

Nomination Packet for the 2024 Virgil Orr Junior Faculty Award

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First-Year Engineering Programs Coordinator & Director of OWISE
Assistant Professor, Mechanical Engineering

A. List of undergraduate courses taught, including overall student evaluation scores

Since starting at Louisiana Tech in the Fall of 2016, I have taught 16 different courses, for a total of 58 different course sections. From the Fall of 2016 to the Spring of 2022, I taught an average of 3 courses per quarter as a lecturer. Beginning in the Fall of 2022, I transitioned to a tenure-track position and began teaching one class per quarter while also conducting my engineering education-related research. My overall average teaching evaluation rating is 3.9/4.0.

Quarter	Course	Eval. Score
Fall 2016	ENGR-120-006	3.8
	ENGR-220-002	3.2
	FYE-100-018	n/a
	HNRS-120-H01	3.7
Winter 2016-17	ENGR-122-002	4.0
	ENGR-220-003	3.8
	HNRS-121-H07	3.9
Spring 2017	ENGR-120-001	3.9
	HNRS-122-H06	3.9
Fall 2017	ENGR-120-006	3.9
	ENGR-121-001	3.8
	FYE-100-013	n/a
Winter 2017-18	ENGR-122-001	3.7
	HNRS-121-H05	3.8
Spring 2018	ENGR-120-001	3.9
	ENGR-122-004	3.9
	ENGR-189A-001	n/a
Fall 2018	ENGR-120-004	3.9
	ENGR-121-001	4.0
	ENGR-189A-001	n/a
	FYE-100-013	n/a
Winter 2018-19	ENGR-121-007	3.8
	ENGR-122-001	4.0
	ENGT-121-001	4.0
Spring 2019	ENGR-120-003	4.0
	ENGR-122-004	4.0
Fall 2019	ENGR-120-004	3.9
	ENGR-189A-001	3.9
	ENGT-120-001	4.0
	FYE-100-013	4.0

Quarter	Course	Eval. Score
Winter 2019-20	ENGR-121-005	3.9
	ENGR-122-001	3.7
	ENGT-121-001	4.0
Spring 2020	ENGR-120-001	4.0
	ENGR-189A-001	4.0
	HNRS-122-H01	3.9
Fall 2020	ENGR-120-003	4.0
	ENGT-120-001	3.9
	FYE-100-023	4.0
Winter 2020-21	ENGR-121-001	4.0
	ENGT-121-001	4.0
Spring 2021	ENGT-222-001	3.6
	HNRS-122-H03	4.0
Fall 2021	ENGR-120-002	4.0
	ENGR-121-002	3.7
	ENGR-189A-001	4.0
	HNRS-100-H13	3.9
Winter 2021-22	ENGR-121-001	4.0
	ENGR-122-001	3.8
	ENGT-121-001	3.9
Spring 2022	ENGT-222-001	3.9
	HNRS-122-H03	3.9
Fall 2022	ENGR-189B-001	4.0
Winter 2022-23	ENGR-189B-001	4.0
Spring 2023	ENGR-189B-002	4.0
Fall 2023	ENGR-189B-001	4.0
Winter 2023-24	ENGR-189B-001	TBD
Spring 2024	ENGR-189B-001	TBD

B. Description of activities in which the nominee has engaged to benefit the students, faculty, and university community and performance evaluations by your superior(s)

B.1 Examples of engagement that benefits the students, faculty, and university community

Throughout my time at Louisiana Tech, I have had the honor of serving in many roles and engaging with others across campus allowing me to impact students, faculty, and the greater university community. Provided are highlights of my roles, activities, and initiatives in which I have led and participated that have had broad-reaching impacts.

First-Year Engineering Programs Coordinator

As the First-Year Engineering Programs Coordinator (FYEPC), I provide resources and support and interact with every first-year engineering student while also guiding a team of 14-20 faculty from different engineering disciplines who teach the 50-60 sections of the three-part first-year course sequence, Living with the Lab (LWTL), each year. In addition to

coordinating the logistics of each course and section, I strive to keep the content challenging and relevant by constantly revising existing course materials and creating new content. These improvements and updates can be seen in over 200+ new resources that I developed in various forms, such as presentations, projects, videos, rubrics, homework, class plans, etc. Students and faculty access these resources through the LWTL website, which I maintain and update each quarter, enabling faculty instruction and undergraduate student learning.

As part of my role as the FYEPC, I coordinate the First-Year Projects Showcase which significantly contributes to students, faculty, and the community. Initially, this event was limited to only first-year engineering students. However, I have collaborated with my counterpart in the computer science department to expand the event to include the first-year Living with Cyber Program. We offer the event each quarter, but the spring is our largest, with approximately 115 teams of first-year students showcasing their final design products. This is a celebration of all the students' hard work over the course of the entire year. I coordinate over 80 guests consisting of COES faculty, faculty from across campus, staff, upper-level students, alumni, and industry partners, along with regional community leaders who help evaluate the projects while interacting with our students.

COES SUCCESS Scholars Program

The COES SUCCESS Scholars Program (SSP) is funded through a \$1.5 million NSF S-STEM grant to provide academic and financial support for low-income, academically talented engineering students. As the PI, I based the SSP on a pilot program that I developed in 2018 which helped increase the retention of first-quarter first-year engineering students. I created a supplemental course offered in conjunction with ENGR 120 where students received more contact hours with their instructor, time in the classroom, and access to more conceptual problems. I found a measurable increase in retention for students taking the supplemental course – a 10-point average increase on their midterm and final exams with a DFW rate of 12% compared to 37% for those not enrolled in the supplemental course. With the NSF funding, I now offer financial assistance and resources to SUCCESS Scholars throughout their four-year journey. In their first year, I expanded the supplemental course to cover the entire first-year curriculum and introduced additional resources such as peer mentorship, after-hours supplemental instruction, career help, industry field trips, community building and engagement events, and faculty mentorship. While many support components persist as students advance academically, some are being adapted to meet their evolving needs.

The SSP has not only deeply impacted the students but also the faculty team supporting it. Alongside the grant team, faculty mentors from various engineering disciplines provide academic advising and conduct individual and group meetings to guide students through their college journey and career exploration. Regular group lunches and professional development sessions offer faculty a relaxed setting for both inter-faculty and student interaction. Because the faculty mentors come from different engineering disciplines, a collaboration has naturally formed between faculty who may not have otherwise interacted. These collaborations have led to research efforts resulting in multiple published papers for the program. Additionally, the faculty mentors often attribute their excitement for being part of the SSP to not only the interactions with the students but also the opportunities it has provided for engaging with each other.

Kern Entrepreneurial Engineering Network (KEEN)

KEEN is a non-profit foundation that has fostered a national network of engineering schools to support engineering education initiatives. Recognizing that all of the COES could benefit from joining KEEN, I led the COES in the application partnership application, which involved meetings to create college-wide awareness, bringing in a national speaker, connecting faculty with summer professional development, and completing the application paperwork. In the Spring of 2024, Louisiana Tech COES was selected as a KEEN partner, granting access to educational resources, professional development opportunities, annual discretionary funding, and requests for proposals of large grants. The KEEN partnership benefits both faculty and students by giving faculty resources to transform our engineering education.

Office of Women in Science and Engineering (OWISE)

I serve as the Director of the OWISE where I provide opportunities and resources for professional and personal development for female STEM students and faculty. Each month, I coordinate and host an enrichment event for female STEM students, featuring career readiness discussions, invited industry speakers, and community-building activities. Each March, I collaborate with two student organizations (Society of Women Engineering and Women in Cyber Security) to host COES Women's Week which is an amazing week full of Women in STEM-centered activities, seminars, guest speakers, charity drives, and even a Cyber scavenger hunt. It is an opportunity for the two student organizations to come together with the support from OWISE and engage with the greater COES student body.

While OWISE is a COES-supported office, I use my role as director to support female STEM faculty across campus through monthly OWISE luncheons. Faculty from COES, ANS, and COEHS are often represented. Through this venue female faculty are given a safe space to discuss issues and concerns related to their career and lives. The structure of each

lunch can shift where sometimes, a faculty member will volunteer to present, or a guest speaker is brought in to highlight a topic relevant to the group. Occasionally, we will have a fun activity that helps build community. Each lunch provides the opportunity for female faculty across campus to connect and engage with their broader community of peers.

INSPIRE: Introducing New Skills and Proficiencies through Immersive Reassuring Experiences

In the Spring of 2023, I was awarded a mini-grant through the Alan Alda Center for Communicating Science that funded INSPIRE, a program I developed to help support first-quarter female engineering students. Through an OWISE event, I received feedback from female students that the first-year engineering classroom could be intimidating, especially given the small number of females in each section. In the Fall of 2023, I offered INSPIRE, a weekend workshop experience to first-quarter first-year female engineering students that gave them experience on milling machines and soldering stations through curricular adjacent activities. The workshop was led by female engineering faculty with assistance from three female upper-level students and one female graduate student. The response from the workshop was overwhelmingly positive. Through a collaboration with a psychology professor, we collected data on the impact of the experience and published the results, which showed a statistically significant increase in confidence in using the engineering equipment as well as community engagement. Given these positive impacts of the program, I intend to continue the effort and grow the program to a larger audience of female engineering students and faculty.

B.2. Performance Evaluation by Superiors

Since I started in the Fall of 2016, I have consistently received positive reviews from my superiors in my annual performance evaluations, receiving “meets expectations” for my teaching, research, and service contributions to the college and university. Provided are a few quotes from my annual performance reviews that highlight my contributions.

“You bring enthusiasm and positivity to the classroom that your students love. They know that you are passionate about their learning and care about their success.”

“The volume and quality of the work completed this past year toward improving the first-year courses is exceptional. I appreciate the thought and many, many hours you have put into making the curriculum better. Your work in adding rigor to the homework assignments and then ensuring the expectations on the exam are properly matched with the homework is making a difference in the performance and confidence of our student body. You are having a positive impact on so many students and on the overall quality of what we are providing as a College and University.”

“In addition to securing and managing a large NSF grant, you are doing all the right things to build a foundation for success in STEM research. You are making contacts at the national level through your training and conference activities, and you are encouraging others locally to become involved in the STEM research engine of the College.”

“Your list of service activities is exceptionally long for a tenure track faculty member; I really don’t see how you do all of these things. Your service is having a tremendous impact on the faculty and students on our campus.”

C. A personal statement of your beliefs concerning the importance of teaching, research, or other services and activities in which the nominee is engaged, and community/university service to the overall mission of the university

I strongly believe in the significance of teaching, research, and service in academia. Collectively, they contribute to the University’s overall impact and are integral to the University community. I find encouragement in Louisiana Tech’s mission statement, which emphasizes the importance of each.

At Louisiana Tech University, we aim to produce high-quality graduates who have gained the knowledge and skills to succeed in their chosen fields. Innovative teaching and education, like that of the first-year engineering course sequence in which I am so heavily involved, is critical to setting a strong foundation for their academic and career journeys. Faculty who are passionate about teaching students are critical as they guide students to reach their highest potential.

Research drives us to push the envelope of knowledge generation and innovation. It fosters curiosity, creativity, and collaboration across campus. Research can provide new opportunities and pathways for faculty, graduate, and undergraduate students. Research publications help maintain the university's relevance and recognition. As researchers share their discoveries, the university community and society as a whole benefit.

The feeling of contributing towards something greater than yourself, that you are providing others with the opportunity to be supported, can be powerful. Service to the university community can provide fulfillment in ways that research and teaching cannot. Through various service activities, like OWISE, COES SSP, and INSPIRE, a lasting impact on the university can be established, which can have broad-reaching impacts beyond the University itself.

Section B.1 of this packet provides descriptions detailing my impact on students, faculty, and the university community; each highlighted activity contains elements pertaining to teaching, research, and service. My personal *passion* lies in teaching undergraduate students, particularly those in their first year navigating the transition from high school to the challenges and newfound independence of college. I find *fulfillment* in providing services that support faculty and students through retention and engagement activities. Furthermore, I am *empowered* by the opportunity to integrate my service and teaching efforts into my research, enabling me to make meaningful contributions to the engineering education community while also building programs that enhance the faculty and student experience at Louisiana Tech University.

D. A list of recent or relevant publications, papers, grants, and/or presentations

D.1 Publications & Conference Presentations

- Cruse K. (Co-Presenter), Kidd, C., Long, W., “A Self-Efficacy Analysis on the Impact of a Thermoelectric Cooling System Project in an Applied Thermodynamics Course,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Cruse, K. (Co-Presenter), Boyet, C., Palmer, J., “Improving First-Year Engineering Student Success with Targeted Financial Assistance, Supplemental Instruction and Cohort Team Building,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Cruse, K. (Presenter), Hall, D., Caldorera-Moore, M., Desselles, M., “SUCCESS Scholars: Early Findings from an NSF S-STEM Project,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Cruse, K. (Presenter), Mennie, K., Ward., A., Caldorera-Moore, M., “Building Community and Increasing Confidence Among First-Year Female Engineering Students through an Engaging Co-Curricular Workshop,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Kidd, C., Cruse, K., “WIP: A framework to develop project-based platforms to support engineering and technology,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Cresap, C., Monceaux., Hall, D., Cruse, K., “Weekly Professional Development Lunches to Build Community Among an S-STEM Cohort,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- Ward, A., Kidd, C., Gouedy, L., Cruse, K., Crittenden, K., “Implementing a Seminar Series to Build Collaboration and Community Among STEM Education Ph.D. Students,” Proceedings of the American Society for Engineering Education, Portland OR, (June 23 – 26, 2024).
- 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. (Co-Presenter), Hall, D., Hollins, B., Kidd, C., Long, W. (Co-Presenter), “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).
- 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).

D.2 Workshops, Presentations, and Panels

- Kidd, C., Cruse, K. (Co-Presenter), “Project Development Canvas (PDC) Interactive Workshop,” Workshop for American Society for Engineering Education Annual Conference and Exposition. Portland OR, (June 23 – 26, 2024).
- Project Development Canvas Workshop for COES Faculty, College of Engineering and Science, Spring 2024
- National NSF S-STEM Workshop Panelist, Spring 2024
- Integrated STEM Education Research Center Open House, College of Engineering and Science. Winter 2023
- Farmer, B., Clifton, A., Long, W., Cruse, K. (Co-Presenter), “Standards-Based Grading.” Workshop, *For Our Futures* UL System Conference, March 2023

D.3 Awarded Grants and Funding

- Primary Lead (PI-role) of Kern Entrepreneurial Engineering Network Partnership (accepted, ~\$50,000+ per year for 10+ years with the option to apply for additional large grants) 2024 - Present
- Lead Pedagogical Expert (Senior Personnel) on GenCyber Grant (funded, \$133,457) 2023 - Present
- PI on Alan Alda Center for Communicating Science mini-grant (funded, \$4,000), INSPIRE: Introducing New Skills & Proficiencies In Reassuring Experiences, 2023 - Present
- PI on NSF S-STEM Grant (funded, \$1,499,870), S-STEM SUCCESS: Supporting Undergraduates through Curricular and Co-Curricula Engagement and Student Scholarships, 2022 - Present
- Co-PI on NSF Advanced Technological Education Grant (funded, \$287,948), Controlling, Operating, and Measuring: Pathways for Learners to Engineering Technology Employment, 2018 - 2022
- PI LaSpace proposal (funded, travel and program expenses for myself and three female COES students to NASA Wallops Flight Facility in Virginia), Louisiana Space Consortium RockOn Program, 2019

E. A list of relevant community and/or service activities

College & Univ.	COES Deans Search Committee Member (2023)
	Engineering Science Foundation Board, faculty representative, 2016 – 2022
	Instructor of FYE 100 First-Year Experience, 2016 – 2021
	Developed and facilitated peer-mentorship training for COES student organizations, 2018 – 2020
	Faculty search teams (ISERC tenure track and ENGR/ICET lecturer), 2017 – 2020
	COES featured presenter for Louisiana Tech Admissions Saturday Recruiting events
	Volunteered at Summer Orientation sessions, helping to advise and clear incoming first-year COES students
Undergraduate Students	Supervise a team of 7 undergraduate student workers (4 SUCCESS Scholars peer mentors, 1 SUCCESS Scholar assistant, 1 OWISE Student Ambassador, 1 LWTL Website Developer)
	Mentored 2 undergraduate students in writing a paper for the ASEE National Conference and Exposition
	Mentored 2 undergraduate students for the 2024 Undergraduate Research and Service-Learning Symposium (students won an award for their presentation) & UL System Academic Summit
	Collaborated with COMM 101 faculty to provide presentation guidance for ENGR 122 students preparing for the First-Year Projects Showcase
	Collaborated with COMM 101 faculty to develop a cohesive thread between the first-year engr series and COMM 101 content
	Serve as faculty mentor for the Society of Women Engineers, 2016 – Present
	Advise 35+ undergraduate mechanical engineering students quarterly
Graduate	Advisor for 5 PhD students (2 Engineering Education, 3 Computational Analysis and Modelling)
	Serve on the PhD committees for three graduate students in Engineering Education
	Co-developed and co-taught a seminar course for students pursuing PhD Engineering with a track in Education
National	Serve as a reviewer for the American Society of Engineering Education Conference proceedings submissions
	Selected participant in the Alan Alda Center for Women in STEM Leadership Workshop
	Selected participant in the ProQual Institute for Engr. Ed. Research Methods (Univ. of GA), 9/2021 - 12/2021
	Selected participant in NSF ENG Career Workshop
	Moderated American Society of Engineering Education Conference Sessions, 2023

F. Any additional pertinent information (e.g., honors and awards, professional society membership, leadership positions, etc.)

- Jay Taylor Undergraduate Teaching Award Recipient (LA Tech), 2023
- Max Watson, Sr. Endowed Professorship in Mechanical Engineering (COES), 2023
- Louisiana Tech University Leadership Institute (LTLI), 2022-2023
- Jay Taylor Undergraduate Teaching Award Nominee and Finalist (LA Tech), 2022
- Featured Faculty for College of Engineering and Science at LA Tech Football Game (LA Tech), 2022
- COES Leadership in Diversity, Equity, and Inclusion Strategic Initiatives Award (LA Tech), 2022
- COES Student Learning and Success Award for College of Engineering and Science (LA Tech), 2019
- COES Student Quality and Outreach Award for College of Engineering and Science (LA Tech), 2018
- Member of the American Society for Engineering Education (ASEE), 2008 – Present