

A&S Dean's Innovation Fund Proposal:

Improved STEM Mentoring for under-represented graduate students at CU-Boulder

Proposers: Andrew Cowell, Director, Center for Native American and Indigenous Studies (CNAIS); Christopher Lowry, IPHY; Dana Stamo, STEM Routes, Bio Engineering; Saydie Sago, CNAIS and IPHY

Abstract: We propose a pilot mentoring program for in-coming Native American graduate students in STEM. The proposal is based on past recent experience with such students, plus recent studies of best practices in this area. We argue that a more intentional and intensive set of mentorship training and guidance workshops is needed in this area, and that a cohort model of mentorship needs to be implemented, whereby students have multiple interacting mentors, who themselves mentor multiple students, providing peer, disciplinary and ethno-cultural mentorship support in an integrated way. This would be a minimum two-year pilot program, with key metrics being recruitment, retention, and student integration into lab groups. We believe if successful the pilot could be used to extend the model to students in other under-represented groups.

Summary: Mentoring is an often-overlooked aspect of the graduate student experience at CU-Boulder, especially for students from under-represented backgrounds. CU-B does have a number of formal and informal mentoring programs, both student-to-student and faculty-to-student. However, research and experience from the STEM Routes program at CU-B (<https://www.colorado.edu/studentgroups/stemroutes/>) indicates several problems. First, there are inadequate numbers of culturally-associated role models for grad students – in other words, CU-B does not have a high number of faculty from under-represented groups, and is unlikely to quickly resolve this bottleneck issue. Secondly, mentors often receive only cursory training initially, and little follow-on guidance. And third, more traditional models of mentoring tend to focus on a single mentor/single mentee ideal, which can place high burdens on both parties, with one person forced 'be all things' to a single mentee.

In contrast, studies on best practices done by STEM Routes (<https://www.colorado.edu/studentgroups/stemroutes/mentoring>) emphasize multiple mentors may be needed for each student – a fellow grad student for example, a discipline-specific mentor, and perhaps a faculty cultural or ethnic model – and thus cohort models may be more effective. Mentors also need more intensive initial and on-going training. Recent work on diversity (such as *Getting to Diversity: What Works and What Doesn't*, by Dobbin and Kalev (2022) argues that mentors specifically in one's field, who have high institutional influence, can be as important or more important than fellow under-represented-minority mentors in diversifying the higher ranks of institutions.

All of these findings resonate with the recent experience of a cohort of 5 Native American graduate students involved in a pilot Tribal Climate Leadership Program (TCLP) here at CU Boulder during 2019-22, as well as the experience of other Native graduate students in STEM

(including Saydie Sago, CNAIS executive board graduate student representative, from IPHY, who coordinates our larger grad student group). These students report the value of non-Native mentors who are open, sensitive and willing to learn from the students (such as Prof. Chris Lewis from IPHY), combined with the presence of Native models of support, even outside their primary field.

We are thus proposing a pilot cohort mentorship model for incoming Native American graduate students in STEM. This would consist of:

- 1) Developing a cohort of graduate students and faculty, both Native and non-Native, such that each incoming student would have ideally three mentors (peer, disciplinary, and Native, though some of these categories may overlap in some cases), and the mentors would operate across multiple students, such that the mentors could better learn from and support each other.
- 2) Providing intensive initial training, in both general mentoring principles and in cultural sensitivity, to these students.
- 3) Providing on-going bi-monthly meetings for additional feedback and training.

James Rattling Leaf (Lakota) of CNAIS and Earth Lab, could be the lead in providing cross-cultural sensitivity training, working with others associated with CNAIS. STEM Routes personnel already have done research and workshops on improved, intensified mentorship programs. CNAIS has an existing Native Graduate Student group which provides additional in-place infrastructure. Mentor recruitment would target both Native groups such as CNAIS and AISES (American Indian Science and Engineering Society) and interested non-Native individuals in STEM fields generally. If the program is successful, we would expect those involved as the first cohort of mentors to provide broader training and feedback, including for other under-represented groups beyond Native Americans.

The program could also be crucial for the proposed institutionalization of the Tribal Climate Leaders Program, which Cowell is working to establish in conjunction with ENVIS, CIRES, Earth Lab and others. The upcoming renewal proposal for the North Central Climate Adaptation Science Center (NCCASC) could include some funding for this type of mentoring program on a permanent basis, along with funding for the TCLP more generally – the current plan is to include around \$20k/yr (based on discussions with Bill Lewis) for a part-time general TCLP student support position, but not all of that could fund just mentoring, and some Native grad students would almost certainly be outside the TCLP in the future. There is no commitment from Bill to the proposal here – I am simply illustrating how this mentoring program could be a pilot test for future efforts, and how some funding might be available for the continuation of the program in ways that synergize with other CU efforts for Native students.

Professors Cowell and Lowry propose to work with Stamo of STEM Routes and Sago, leader of CNAIS Graduate Student group, to organize and implement the pilot. Metrics for success for the two-year pilot would include recruitment and retention of students, and successful integration of students into research labs.



Budget: due to the intense nature of the mentor training and supervision, and the expectation that those doing the mentoring share expertise with others afterwards, we believe that the mentors should be paid.

Assume a relatively nominal rate of \$20/hr for the trainings or support sessions, twice a month, this would be \$40/month x c. 10 mentors total = \$400/month = \$3600/year = ***\$7200 for the full program for two years to mentors.*** This would go to both faculty and peer grad student mentors.

Ideally, if the grad students became peer mentors themselves after going through the program, we would like to pay them as well, but we are not requesting payment at the moment for the mentees.

James Rattling Leaf is already employed by CU at 25% time related to Earth Lab (and the TCLP), so we believe his contributions to the trainings would be covered already.

STEM Routes would need \$80/month = \$720/yr = ***\$1440 for the full program to reimburse training costs*** (avg. 2 trainers/leaders per session).

TOTAL COSTS: \$8440