

College of Education
2021 IHP Proposal Template Guidance
Proposal for 2021-22 TTF Searches

Proposal number	P21-COE-3
College/School/Division	College of Education
Cluster/Node (if applicable)	
Department/Program	Education Studies
Requested TTF Specialty	Computing Education in Higher Education
Requested TTF Rank	Assistant Professor

Proposal Description

This proposal supports the hire of a Discipline-Based Education Researcher (DBER), in collaboration with the *department of Computer and Information Science (CIS)* of the *College of Arts and Sciences*. This assistant professor hire will position the UO to take a leadership role in addressing a national gap in research studying the scholarship of teaching and learning related to computing in post-secondary settings, especially the well-documented disparities in student access and success.

Proposal Rationale

- 1. Describe the rationale for the position, including how the proposal aligns with the strategic vision and needs of the unit and college/school.**

With this hire the UO will address a national gap in research studying the scholarship of teaching and learning related to computing, particularly in post-secondary settings, and how these approaches impact students' participation and sense of belonging in the field. This area of research is desperately needed to understand, and disrupt, long-standing racial and gender inequities that have prevented many BIPOC (Black, Indigenous, and people of color) students, and women, from participating in computing education experiences in higher education. The position will allow UO to build on existing resources in computer science education and CS for Oregon, a statewide initiative led by Dr. Joanna Goode (EDST). The position will synergize this existing K-12 computing education expertise at the UO and extend computing education expertise into higher education, establishing a position focused on the particularities of supporting inclusive computing education experiences in colleges and universities.

This position addresses the call for collaborative education research across units. This faculty position advances a Discipline Based Education Research (DBER) approach to scholarship in Computing Education, to be housed in the College of Education (COE), and *affiliated with the department of Computer and Information Science (CIS)*. Aligned with DBER research, this position will support scholarship around teaching and learning in computer science and related areas, including a probing of the key questions asked, approaches to problem solving, representations to explain phenomenon in computing, and ethical considerations. Computing education research seeks to understanding how instructors' pedagogical content knowledge and instructional design impacts students' content learning and sense of belonging in computing. Computing education research also involves studying how particular disciplinary and institutional structures can perpetuate, or distribute, opportunities or barriers to learn computing. This position will center paradigms of broadening participation in computing scholarship to approach post-secondary research and teaching with a lens of access, equity, and inclusion.

The field of Computing Education Research has grown tremendously in recent years, as is evident by surges in the quantity and quality of computing education scholarship outlets, the increase of computing education research faculty positions in other universities, and consistently strong federal grant funding. This growth in

College of Education
2021 IHP Proposal Template Guidance

Proposal for 2021-22 TTF Searches

research has been accompanied by a groundswell of K-12 computer science education and a surge of college students expressing interest in computer science. While the UO has been a significant contributor in establishing a research base that has shaped K-12 computing education, there is a notable gap in expertise when it comes to knowledge that contributes research on computer science teaching, learning, and institutional structures in post-secondary settings. This position would locate the UO as a prominent and national leader in K-18 computing education research with authority and expertise in equity and inclusion. This position builds on a legacy of academic research in K-12 computing education that will become more expansive and impactful when extended to include expertise in higher education. Computing education research is a highly relevant scholarly area in research and innovation as there are immediate equity and inclusion efforts that will benefit from UO's scholarly contributions.

2. Indicate how the proposed search will do one or more of the following, as appropriate:

- Contribute to growth in national and international leadership of the university within the proposed field.

The justification for this new tenure-line position is highly relevant and timely. In January, 2021, the National Academies of Science, Engineering, and Medicine recently released a report, "Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors." In reviewing the evidence from the field, the report. The findings of the report concluded:

CONCLUSION 1: Women, Black, Latinx, and Indigenous people are underrepresented in computing related careers and in the educational pathways into them when compared to their representation in the population of the United States. This underrepresentation is due, in part, to historic inequities, systemic biases, and stereotypes about who can succeed in computing as well as to lack of access to learning opportunities.

The committee noted that despite the substantial impact on society and the academy, there was a history of disparities in accessing authentic learning experiences that are appealing and engaging for all learners. The report identified the need for research to address underrepresentation in computing, and develop research that attends to countering these biases and opportunity gaps for entering and remaining in educational pathways. Specifically, the report also offers a recommendation to higher education, in the form of addressing instructor capacity in teacher education:

RECOMMENDATION 3: Preservice and in-service educators... should seek out opportunities and materials on how to incorporate effective practices for creating authentic learning experiences in computing

With this new tenure-line position, the UO will have enhanced resources and expertise to contribute to the solutions related to broadening participation in computing: 1) through a focus on studying inclusive policies and practices that support inclusion in computing education; and 2) building a robust teacher education pathway.

- Help catalyze excellence in new areas of research or creative activity, maintain or strengthen established premier areas of research or creative activity, or draw together multiple areas of research or creative excellence.

The UO will benefit from investing in this ripe area of Computing Education Research. At the unit level, this position will further strengthen, and expand, on the STEM-education research expertise of faculty in

College of Education
2021 IHP Proposal Template Guidance

Proposal for 2021-22 TTF Searches

the Department of Education studies. Two faculty members, Dr. Goode (EDST) and Dr. Husman (EDST), have a record of NSF-funded, nationally-renowned, and award-winning research around computing education for K-12 students.

The COE faculty position would enhance collaboration opportunities with the department of Computer and Information Science (CIS), such as a history of collaboration with CIS faculty Dr. Hornof and Dr. Sventek. The position would also create new opportunities for CIS faculty such as Dr. Freeman and Dr. Young. These are examples of CIS faculty who already pursue research-based approaches to computer science education, and would appreciate further collaboration with experts in evidence-based practices. Bringing these two departments and research fields together, through a shared interest in computing education research, will accelerate collaborative computing education research, provide more opportunities for graduate student mentorship in computing education. The collaboration could also expand CIS course pathways for computing students to include careers in computing education, create more access to learning opportunities, and address issues of diversity and inclusion in computer science.

- Grow and/or maintain areas of demonstrated prospective/future undergraduate student interest.

There is an important national and state context to this position. As the national “CS for All” movement, has swept the nation’s K-12 schools, most states have developed state computing education plans, and some have even adopted high school computer science graduation requirements. New courses in computer science are amongst the fastest growing in the College Board’s Advanced Placement program. New K-12 policies and courses have boosted student interest in pursuing computing in colleges and universities and developed a pressing need for prepared K-12 computer science teachers. To date, only the state of Oregon has not yet adopted a state plan for computer science education, though if 2021 HB 2570 is passed, a strategic plan be developed. As part of her “CS for Oregon” work, Dr. Goode has been actively informing and participating in this legislative effort, positioning the UO for statewide leadership. Dr. Hornof has also actively supported these efforts. We anticipate that this effort will result in a boost to K-18 computing education and related areas; including a surge of interested students in UO undergraduate programs that are interested in computing and computing education. Having an expert in higher education computing research will capitalize on the synergy of this moment, leverage the intersection of education research and computing education, and create more capacity at the UO to teach computing education courses. Offering an inclusive approach to computing education will likely increase the diversity of undergraduate and graduate students involved in computing.

- Grow and/or maintain successful graduate programs, where there is faculty capacity for building areas of excellence and/or new programs of particular institutional need.

These new state education policies are likely to lead to a statewide call for Oregon teacher education programs to produce knowledgeable computer science teacher candidates skilled in equity and inclusion. Having faculty expertise in computing education in higher education, and adding to the breadth of faculty at the UO working in related areas, would uniquely position the UO within the OUS system to build, staff, and sustain a robust graduate-level Teacher Education pathway for educators preparing to teach computer science in their classrooms. The state of Oregon will soon need a supply of computer science instructors, and UO can provide it. The COE will benefit from expanded teacher education course pathways that this new faculty expert in computing education can help design and instruct. We also anticipate that this position would also enhance our doctoral program by expanding our faculty’s STEM equity footprint in the department’s Critical and Sociocultural Studies in Education (CSSE) program.

College of Education
2021 IHP Proposal Template Guidance
Proposal for 2021-22 TTF Searches

3. Respond to the prompts below with respect to diversity, equity, and inclusion.

- i. To facilitate **inclusive searches**, UO requires robust active recruitment work before launching each TTF search.

a. Field Availability Estimate (FAE) data

	% <i>Women</i>	% <i>Minorities</i>	% <i>Black</i>	% <i>Asian</i>	% <i>American Indian or Alaska Native</i>	% <i>Hispanic or Latino</i>	% <i>Two or more races</i>
Education research	70	30	13	6	1	8	3
Computer & info sciences	21	29	5	16	0	5	3

- b. Describe how you will approach recruitment for this position, noting how you will mitigate potential challenges that may arise based on the FAE data.

We will rely on advertising in publication venues within both Education and Computing, such as American Educational Research Association (AERA) jobs board and the Association of Computing Machinery (ACM). To address FAE challenges, we will distribute this job position strategically, including to: Black ComputHer organization, Richard Tapia Celebration of Diversity in Computing conference, the National Center for Women in Technology (NCWIT) alliance, Network Gender and STEM, and Anita Borg Institute. We will reach out directly to our professional networks, such as Dr. Mark Guzdial (Michigan State), Dr. Dan Garcia (UC Berkeley), and Dr. Nikki Washington (Duke University) to recruit strong applicants, particularly candidates from underrepresented groups.

- c. Approved searches will be required to request that candidates submit a diversity, equity, inclusion statement in their application materials. Please describe specifically what will be critical for your unit to ascertain from these statements.

Our unit is interested in candidates' their lived experiences, critical dispositions, instructional practices, and knowledge of central tenets of racial and gender educational equity and justice. There is extensive literature on improving diversity in computing, and how active instruction increases retention in computing. We will look for evidence that shows applicants are familiar with this literature and apply these transformative practices into their instruction and scholarship.

- ii. The provost expects units to **support student success, access, and experience** by eliminating opportunity gaps and creating a culture of **inclusive teaching**. Explain how you will design the hiring process to identify potential colleagues who will contribute to this mission.

We will ask candidates to both describe their pedagogical approaches, and also invite finalists to teach a sample lesson to a group of undergraduate students during their site interview. Unique to this hire, we expect a high-quality candidate not only to use inclusive teaching practices but to contribute to the scholarship of inclusive teaching and support inclusive CS instruction across units.

- iii. Discuss how your unit would **support the new TTF hire** to ensure they are successful.

Our unit has a record of a faculty mentoring support system that we will initiate when we hire a new Assistant Professor. Through OESL GMU, the faculty will receive mentorship and support for grants writing and management, and be encouraged to collaborate with other PIs and projects. A CS education researcher will find their work fits well with the mission and other research supported by the center.