12): Level 2, ($5M over 5 yrs.)
- Innovative Technology Experience for Students and Teachers (ITEST): Strategies, ($1.2M over 3 yrs.)
- Innovative Technology Experience for Students and Teachers (ITEST): Strategies, ($2M over 3 yrs.)
- Innovative Technology Experience for Students and Teachers (ITEST): Center, ($3.5M over 3 yrs.)
- STEM + Computing Partnerships (STEM+C): Exploratory, ($1.25M over 2 yrs.)
- STEM + Computing Partnerships (STEM+C): Development, ($2.5M over 3 yrs.)
- STEM + Computing Partnerships (STEM+C): Broadening Participation, ($600k over 3 yrs.)
- STEM + Computing Partnerships (STEM+C): CS-10k, ($1M over 3 yrs.)

NSF – Directorate for Education & Human Resources – Division of Undergraduate Education (DUE)

- Scholarships in STEM (S-STEM): Institutional Capacity, ($650k over 5 yrs.)
- Scholarships in STEM (S-STEM): Design & Development, ($1M over 5 yrs.)
- Scholarships in STEM (S-STEM): Multi-Institution, ($2M over 5 yrs.)

APPENDIX B: ENED COURSES AND RATIONALE

The contributions of engineering education to the graduate program/teaching mission of the College of Engineering can be examined by defining the following target groups of students.

1. **Effective teachers:** Graduate teaching assistants with a basic understanding of the scholarship of teaching and learning in the context of engineering and the ability to apply effective teaching strategies in the classroom
2. **Future scholarly educational practitioners**: Graduate students and future faculty members in traditional engineering disciplines with an interest in developing their teaching practice through sustained engagement with the scholarship of teaching and learning and educational research in engineering. A component of the goals for this group would be the ability to meaningfully conceptualize educational evaluation approaches in the context of the educational component of federal funding proposals.
3. **Future educational researchers:** Graduate students in the area of engineering research who pursue a career of engineering education research and engineering teaching.

Given these types of participants, two strands of engineering education graduate courses are proposed:

1. *Effective teaching techniques course (ENED7010):*
   This course provides a basic introduction to engineering education as a field and the notion of the scholarship of teaching and learning in the context of engineering. The main part of the course would be devoted to exploring the theoretical foundations and acquiring the practical abilities that will allow students to employ effective and innovative instructional strategies in the classroom. This course addresses the needs of **effective teachers** and serves as an entry point for **future scholarly educational practitioners** into the field. The course would be recommended for graduate teaching assistants.
2. *Engineering education SOTL and research courses (ENED 8010 – 8040):*
   This group of four courses explores the relationship between fundamental research and the scholarly educational practice with respect to (1) the foundations and language of the field as well as the landscape of research and innovation activity (ENED 8010: Eng Ed Research), (2) the underlying theoretical foundations of human learning and development (ENED 8040: Eng Ed Theory), current issues and future trends in the field (ENED 8020: Eng Ed Issues) and methods of educational evaluation and research (ENED 8030: Eng Ed Methods). This group of courses beneficially integrates the needs and goals of both **scholarly educational practitioners** and **educational researchers**.

APPENDIX C: EXAMPLE PLAN OF STUDY

When proposed at a later stage, the Ph.D. in Engineering with an emphasis in engineering education is intended to provide students with the foundations necessary to pursue a thesis or dissertation in engineering education research. These courses provide both the fundamental educational research core and a core in the emerging discipline of engineering education research. The Ph.D. in Engineering with an emphasis in engineering education requires a minimum of 36 credit hours (in addition to research hours).

Ph.D. Course Requirements

Required Courses for all Ph.D. Engineering Students (9 hours):

ENGR 8910	Research & Design Methods	3
ENGR 8103	Computational Engineering	3
GRSC 8100	Technology Commercialization	2
ENGR 8950	Seminar	1

Required Courses for Engineering Education Ph.D. Students (24 hours)

ENED 8010	Engineering Education Research	3
ENED 8020	Engineering Education Issues	3
ENED 8030	Engineering Education Research Methods	3
ENED 8040	Engineering Education Theory	3
QUAL 8400	Qualitative Research Traditions	3
QUAL 8410	Designing Qualitative Research	3
QUAL 8420	Analyzing Qualitative Data	3

Elective Courses (choose one from the following):

QUAL 8520	Interviewing in Qualitative Research	3
QUAL 8530	Case Study Research	3
QUAL 8540	Participant Observation	3
QUAL 8525	Narrative Analysis	3

Appendix D: Letters of Support

Appendix D1: Letter of Support from Dean Leo (CENGR)

Appendix D2: Letter of Support from Dr. Watson (CTL)

Appendix D3: Letter of Support from Dean Kennedy (COE)

Appendix D4: Letter of Support from Dr. Lemons (SEER)

Appendix D5: Letter of Support from Dean Scheyett (SSW)

Appendix D6: Letter of Support from Dr. Cook (Diversity Office)

Appendix D7: Letter of Support from Dean Barbour (Graduate School)

College of Engineering

October 6, 2016

Dr. Joachim Walther
Associate Professor, College of Engineering
Driftmier Engineering Center
University of Georgia
CAMPUS

Dear Dr. Walther,

It is my pleasure to provide this letter of support from the College of Engineering for the proposed *Engineering Education Transformation Institute* (EETI). Your vision, and that of your faculty team who helped define its mission, have established a framework and roadmap for EETI that will result in impact both across the College of Engineering as well as campus-wide. For the reasons and in the ways outlined in this letter of support, the College of Engineering enthusiastically commits to its role as administrative home of EETI and looks forward to helping to shepherd the institute's growth and serve as an effective steward for the crosscutting programs EETI develops.

EETI's vision to become an innovative, embedded engineering education institute is timely in that it responds to the national need for increasing the number and diversity of engineering students combined with the recognized need for novel and creative ways to educate engineering students to adequately prepare them for the complex, global challenges of this century. This vision of EETI is strongly consistent with that of the College of Engineering. The College views the Institute as a critical cross-cutting organization for us as we continue to grow and can serve to further differentiate our programs and our students.

The College of Engineering will strongly support the EETI in its role as EETI's home administrative unit. The College will provide the necessary faculty time and staff support for Dr. Walther to undertake the responsibilities of leading the institute. CENGR will provide the initial support and work to maintain and grow a diversity of support for institute programs that are central to achieving its mission including proactive publication and proposal writing activities, developing partnerships, travel for program development and outreach, and workshops. The College will provide existing space for operation of EETI. Through the membership of Dr. Hornak, CENGR Associate Dean for Research on EETI's Internal Advisory Board, we will work with other collaborating units to facilitate EETI's operation.

I look forward to the establishment of EETI as a formal UGA Institute. The College is committed to working with you and your team for the benefit of the College and campus as you bring EETI national recognition.

Sincerely,

Donald J. Leo, Ph.D.
Dean
UGA Foundation Professor in Engineering

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The University of Georgia

Center for Teaching and Learning

September 14, 2016

Joachim Walther, Ph.D.
Associate Professor
University of Georgia
College of Engineering
609 Driftmier Engineering Center
Athens, GA 30602

Dear Dr. Walther,

It is a pleasure to provide this letter in support of your exciting effort to form the Engineering Education Transformations Institute as a vehicle to build a community of educators and scholars engaged in efforts around teaching and learning in the College of Engineering. I was excited to learn about this unique way of combining the scholarship of teaching and learning, instructor professional development and explicit community building as a way to transform the culture around engineering education in your college.

This effort leverages and will further expand prior connections that exist between the Center for Teaching and Learning (CTL) and the College of Engineering in the form of, for example, Learning Technology Grants and teaching consultations with individual faculty. I am enthusiastic about the opportunities we discussed to utilize the CTL structures and programs around promoting teaching excellence to support your integrated efforts in the institute. The CTL College/Department Partnership program offers a great opportunity to tailor our program offerings to the engineering education context and contribute to the excellence in engineering teaching in a purposeful and sustained fashion.

I am looking forward to continuing our conversations and am committed to building a closer, long-term connection between CTL and the College of Engineering through the infrastructure afforded by the Engineering Education Transformations Institute.

I strongly support this exciting effort and am happy to provide help in any way I can.

Yours Sincerely,

C. Edward Watson, Ph.D.
Director, Center for Teaching and Learning
Fellow, Institute of Higher Education

Instructional Plaza • Athens, Georgia 30602-3016 • Telephone (706) 542-1355 • Fax (706) 542-6587

The University of Georgia

College of Education
Office of the Dean

6 September 2016

Joachim Walther, PhD
Associate Professor
Driftmier Engineering Center, Room 609
University of Georgia
Athens, GA 30602

Dear Dr. Walther:

I am pleased to write this letter of support for the formation of the Engineering Education Transformations Institute in the College of Engineering. I am excited about the institute's focus on connecting innovative improvement of educational practice with educational research to transform the culture around teaching and learning in the College of Engineering.

The institute will assist in encouraging innovation between our colleges creating collaborative efforts to structure and strengthen educational work in this important STEM discipline. This initiative will also continue to enhance students' research and its effectiveness in the engineering education field.

The College of Education looks forward to working with you and exploring future ways for interdisciplinary collaborations with the formation of the Engineering Education Transformations Institute.

Sincerely,

Craig H. Kennedy, PhD
Dean and Professor

Aderhold Hall • Athens, Georgia 30602-7101 • Telephone 706-542-6446 • Fax 706-542-0360

The University of Georgia

Franklin College of Arts and Sciences
Department of Biochemistry and Molecular Biology

August 31, 2016

Dear Jo,

Thank you for the opportunity to discuss the vision and plan for the Engineering Education Transformations Institute to be established within the College of Engineering. I was excited to hear about this effort to create and foster a local community and shared capacity around the scholarship of teaching and learning in the engineering context.

I appreciate your broad vision for engineering education that includes aspects of STEM education but also emphasizes the notion of professional education, which is significant for the engineering discipline. In the context of STEM education work, I see numerous promising opportunities to connect educational efforts in the context of the engineering sciences with the work in discipline-based education research pursued by the SEER Center.

I foresee that the Engineering Education Transformations Institute will provide a recognizable structure and support for educational work in your college and thus provide a crucial point of contact for establishing interdisciplinary collaborations in areas of shared interest. I am looking forward to the exciting, new opportunities that will arise from these synergies between SEER and EETI and am confident that participation in shared activities will be extremely beneficial for the mission of both units.

Please let me know if there are any other ways in which I can support this exciting effort.

Best,

Paula P. Lemons, Ph.D.,
Associate Professor
Director, SEER (Scientists Engaged in Education Research) Center
seercenter.uga.edu

The University of Georgia

School of Social Work
Office of the Dean

September 6, 2016

Jo Walther, PhD
Assistant Professor
College of Engineering
University of Georgia

Dear Dr. Walther,

I am very pleased to provide this letter in support of your initiative to form the Engineering Education Transformations Institute in the College of Engineering. This is an exciting development for engineering at the University of Georgia and will provide significant opportunities to expand the collaborative relationship between the School of Social Work and your college. Your collaborative work with Dr. Shari Miller that was funded by the National Science Foundation is a great example for the potential of collaborative educational research in this inter-professional space.

In my role as the Dean of the School of Social work I am committed to promoting and further expanding this innovative interdisciplinary collaboration and am confident that the proposed institute will proved the necessary structure and intellectual home for these activities to reach their full potential. In this context, I appreciate your broad vision of engineering education and feel that the inclusion of the discipline of engineering in the emerging discourse around inter-professional education has the potential to significantly advance your field and, at the same time, provide important impulses to further the broader conversation.

In a prior deanship at the University of South Carolina I was part of the development of a collaboration among social work, engineering, and the health sciences to create a center of gerontechnology called SmartHOME. This collaboration was immensely successful, with innovative initiative such as anR25 training grant for underrepresented students interested in STEM fields to use technology to improve care for older adults. I believe this Engineering Transformation Institute provides a similar opportunity for innovation and collaboration among seemingly disparate fields in the service of solving the grand challenges of the day.

Given my interest in and the significance of this effort I would be delighted to serve as an advisory board member for the Engineering Education Transformations Institute and provide input and support in this crucial phase of its formation.

Sincerely,

Anna Scheyett, MSW, PhD
Dean and Professor

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An Equal Opportunity/Affirmative Action/Veteran/Disability Institution

Office of Institutional Diversity
Associate Provost

Dr. Joachim Walther
University of Georgia
College Of Engineering
0609 Driftmier Engineering Center
Athens, GA 30602

Dear Dr. Walther,

I am very pleased to provide this letter of support for the Engineering Education Transformations Institute. The institute will provide a great focal point for activities around diversity in the College of Engineering and I was excited to learn about the central role that diversity and inclusiveness play in your compelling vision for the institute.

I recognize the particular need for and specific context of diversity work in the engineering setting and am excited about the many opportunities to establish beneficial connections between the work of my office and the efforts of the institute. Diversity in the STEM area, and particularly in engineering, are of key importance for the development of these fields and through the strategic partnership between the Office of Institutional Diversity and your institute, I feel we can make contributions to these crucial efforts in ways that can overcome the persistent challenges that diversity efforts still face in the engineering context.

For these reasons, I strongly support the formation of the Engineering Education Transformations Institute and am also excited to serve as a member of your advisory board. Through this role I hope to contribute my perspective and expertise to this crucial phase of establishing the structures and the culture of this exciting, new unit.

Please let me know if there are other ways that I, or my office can assist with this project moving forward.

Sincerely,

Michelle Cook

Michelle Cook, Ph.D.
Associate Provost & Chief Diversity Officer
Peach State LSAMP Lead Co-PI

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The University of Georgia
Graduate School

August 27, 2016

Dr. Joachim Walther
Associate Professor, College of Engineering
University of Georgia
Athens, GA 30602

Dear Dr. Walther:

I am pleased to provide this letter of support for your proposed Engineering Education Transformations Institute (EETI). This is a timely proposal that addresses the critical need to enhance recruitment and retention of underrepresented individuals into the field of engineering. I am familiar with your work in the field of engineering education research and applaud your efforts to infuse "humanity" into the strategies we use to train the next generation of engineers. Your proposed plans to engage underrepresented students, engage engineering faculty in the scholarship of teaching and learning, provide comprehensive training for graduate students, and increase scholarship in engineering education are timely and appropriate for the University of Georgia to undertake at this time. I view the EETI as a model for STEM educators in other disciplines at the University of Georgia. In this regard, I hope you will continue to reach out to those individuals, build bridges with their units, and consider broadening the mission of EETI to include other STEM disciplines as well.

I am happy to serve on the Internal Advisory Board of the EETI. In my role as graduate dean, I am also happy to facilitate your interactions with other STEM units, with the ultimate goal of incorporating your innovative strategies into their instructional methods.

Please do not hesitate to contact me if you have questions or concerns about the contents of this letter. You can reach me at 706-542-6392 or graddean@uga.edu.

Best regards

210 South Jackson Street • Athens, Georgia 20602-1633
grad.uga.edu