Nomination Packet for the 2022 F. Jay Taylor Undergraduate Teaching Award

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A. List of undergraduate courses taught, enrollment as of 9th day rosters (Enrolled), retention rates from final enrollment (Retained), and overall student evaluation scores

Quarter	Course	Retained/Enrolled	% Retained	Eval. Score
Fall 2016	ENGR-120-006	35/43	81	3.8
	ENGR-220-002	34/49	69	3.2
	FYE-100-018	27/27	100	n/a
	HNRS-120-H01	22/22	100	3.7
Winter 2016-17	ENGR-122-002	15/17	88	4.0
	ENGR-220-003	27/43	63	3.8
	HNRS-121-H07	11/12	92	3.9
Spring 2017	ENGR-120-001	22/28	79	3.9
	HNRS-122-H06	23/23	100	3.9
Fall 2017	ENGR-120-006	31/42	74	3.9
	ENGR-121-001	20/21	95	3.8
	FYE-100-013	36/36	100	n/a
Winter 2017-18	ENGR-122-001	49/52	94	3.7
	HNRS-121-H05	17/17	100	3.8
Spring 2018	ENGR-120-001	22/28	79	3.9
	ENGR-122-004	23/23	100	3.9
	ENGR-189A-001	28/28	100	n/a
Fall 2018	ENGR-120-004	33/36	92	3.9
	ENGR-121-001	36/37	97	4.0
	ENGR-189A-001	35/36	97	n/a
	FYE-100-013	40/40	100	n/a
Winter 2018-19	ENGR-121-007	19/22	86	3.8
	ENGR-122-001	31/31	100	4.0
	ENGT-121-001	9/10	90	4.0
Spring 2019	ENGR-120-003	17/24	71	4.0
	ENGR-122-004	29/32	91	4.0
Fall 2019	ENGR-120-004	29/31	94	3.9
	ENGR-189A-001	31/31	100	3.9
	ENGT-120-001	10/11	91	4.0
	FYE-100-013	38/38	100	4.0
Winter 2019-20	ENGR-121-005	27/29	93	3.9
	ENGR-122-001	35/36	97	3.7
	ENGT-121-001	14/16	88	4.0
Spring 2020	ENGR-120-001	18/22	82	4.0
	ENGR-189A-001	21/22	95	4.0
	HNRS-122-H01	19/19	100	3.9
Fall 2020	ENGR-120-003	26/30	87	4.0
	ENGT-120-001	12/13	92	3.9
	FYE-100-023	30/31	97	4.0
Winter 2020-21	ENGR-121-001	22/23	96	4.0
	ENGT-121-001	13/13	100	4.0
Spring 2021	ENGT-222-001	14/14	100	3.6
	HNRS-122-H03	24/24	100	4.0
Fall 2021	ENGR-120-002	28/28	100	4.0

	ENGR-121-002	35/38	92	3.7
	ENGR-189A-001	28/28	100	4.0
	HNRS-100-H13	47/47	100	3.9
Winter 2021-22	ENGR-121-001	27/29	93	4.0
	ENGR-122-001	18/20	90	3.8
	ENGT-121-001	23/25	92	3.9
Spring 2022	ENGT-222-001	24/25	96	3.9
	HNRS-122-H03	24/24	100	3.9
Fall 2022	ENGR-189B-001	23/24	96	4.0
Winter 2022-23	ENGR-189B-001	20/20	100	4.0
Spring 2023	ENGR-189B-002	tbd/18	tbd	tbd

Since starting at Louisiana Tech in fall of 2016, I have taught 16 different courses for a total of 55 different course sections. From Fall of 2016 to Spring of 2022, I taught an average of 3 courses per quarter as a lecturer. Beginning in Fall of 2022, I transitioned to a tenure track position and began teaching one class per quarter along with conducting my engineering education research which is directly related to undergraduate teaching. My average teaching evaluation rating is 3.9/4.0 and my overall retention percentage is 93%.

B. Personal statement of beliefs concerning the significance of undergraduate teaching within the overall mission of Louisiana Tech University

Many aspects of the Louisiana Tech's mission statement align with my beliefs towards undergraduate teaching. Specifically, quality teaching, creative activity, challenging coursework, supportive community, and workforce development are all crucial factors to the success of our students, and they are fundamental to my approach to teaching. As an instructor, I believe that we have a unique opportunity to positively impact the lives and future careers of our students. I strive to create a ***supportive community*** that ***challenges*** students through ***high-quality teaching*** and engagement while fostering ***creativity*** and preparing students for ***future success***.

I predominantly teach in the first-year engineering curriculum. With each new academic year, I look forward to meeting the incoming class of students. I enjoy seeing the students grow and develop as individuals during the academic year. The first year is critical for their success, and I do not take it lightly that they will potentially view me in roles beyond their instructor. They often see me as a role model, a mentor, and as an authority that can help guide them through their academic and career goals. I recall my perspective when I was their age; much of my approach to these first-year students is rooted in my experience at their same stage in life.

My experience as a homesick and struggling first-year engineering student at Louisiana Tech taught me the significant role instructors play in retention and empowering students to live up to their potential. I was incredibly fortunate to have the structure of the first-year engineering course sequence to provide me with engaging faculty who supported, challenged, and encouraged me. Without this experience, I am confident I would not be where I am today. The first-year engineering curriculum and faculty provided me with the foundation that I needed to be successful, and it inspired me to become a professor. Now, I have the honor of working with many of the faculty members who mentored me as a student. I get the opportunity to pay it forward to each new class of students. I continue to strive to keep the ideals of community and support alive while working to grow our programs to meet the changing needs of our students.

In all my courses, I place heavy emphasis on fostering a supportive and collaborative environment that emphasizes community. I challenge my students through creative engagement and project-based learning, pushing them to see their capabilities and experience the satisfaction that comes with

persevering through difficult problems. As a passionate advocate for quality undergraduate engineering education, I view it as a privilege to work with students and have an impact on their education, experiences, and future careers.

C. Important innovations in undergraduate teaching

Living with the Lab

As First-Year Engineering Coordinator, I am constantly developing, improving, and maintaining content for the first-year engineering and engineering technology course sequences called Living with the Lab (LWTL), which are taught by a team of 14-20 faculty each year. My work in this role directly impacts the undergraduate instruction of every student who enrolls in these courses (approximately 600, 400, 300, and 30 students each Fall, Winter, Spring, and Summer Quarter, respectively). I revise existing course materials and create new original content as I seek to keep the content fresh and challenging. I have scaffolded the content in each course to foster deep understanding while maintaining rigor. Through this process, I have improved existing content, developed new projects in each course, and created new and additional support materials to enable faculty instruction and undergraduate student learning. The product of this work can be seen in the over 200+ new resources that I developed in various forms such as presentations, videos, rubrics, homeworks, class plans, etc. Students and faculty access these resources through the LWTL website which I maintain and update each quarter.

Course to Increase Student Retention & SUCCESS Scholars Program

I developed a course to help with retention of undergraduate students in the first quarter of their first-year engineering course. I looked at data from Fall 2012 to Winter 2017-18 and realized the DFW rate was high (averaging 44% DFW out of the 3,418 students). This inspired me to make a change. I developed a supplemental course, ENGR 189A, to be offered in conjunction with ENGR 120 where students can receive more contact hours with their instructor, time in the classroom, and access to more conceptual problems. After offering this course multiple times, I found a measurable increase in retention. The ENGR189A students experienced a 25% pass rate increase as well as a 10-point increase on midterm and final exam performance. For the quarters when the ENGR 189A was offered, the DFW rate for these students was 12% compared to 37% for those not in the ENGR189A course. From the positive impact of ENGR 189A course, the SUCCESS Scholars program was developed.

In Fall the of 2022, I received a $1.5mil grant from NSF to support a project called “S-STEM SUCCESS: Supporting Undergraduates through Curricular and Co-Curricular Engagement and Student Scholarships.” From this grant, I have been able to create a full multi-year academic, career, and financial support program for low-income students (an at-risk population for attrition). I developed the SUCCESS Scholars Program to build a strong academic foundation in the first year. Students meet with me (their engineering instructor) three days a week instead of two. This structure is modelled after the ENGR 189A course; however, now the experience is expanded to the full year instead of just one quarter. Additionally, I developed supplemental instruction sessions for the students which occur at least three days a week and are led by peer mentors. These sessions are designed to help students with their mathematics and engineering courses while also giving them peer role models and community engagement. Over the course of the year, I have provided these students with career development seminars, an industry tour, and multiple community building activities. Another critical component of the SUCCESS Scholars Program is pairing each student with a faculty mentor in their discipline who will help guide them with career and academic decisions. With each cohort, the students will be supported through four full academic years. As students progress academically, I will evolve the focus of the program to meet their changing needs.

Preliminary results of the SUCCESS Scholars Program have shown significant positive impacts. Students consistently perform roughly 10 points higher than their comparable cohorts on both their mathematics and engineering course examinations. Students are engaged in University and COES activities and organizations with some holding leadership positions. Three students in the program were selected as Outstanding Freshmen of the Year for the COES. One student has secured an internship (rare for first-year engineering students) with others receiving interview requests. A group from the cohort was selected as the First-Place Overall Project out of 88 teams at the First-Year Projects Showcase. Seeing these positive impacts is incredibly rewarding. I look forward to continuing to develop new resources for these students, provide more opportunities, and see them grow with each year.

Female Student Engagement

Empowering women in STEM is a passion of mine. Together with my Co-Director of the Office for Women in Science and Engineering (OWISE), we developed a series of student engagement and support events. Each month we host at least one enrichment opportunity for undergraduate students. Events this past year included a professional development seminar on interview tips, defining your personal brand, imposter syndrome, alumni talks, meet-the-faculty night, and many more. These monthly OWISE events can range in attendance from about 20 to over 100 students.

I recently received a $4000 mini grant to fund a seed project called, "INSPIRE: Introducing New Skills & Proficiencies In Reassuring Experiences." The goal of this project is to increase retention of the incoming class of female students by fostering a sense of community, support, and connection to the college as well as building confidence with equipment used in their classes. The first-quarter female students will be invited to an outside of class immersive workshop that will have activities focused on using laboratory equipment and community building with their peers, upper-level female students, and female faculty mentors. Over the summer, I will finalize the activities for this project and will implement it this Fall with the intent of growing the INSPIRE initiative into a larger more comprehensive experience.

D. Recent or relevant publications, papers, and/or presentations related to teaching

Cruse, K. **(Co-Presenter)**, Boyet, C. (Co-Presenter), Holloway, H., Savercool, L., "Measuring the Impact of an Enrichment Program for First-Term Undergraduate Engineering Students in Mathematics and Engineering Curricula," Proceedings of the American Society for Engineering Education, Baltimore, MD, (June 25 – 28, 2023).

Cruse, K. **(Presenter)**, Hall, D., Hollins, B., Kidd, C., Long, W., "A Thermoelectric Cooling Project to Improve Student Learning in an Engineering Technology Thermodynamics Course," Proceedings of the American Society for Engineering Education, Baltimore, MD, (June 25 – 28, 2023).

Niemirowski, J., Hall, D., Cruse, K., "Implementation and Evaluation of a Predictive Maintenance Course Utilizing Machine Learning," Proceedings of the American Society for Engineering Education, Baltimore, MD, (June 25 –28, 2023).

Farman, B., Clifton, A., Cruse, K., Long, W., "Implementing Standards Based Grading in STEM," For Our Futures Conference, Lake Charles, LA, (March 26 – 28, 2023)

Reis, L., Corbett, K. **(Co-Presenter)**, DeLeo-Allen, A., "Closing the Socioeconomic and Academic Gaps to Increase Education Equity in STEM," 2020 Virtual Conference on Transforming STEM Higher Education: This Changes Everything (2020, November 5-7).

Corbett, K. **(Presenter)**, Evans, K., McAdams, S., Gaudin, J., Walker, M., Fontenot, T., "Work in Progress: Developing a Model for Student-led Peer Mentorship Programs," Proceedings of the American Society for Engineering Education, Salt Lake City, UT (June 24 – 27, 2018).

Corbett, K. **(Presenter)**, "Work in Progress: Redesigning Curriculum to Foster Student Success," Proceedings of the American Society for Engineering Education, Salt Lake City, UT (June 24 – 27, 2018).

E. Additional pertinent information

E.1 Grants

- PI on Alan Alda Center for Women in STEM Leadership Mini-Grant (**funded, $4,000**) 2023 - Present
  - INSPIRE: Introducing New Skills & Proficiencies In Reassuring Experiences
- PI on NSF S-STEM Proposal (**funded, $1,499,870**), 2022 - Present
  - S-STEM SUCCESS: Supporting Undergraduates through Curricular and Co-Curricula Engagement and Student Scholarships
- Co-PI on NSF Advanced Technological Education Grant (**funded, $287,948**), 2018 – Present
  - Controlling, Operating, and Measuring: Pathways for Learners to Engr. Technology Employment
- PI LaSpace proposal (**funded, travel and program expenses**), 2019
  - LA Space Consortium RockOn Program, mentored a team of three female COES undergraduate students at NASA Wallops Flight Facility in Virginia.

E.2 Keynote Addresses & Invited Talks

- "Sharing Their Journey: A Female STEM Professionals Panel," Women's Week, (Ruston, LA)
- Beyond 1894 – Women in STEM Podcast Invited Guest Speaker (Ruston, LA)
- COES Women in STEM at LA Tech Panel at Spring Recruitment Day (Ruston, LA)
- "Student Led Peer Mentorship Programs" at OWISE Faculty Luncheon (Ruston, LA)

E.3 Professional Development Workshops & Courses

- Louisiana Tech Leadership Institute (LTLI), 10/2022-5/2023
- 2023 NSF ENG CAREER Workshop, 5/2023
- Alan Alda Center for Women in STEM Leadership, 1/2023-2/2023
- Delta Junior Faculty Institute, American Society for Engineering Education, 10/2022
- ProQual Institute for Engineering Ed. Research Methods (University of Georgia), 9/2021 - 12/2021
- National Effective Teaching (NETI) Workshop, 9/2020

E.4 Service to the College of Engineering and Science and Louisiana Tech University

- Louisiana Tech University GER Committee, 2022 - Present
- Louisiana Tech University Honors Curriculum Committee, 2022-Present
- PhD advisor (2 students) & Graduate student committee member (2 students), 2019 - Present
- Engineering Science Foundation Board, faculty representative, 2016 – 2022
- Society of Women Engineers (SWE) faculty advisor, 2016 - Present
- Academic advisor to 45+ Mechanical Engineering undergraduate students per quarter, 2016 - Present
- Mechanical Engineering senior design advisor (various groups), 2016 – Present
- Instructor of FYE 100 First-Year Experience, 2016 – 2021
- Develop and facilitate peer-mentorship training for student organizations, 2018 – 2020
- Faculty search teams (ISERC tenure track and ENGR/ICET lecturer), 2017 – 2020

E.5 Awards

- Leadership in Diversity, Equity, and Inclusion Strategic Initiatives Award (LA Tech), 2022
- F. Jay Taylor Undergraduate Teaching Award Finalist (LA Tech), 2022
- Featured Faculty for College of Engineering and Science at La Tech Football Game (LA Tech, 2022)
- Student Learning and Success Award for College of Engineering and Science (LA Tech), 2019
- Student Quality and Outreach Award for College of Engineering and Science (LA Tech), 2018

E.5 Professional Membership

- American Society for Engineering Education, 2008 – Present
- American Society of Mechanical Engineers, 2004 - 2009 & 2015 - 2017