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PROJECT INFORMATION

Name of Project	Chemical Engineering Faculty Summer School
Primary AIChE Committee or Entity Responsible for Project	Education Division
AIChE Operating Council, Board Committee and/or Industry Technology Group which has endorsed this project	CTOC
Operating Council Endorsement Letter	https://s3.amazonaws.com/files.formstack.com/uploads/1747535/56873686/810429156/56873686_foundation_grant_proposal_support_from_ctoc_-_education_division_112820.pdf
Anticipated Start Date of Expenditure for Requested Funding (Month/Year)	July 2022
Anticipated End Date of Expenditure for Requested Funding (Month/Year)	September 2022
Brief Description of the Proposed Project (40 words or less)	Provide financial support to assure accessibility and diversity of new faculty attending the 2022 Summer School for Chemical Engineering Faculty as well as initiate and cultivate long term fundraising efforts to endow future summer schools.

Detailed Description of Proposed Project

The Summer School for Chemical Engineering Faculty is an almost century old tradition to bring together new professors and provide professional development workshops in an immersive setting. A co-branded Summer School between AIChE's Education Division (EdDiv) and ASEE's Chemical Engineering Division (ChED) was one of the main points of a memorandum of understanding signed by both groups in 2019. The increased communication and collaboration between EdDiv and ChED is strengthening both groups, faculty development, student success, and the profession. For example, in March 2020 due to the COVID19 pandemic, EdDiv led the formation of 5 communities of practice, so faculty could share their experiences and best practices with online and remote instruction. Past and present officers of ChED and EdDiv are serving as leaders and facilitators of these groups. Almost 100 faculty from around the world have participated in some way in these groups in their first 6 weeks.

Partially due to the economic uncertainty related to the COVID19 pandemic as well as a good fiscal practice to have multiple revenue streams, we are requesting funds for the 2022 Summer

School for Chemical Engineering Faculty as well as resources to initiate, cultivate, and fiscally support future summer schools through an endowment.

A brief history of the summer school and the role of AIChE

The American Institute of Chemical Engineers (AIChE) and the American Society for Engineering Education (ASEE) have for over one hundred years been directly associated with the training of chemical engineers and chemical engineering professors. AIChE was founded in 1908, and ASEE, which was originally called the Society for the Promotion of Engineering Education (SPEE), was founded in 1893. Both societies intersected in 1931 with the first Summer School for Chemical Engineering Teachers.

In 1931, the first Summer School for Chemical Engineering Teachers was developed from a request by AIChE leadership to SPEE, which, since 1927, was organizing Summer Schools for Engineering Teachers. This petition "...originating with the American Institute of Chemical Engineers that has by action of its governing body" requested that SPEE hold a session for chemical engineering teachers. In 1946, AIChE established representation with SPEE, thus leading to the development of the ASEE Chemical Engineering Division. Therefore, our groups have always worked together.

Since the first summer school was held, AIChE has been a significant contributor and partner to the summer school - from funding, to publishing proceedings, to archiving materials from the summer schools. This partnership continues today. At the 2018 AIChE Annual Meeting, after the most recent Summer School in 2017, a session titled How Summer School Improved My Teaching and a Summer School Meet-Up were organized.

Furthermore, AIChE has a long- standing history in fostering the development of chemical engineering faculty. Examples include Meet the Faculty Candidates session, NSF workshops, workshops on effective teaching, and Future Faculty Mentoring Program.

New or Continuing Project Status	New
AIChE New Business Process Status	Review not required per staff liaison

PROJECT INFORMATION - Copy

FUNDING REQUEST

A. Total funding requested from AIChE Foundation ($)	44,400
B. Other Funding – description of sources & amounts ($)	$100,000 NSF $70,000 Corporate donations/sponsorships, $ 30,000 University funding for second participant
C. Itemized estimated costs excluding staff labor – description and amount ($)	$40,000 would cover the majority of costs for 38 participants and 15 presenters Specifically, participants' local expenses include on-campus housing and daily meals ($640 per person). Presenters' expenses include air travel, on-campus housing, and daily meals ($1040 per person). $200,000 covers the costs of the plenary speakers, teaching institute leader, participant, organizers, workshop leaders meals, housing, Colorado School of Mines conference room rental/services fees
D. Estimated staff labor cost ($)	$$4,400 ($46/hour plus 34.44 % fringe, 42.63 % overhead; therefore $88/hour for 1 staff member for 50 hours). The AIChE staff labor with include attend organizing meetings, Summer School participant registration and workshop presenter travel reimbursement.)

RESULTS MEASURES

Method to evaluate results

After the Summer School, the participants will meet regularly for a year and a half with a Virtual Community of Practice (VCP) and VCP leader to discuss plans for implementation of effective teaching methods. (The AIChE Education Division successfully established VCP during the pandemic and have had over 20 VCPs with 10-20 faculty participating in each VCP) During this time, we will collect data and materials to assess if, when, and how faculty are implementing effective teaching methods.

The first post-Summer School meeting will be individually with the VCP leader. The 2022 Summer School ends July 29, just over three weeks before many universities start fall classes. During that short time before the fall semester/quarter, the faculty will need to consider the courses they teach, choose one to focus on, decide what effective teaching method to try, and revise the course plan to incorporate the effective teaching method. A one-on-one meeting with the VCP leader will be easier to arrange during this busy time than a meeting coordinated with many other people. During this planning meeting, the project participant will describe how the effective teaching method will be used in the class and how the effectiveness of the teaching method will be assessed. The VCP leader will help the participant anticipate and plan for potential difficulties with the method and assessment. Human subjects issues will be discussed as well.

The VCPs will meet for one hour approximately once a month during the fall and spring semesters. Faculty on a quarter schedule will be accommodated for, but schedules may not align perfectly. If there is no time that all members of a VCP can meet, the PIs may rearrange the membership of the VCPs. We may also rearrange from semester to semester to keep faculty teaching the same courses together, but we prefer to keep a group together once formed. Meetings will start with updates on the implementation of effective teaching methods by each faculty member. These check-ins will include what has been done, successes and challenges, assessment results, plans for the next month, and suggestions from the group about the challenges and planned activities.

After the check-ins, the group will continue their education and growth as engineering educators. For example, a selection from the literature on effective teaching methods may be discussed like a book club or group meeting. Articles and discussion questions will be posted to the group in advance to prepare for the meetings. Leaders may plan activities that demonstrate another active learning technique, include brainstorming related to difficult course concepts, or role playing difficult student interactions or questions.

A reflection meeting - individually between the VCP leader and each participant - will take place at the end of each teaching term. During these meetings, the leader will ask each participant to complete a survey of activities and attitudes. The faculty questions will both be asked on a 5-point Likert scales of "unfamiliar" to "familiar" and "never" to "in all classes", and student indicators of motivation will be a percentage.

Normalized gains will be used to compare pre and post scores.

Participant and leader will decide what items should be submitted to the portfolio as evidence of implementation (or lack thereof) of effective teaching methods during the course. Examples may include course syllabus, materials or activities for lectures, surveys of students, or other assessment data. The leader and participant will also discuss plans for the next term.

Post-Summer-School engagements with professional societies. Many pathways exist for participants to become involved with AIChE and/or ASEE. Since the Summer School is hosted by both the Chemical Engineering Division of ASEE and Education Division of AIChE, VCP leaders will encourage participants to attend division business meetings and awards banquets. Participants will also be encouraged to volunteer to chair or co-chair sessions and review abstracts and papers. After the implementation of evidence-based teaching methods, participants will be encouraged to give presentations at the annual society meetings or similar regional meetings. Additionally, a session about a year after the Summer School has traditionally been held titled "What I learned at Summer School" or similar. The faculty participants will be welcomed to contribute to continuing Summer School programming at the AIChE and ASEE annual meetings.

Plans to support project after funding grant period, if applicable	An AIChE Summer School for Faculty Endowment Fund has been established. The Steering Committee (Jennifer Sinclair Lewis, Scott Fogler, Kim Ogden, John O'Connell, LaRuth McAfee, Joseph Shaeiwitz, Matthew Liberatore) has identified a list of individuals who would likely support this cause and have reached out to them as potential donors.

CONTACT INFORMATION

Project Lead Contact Name	Taryn Melkus Bayles
Project Lead Email Address	tbayles@pitt.edu
Project Lead Telephone Number	(410) 562-7619
AIChE Staff Liaison Name	Gina Gatto
Names of other volunteers involved with project	Matthew Liberatore, Laura Ford, Margot Vigeant, Jennifer Sinclair Curtis, Milo Koretsky, Daniel Lepek, Daniel Burkey, Tracy Gardner, Michael Barankin
Other AIChE committees/entities which will collaborate on the project, if applicable	AIChE Education Division
Other organizations outside of AIChE which will collaborate on the project, if applicable	ASEE Chemical Engineering Division

SUPPORTIVE INFORMATION

Safety and Ethical Practice	Yes
If yes, describe how	Summer School 2022 provides workshop sessions on best practices in teaching process safety and ethics, as well as sustainable design.
Attracting and Retaining the Best and the Brightest	Yes
If yes, describe how	Summer Schools consistently hold session related to K12 education and the 2022 summer school has planned a specific diversity-focused plenary session and related workshops. In addition, the participants selected to receive the AIChE foundation funding will focus on increasing participant diversity which is not limited to gender, race, international, graduate students seeking faculty positions, adjunct faculty, non tenure stream faculty, etc.
Education, Training and Career Development	Yes

If yes, describe how	Summer School 2022 will offer a combination of in-person immersive experience, take home resources, continuous opportunities for engagement at the AIChE Annual Meeting through meet- ups and programming, and development of virtual communities of practice - both being run during the Covid 19 pandemic. In addition, Laura Ford and Matt Liberatore have submitted a grant to NSF's Improving Undergraduate STEM Education program to support mid-career experienced faculty) and Taryn Bayles is submitting the $100k NSF grant for supplemental conference support the Chemical Engineering Summer School.
Research and Innovation	No
Changing Perceptions	No

Additional Impacts

AIChE Strategic Plan Fit	Yes

If yes, describe how

SIX STRATEGIC PRIORITIES

1. LEADERSHIP

AIChE will enable the success of all members and stakeholders as the leader in advancing the chemical and related engineering professions. AIChE will: • Continue to advance the profession, globally. • Be broad, diverse and inclusive of all constituents and stakeholders. • Explore alternate models for engagement. • Strive to be the best. • Act nimbly.

Summer School 2022 is providing leadership. Educating future ChEs is advancing the profession. Summer school by its name is an alternative model for engagement, not a conference but a combination of professional development and community building.

2. COMMUNITIES

AIChE will strengthen existing and create new, relevant communities. AIChE will: • Strengthen existing communities, by representative constituency (i.e., industry, academic, government), by technical/topical/social interest, or by committee (i.e., division, ITG, WIC, MAC, local section). • Develop new communities in emerging and underserved areas. • Grow in advanced manufacturing areas, while strengthening and sustaining the RAPID Manufacturing Institute.

Summer School 2022 builds new communities and strengthens existing groups. While summer school is nearing 100 years as a tradition for chemical engineering faculty, EdDiv is an 11 year old division whose membership grows and engages industry and accreditation groups.

3. CONTENT

AIChE will enhance the academic curriculum and promote lifelong learning across the profession by developing trusted content. AIChE will: • Develop and curate timely content across all delivery methods, with global reach, delivering through multiple media and venues. • Address workforce and professional development gaps to benefit industry and members along the entire career in areas such as safety, digitization and advanced manufacturing. • Develop and implement competency assessment programs covering specific skills.

Summer School 2022 content will contain three tracks: curricular-related content, diversity, and innovative pedagogies. All three tracks enhance the academic curriculum and promote lifelong learning among faculty.

4. DIVERSITY & INCLUSION

AIChE will expand the diversity and inclusivity of the profession. AIChE will develop initiatives to engage and retain diversity across the profession. AIChE will: • Begin early for engagement (i.e., middle and high schools). • Explore alternative entryways to ChE, e.g., community colleges. • Promote inclusion programs. • Leverage partnerships (e.g., organizations, universities, corporations and funding agencies).

The AIChE Foundation funding will be used to support participants selected to increase diversity (which is not limited to gender, race, international, graduate students seeking faculty positions, adjunct faculty, non-tenure stream faculty, etc.). Summer Schools consistently hold sessions related to K12 education and a specific diversity-focused plenary session and related workshops are being organized. We are working with chemical engineering departments, NSF, and industry to support the 2022 summer

school.

5. SOCIETAL

AIChE will address important societal issues by utilizing the expertise of the profession. AIChE will discuss and engage with key constituencies such as the government, industry, academia and the public on important issues. Those issues may include safety, sustainability, public health, education, manufacturing, and the environment. AIChE also will perform societal outreach, demonstrating how ChEs can, and do, make the world a better place.

Building upon K12 education and similar themes already mentioned, previous summer schools offered workshops related to sustainable design, safety, and environmental engineering.

6. TRANSFORMATIONAL TECHNOLOGIES

AIChE will proactively innovate and deliver products and services through transformational technologies. AIChE will: • Deliver content using state-of-the-art platforms, providing global impact and accessibility. • Utilize more interactive and collaborative delivery methods. • Develop and deploy new tools for educational training.

Summer School 2022 will offer a combination of in-person immersive experience, take home resources, continuous opportunities for engagement at the AIChE Annual Meeting through meet- ups and programming, and development of virtual communities of practice - both being run during March-May 2020 as well as proposed for experienced faculty returning to summer school (this initiative is a pending proposal submitted in January 2020 led by Laura Ford and Matthew Liberatore to the National Science Foundation's Improving Undergraduate STEM Education program). A second proposal, led by Taryn Bayles will be submitted to the National Science Foundation (via CBET) for a supplemental conference support to host the Chemical Engineering summer school (approximately $100k).

Foundation Donor Appeal	Yes
If yes, describe how	AIChE Giving Summer School for Faculty Endowment
Leverage and Resource Effectiveness	No
Supporting Document	https://s3.amazonaws.com/files.formstack.com/uploads/1747535/58942414/810429156/58942414_aiche_foundation_request_for_future_summer_school.pdf