California Education Learning Lab
2019-20 Requests for Proposals

Using Research and Technology to Transform Undergraduate STEM Education

Introduction

[Assembly Bill 1809 (Chapter 33, Statutes of 2018)](#) established the California Education Learning Lab ("Learning Lab") as a competitive grantmaking program for intersegmental faculty teams[1] to incorporate the science of learning and adaptive learning technology into their curriculum and pedagogy, with the express purpose of improving learning outcomes and closing equity and achievement gaps in STEM and other disciplines.

In pursuit of this mission, the Learning Lab seeks to encourage the development and dissemination of pedagogical practices, learning resources, technological tools, courses, and course series that demonstrate success in improving learning outcomes and closing equity gaps, and contribute to the fundamental understanding of human learning. Learning Lab grants are accordingly intended to support projects that:

- Develop and implement curricular and pedagogical innovations;
- Demonstrate the effectiveness of those curricular and pedagogical innovations through a process of rigorous assessment and evaluation (and apply the results of that assessment through a process of iterative improvement);
- Utilize technology tools, including adaptive learning technology, in online or hybrid course environments to support learning outcomes and the collection of learning data for the purpose of advancing research into human learning; (in order to encourage broad participation and impact in funding opportunities, Learning Lab defines adaptive learning technology and online/hybrid course environments broadly—please see definitions below); and
- Show clear potential for replication and dissemination, as well as capacity to affect positive pedagogical and/or curricular change at scale.

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[1] "Intersegmental faculty team" refers to a team of faculty from more than one segment of public higher education, e.g., University of California, California State University, California Community Colleges.

Learning Lab believes these components to be of equal importance. Thus, unlike other calls for proposals that address stem equity and opportunity, the Learning Lab's Requests for Proposals take an integrated approach to the design of grant opportunities and aim to support projects that incorporate fully the four project elements listed above.

For 2019-20, the Learning Lab is issuing three Requests for Proposals to support curricular and pedagogical innovation and professional development for faculty in undergraduate STEM education:

1)   Innovation Grants – Innovation Grants will provide intersegmental faculty teams with large grants (approximately $1.0 million each) for development, implementation, and assessment of STEM educational innovations that aim to transform the culture of learning (both with regard to addressing and bridging traditional divisions between learning/education-based research and teaching practice, as well as how students perceive the learning culture), improve learning outcomes, and close equity and achievement gaps. These grants will support both projects that focus on developing and implementing innovations in lower-division STEM courses, and projects that aim to improve learning outcomes in undergraduate STEM education through large-scale faculty professional development programs.

2)   Seed Grants – Seed Grants will provide seed funding (approximately $100,000 each) for intersegmental faculty teams that are developing promising pedagogical/curricular innovations, but are in earlier planning stages. Seed grants are intended to help teams design and develop projects that may compete for Innovation Grants in future RFP cycles.

3)   Professional Development Grants – Professional Development Grants will provide funding (approximately $200,000 each) to intersegmental partnerships to support the creation or expansion of faculty professional development programs that contribute to improvement in learning outcomes or reduction in equity gaps in undergraduate STEM courses. These grants may be used to scale existing programs of faculty professional development, tailor existing programs in a local context, and/or as seed funding for the creation of new faculty professional development programs.

Project teams may apply for only one of these funding opportunities. Innovation, Seed, and Professional Development grants are each intended to support projects that are in different stages of development and operating at different scales. Please determine which grant opportunity is most appropriate for your project and apply for that grant only. Learning Lab intends to award up to 7 Innovation Grants, up to 9 Seed Grants, and up to 8 Professional Development Grants.

Learning Lab grant opportunities will be open to proposals addressing lower-division courses and faculty who teach these courses in the following STEM disciplines[2]:

- ❖ Life and biological sciences
- ❖ Engineering, computer science, information/data science, math and statistics
- ❖ Physical sciences (including earth and environmental sciences).

Projects must be co-hosted by a faculty team representing a minimum of two public higher education segments in California. (Example: a faculty member from the California Community Colleges must collaborate with a faculty member from the University of California OR the California State University. Faculty collaboration across all three segments is welcome and encouraged.) Collaboration with faculty from private independent/nonprofit institutions and nonfaculty professionals is also welcome.

Faculty teams should feature meaningful, well-balanced collaboration among partner institutions. In granting awards, Learning Lab will further take into consideration where projects are located in California, in order to balance geographic equity of awards and diversity of awarded institutions.

Adaptive Learning Technology and Online/Hybrid Learning Environments

Adaptive learning is defined by statute to mean "a technology-mediated environment in which the learner's experience is adapted to learner behavior and responses." In order to have the potential for large-scale impact, Learning Lab understands adaptive learning technologies in the broad sense of deploying technology to better understand learner experience/learner gaps and assets, and to modify learning environments, pedagogical approaches and/or available resources to be more inclusive of students most likely to leave the sciences (such as first-generation college-going students and underrepresented students in the sciences) and produce better learning outcomes across the broad range of students.

Learning Lab also takes a broad view of what qualifies as an online or hybrid course. Online courses allow students to interact, either synchronously or asynchronously, with the course material/lecture/lab work, and other participants and/or instructors/TAs in a technology-mediated, remote environment. Learning Lab understands hybrid courses or blended courses as those that use both "online" and in-person interactions as part of the formal course environment or requirements. A hybrid course would allow some component of the course to

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[2] Proposals may address lower-division courses in these STEM disciplines that are oriented toward non-STEM majors, as well as lower-division courses that are intended for STEM majors.

be available or accessible in an online environment. For the purposes of the Learning Lab's 2019-20 RFP, a course does not have to be officially designated by the institution or department as "hybrid" to be eligible for Learning Lab grant funding, so long as it conforms to the definition above.

Learning Lab Application Process

For the Innovation and Professional Development grant opportunities, awardees will be selected through a three-stage process involving: (1) submission of letters of intent to submit concept proposals; (2) submission of concept proposals; and (3) submission of full proposals, based on selected concept proposals, from which the final selection of awards will be made. Seed grant awardees will be selected through a two-stage process involving: (1) submission of letter of intent to submit proposals; and (2) submission of proposals from which the selection of awards will be made.

Applicants will submit all application materials through the Learning Lab's application management portal. Please use the following links to access the grant-specific submission portals:

Innovation Grants
https://webportalapp.com/sp/learninglab_innovation_grant

Seed Grants
https://webportalapp.com/sp/learninglab_seed_grant

Professional Development Grants
https://webportalapp.com/sp/learninglab_profdevelopment_grant

Please note: applicants must create a user profile and provide information on their project teams in advance of submitting application materials through the submission portal.

Post-Award Agreements

Applicants whose proposals are selected will be asked to enter into an agreement with the Governor's Office of Planning and Research. Learning Lab will administer the agreement, which will address project implementation, including the following:

a) **Indirect Costs:** Up to 8 percent in indirect costs are allowed; combined direct and indirect costs cannot exceed the award amount. Learning Lab calculates the 8 percent IDC rate based on total combined direct costs for all partner institutions and does not permit layering of IDC in excess of 8 percent of total direct costs. Consequently, a project

awarded a $1 million grant and claiming 8 percent in indirect costs would have maximum total direct costs of $925,926 and maximum total indirect costs of $74,074. Please see FAQs for further information.

b) **Open Educational Resources:** Agree to terms and conditions that require course and course series and technology/platforms enabled with Learning Lab funds to be available as open educational resources, as defined through the grant agreement. Please see FAQs for further information.

c) **Start Date:** Initiate work within 30 days of signing the agreement. Grant agreements must be in place prior to the 2020-21 fiscal year.

d) **Reporting:** Submit progress reports at agreed-upon intervals, including tracking of milestones and expenditures, participate in conference calls and convening activities, and seek technical assistance from the Learning Lab Advisors or Learning Lab staff. All post-award expectations will be specified in award agreements.

e) **Use of Data:** Investigators and demonstration teams are expected to share data and research findings consistent with academic standards.

f) **Protection of Privacy and Personal Information:** Investigators and demonstration project teams are expected to follow state and federal law to protect privacy and personal information.

Please review the following grant-specific Requests for Proposals for details on each of the three grant opportunities.

I. *Innovation Grant*

For this RFP, up to $7.0 million will be provided from the Learning Lab to fund seven demonstration projects (approximately $1.0 million each) for 3 years to support curricular and pedagogical innovations that aim to improve learning outcomes, transform the culture of learning, and close equity and achievement gaps in online and hybrid learning environments (see definition in the Introduction). Projects are encouraged to promote students' sense of belonging in STEM, students' STEM identity, and connections between STEM and students' lives, career aspirations and home communities, leveraging affective components of learning to reduce achievement gaps.

The Learning Lab will fund both projects that develop curricular and pedagogical innovations aimed directly toward students in lower-division STEM courses, and projects that indirectly support curricular and pedagogical change through the creation of innovative, large-scale faculty professional development programs that are closely related to improving learning outcomes or closing equity/achievements gaps in STEM fields. All projects, including professional development projects, must speak to the science of human learning, engage with discipline-based education research, utilize learning technology for purposes of data collection, and/or integrate learning research and teaching practice as core program elements.

Projects should:

- Aim to transform the culture of learning (both with regard to bridging divisions between learning/education-based research and teaching practice, as well as how students perceive the classroom or disciplinary learning culture).
- Apply the methods and principles of instructional design to the development and implementation of the project and any associated professional development.
- Include rigorous research design as an integral part of their project plan. Proposals should include a well-articulated and clearly defined research strategy that includes an explicit hypothesis (grounded in the science of human learning, discipline-based research, or another relevant research literature), measurable objectives, and a well-developed assessment plan to evaluate the implementation and effectiveness of the planned approach.
- Include a well-articulated plan for broad dissemination and lasting impact.
- Feature meaningful, well-balanced collaboration among partner institutions.
- Include in the project team experts in the science of human learning, learning assessment, discipline-based education research, and pedagogical/curricular evaluation, as well as social and behavioral scientists with expertise in the sources of equity and achievement gaps.

- Discuss learning from an asset-based perspective (i.e. building on strengths) rather than a deficit-based perspective (i.e., cataloging what is "wrong" with learners that needs to be "fixed").

A. Application Process

Please submit all application materials through the Learning Lab's application portal for Professional Development Grants:
[Link to Innovation Grant Application Submission Portal](#)

Stage 1: Letter of intent to submit a concept proposal (**DUE: October 22, 2019 by 5:00pm Pacific Time**)
See Section C below.

Stage 2: Institutional cover letter(s) and concept proposal (**DUE: November 15, 2019 by 5:00pm Pacific Time**)
See Sections D and E below.

Stage 3: Full proposal (**DUE: February 3, 2020 by 5:00pm Pacific Time**)
See Section F below.

B. Eligibility

1. Applicant teams must include faculty co-principal investigators (PIs/co-PIs) from at least two public higher education segments. Representation from all three public higher education segments is encouraged. Additional partnerships, such as with private independent/nonprofit institutions and/or industry partners, are also encouraged. All faculty teams must commit to teaching and evaluating the co-developed or jointly redesigned curriculum or innovative pedagogy during the grant period, or to applying the learning from the program of professional development during the grant period.

2. Innovation grant projects should aim directly or indirectly (through a program of faculty professional development) to improve learning outcomes and close equity/achievement gaps for STEM undergraduate students in lower division course series[3] where the mode of learning is online or hybrid, i.e., makes use of both online and in-person interactions as part of the formal course environment or requirements. Courses are also expected to incorporate concepts of the science of learning and adaptive learning technologies. Please see the definitions of adaptive learning technology and online/hybrid courses in the Introduction.

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[3] High school dual enrollees may also be captured as part of this population.

3. Projects should address courses and course series and faculty who teach courses in life and biological sciences, computer science, engineering, information/data sciences, math and statistics, or physical sciences (including earth and environmental sciences).

C. Letter of Intent

Applicants should submit a brief, one-page letter of intent. The letter should note the anticipated host institution (which will act as grantee and fiscal intermediary for purposes of grant administration), expected partner institutions, and co-principal investigators and provide a tentative title of the proposal and a tentative total budget. The letter should also characterize the discipline-specific problem that co-PIs are trying to solve and/or investigate and include a brief description of the proposed project.

D. Institutional Cover Letter (to be submitted with the Concept Proposal)

For each faculty team application, the relevant departments/schools/institutions should provide answers for Section D1, D2, D3, & D4, in a brief cover letter (limit 2 pages, not including signatures); Arial 11 font; single spaced; 0.5 inch margins; no appendices.

Please note: teams may submit *either* one cover letter with all required signatures from partner institutions, *or* individual cover letters from each partner institution. All pages should be included in a single PDF, together with the Concept Proposal.

1. Partner institutions: Identify the institutions that are submitting the proposal, including the host institution.

2. Institutional focus: Describe each department/school/institution's commitment (e.g., faculty release time, funding, administrative support) to the proposed demonstration project.

3. Program integration/Lasting impact: Describe how the proposed project's innovations will be sustained after the end of the grant program. For applications proposing a large-scale professional development program, explain how the program will fit into the department/school/institution's existing systems of faculty professional development and of faculty promotion/reward, and how the program will work with and enhance existing programs of faculty professional development (including, but not limited to, centers of teaching and learning).

4. Principal investigators: Identify the investigators who will serve as faculty (co-)PIs. Please briefly describe each PI's capacity, including any previous and/or current grant funding received, strength of faculty and student engagement activities, and history of successful intersegmental partnerships.

5. <u>Authorized signatures:</u> For each faculty (co-)PI, the institutional cover letter should be signed by the appropriate department chair AND dean, vice chancellor/vice president of research or provost or equivalent.

E. Concept Proposal (Innovation Grants)

Please provide a short Concept Proposal: maximum five pages, not including endnotes/references (please use endnotes for source references only; do not include substantive materials in endnotes); Arial 11 font; single spaced; 0.5 inch margins; no appendices. Please submit the Concept Proposal and Institutional Cover Letter(s) as a single PDF.

The concept proposal should identify the problem the project team is trying to solve, using institutional data disaggregated by course and student characteristics (e.g., ethnicity, gender, socio-economic status, first-generation college going) to illustrate the existing campus-, school- or department-specific equity issues that the project is designed to address. It should explain how the project aims to solve this problem (i.e., by describing the planned pedagogical/curricular innovation or proposed large scale, innovative faculty professional development program) and summarize the project plan and research strategy, which should include an explicit hypothesis, measurable objectives, and an assessment plan.

In describing the proposed innovation and project plan, the concept proposal should discuss both how the project will use technology tools to support learning outcomes and collect learning data and how the project will promote either directly or indirectly students' sense of belonging in STEM, students' STEM identity, and connections between curricula and students' lives, career aspirations, and home communities. The proposal should also describe how the project team will use the results of assessments that are valid and reliable in the context of the project's course(s) and innovation(s) and data collection to support iterative improvement of pedagogy, curricula, and/or the learning experience.

Finally, the proposal should briefly describe the project team and their specific roles in the project, and discuss how the team will disseminate/scale the proposed innovation. The concept proposal throughout should reflect a grounding in the research literature on the science of learning, discipline-based education research, and learning measurement, as well as in literature relating to sociocultural barriers to student learning, and should further discuss how the project will contribute to these literatures. The proposal should briefly describe how Learning Lab funds (approximately $1 million) will be used to carry out the project plan.

F. Full Proposal (Innovation Grants)

Please provide a Full Proposal including Institutional Cover Letter(s), Project Summary, Project Narrative, Endnotes/References, and Appendices, as described below; Arial 11 font; single spaced; 0.5 inch margins. <mark>Please include the official name or short name of the project in a footer, together with the last name of the PI or of a Co-PI responsible for project team correspondence.</mark> Please submit all Full Proposal components as a single PDF.

A limited number of concept proposals will be selected for advancement to the next stage: submission of a full proposal. A full proposal will include five components:

i. **Institutional Cover Letter(s) (maximum 2 pages per letter, not including signatures)**
ii. **Project Summary (maximum 2 pages)**
iii. **Project Narrative (maximum 15 pages, not including footnotes/endnotes)**
iv. **Endnotes/References that ground the proposal in the current and pertinent research literature (no page limit)**
v. **Appendices**
   a. Additional information on team members (maximum 3 pages)
   b. Budget overview (maximum 2 pages)
   c. Common data-sharing/technology platform (maximum 1 page)
   d. Accessibility (maximum 1/2 page)
   e. Information requested by the Selection Committee (maximum 1/2 page per response)

Full Proposal Instructions

i. **Institutional Cover Letter(s):** Please provide the institutional cover letter(s) included with the concept proposal, updated for content and/or signatories.

ii. **Project Summary (maximum 2 pages)**: Describe the project as succinctly and clearly as possible, contrasting how it differs from the status quo, or what is currently the norm in the discipline or course.

   <mark>Please include in the project summary responses to the following questions:</mark>

   a. <mark>How many faculty will participate over the grant period?</mark>
   b. <mark>How many faculty are anticipated to participate beyond the grant period?</mark>
   c. <mark>How many students will be impacted over the grant period?</mark>
   d. <mark>How many students are anticipated to be impacted beyond the grant period?</mark>

iii. **Project Narrative (maximum 15 pages):** The project narrative should identify the problem that the project aims to solve, explain the project's approach to solving this problem (i.e, the pedagogical/curricular innovation or proposed faculty professional development program), and detail the project's specific goals and research strategy. The project

narrative should also clearly articulate a project plan, with a project timeline, a plan for valid and reliable assessment that evaluates the implementation and effectiveness of the proposed innovation, and a dissemination plan for the proposed innovation. Finally, the project narrative should include a high-level description of the project team, including team member qualifications, and a discussion of their specific roles in the project.

Helpful tips for writing a strong project narrative

A strong proposal will include the following elements within the overall context of the project narrative:

- A clear example of how the proposed innovation will work in practice, explaining how students and/or faculty will experience that innovation.
- A description of how data/metrics from the partner institutions highlight the problem being addressed and how the project team will measure or evaluate project success, including specific discussion of how the project team will identify assessments that are valid and reliable within the context of the proposed project's course(s) and innovation(s).
- A description of how assessment results will be used iteratively to develop or improve the project approach.
- A demonstration of knowledge and grounding in the literature of the science of learning and of discipline-based education research, and connection of the different parts of the project/interventions to the research cited.
- A discussion of how the project will further existing research and/or addresses the gaps in our understanding of human learning and of discipline-based education research.
- A discussion of how the project will use data and technology tools, **including adaptive learning technology** (see definition in the Introduction). If the project includes the development of new technology tools, the project description should explain how the technology will be developed within the grant's timeframe and with the funding provided.
- A description of project's approach to increasing student engagement, either through pedagogy and curriculum or through encouraging better pedagogy and curriculum, including engagement of students who may not identify as STEM proficient, and how the project will increase students' sense of belonging, engagement with subject matter content and with the relevant STEM discipline.
- A discussion of sociocultural barriers to student learning that is informed by the research of social and behavioral scientists, explaining how the proposed approach will address aspects of "traditional" classroom or disciplinary culture that are barriers to student learning and their sense of belonging.
- A clear plan for broad dissemination and lasting impact, explaining concretely how the proposed innovations or professional development program can be scaled and/or replicated and can be made affordable for users (both institutions and students), and articulating the potential of the proposed approach to improve learning outcomes and/or close achievement gaps at scale. The plan for dissemination and lasting impact should

include discussion of how the proposed innovation or professional development program can be made available and implemented at additional institutions.

iv. **Endnotes/References (no page limit):** Please provide endnotes/references that ground the proposal in the current and pertinent research literature. Endnotes should be used for source references only; do not include substantive material in endnotes.

v. **Appendices**

   a. **Additional information on team members (maximum 3 pages total)**: Please provide additional information on team members (i.e. statement of qualifications), not covered in the full proposal.

   b. **Budget overview (maximum 2 pages)**: Briefly outline how Learning Lab funds (approximately $1.0 million) will be used and how other resources may be leveraged including any outside funds or institutional funds. (A budget template will be provided.)

      Note: Learning Lab funds are intended to be used in California. If the project necessitates the use of Learning Lab funds outside of California, provide a brief justification and estimate of the funding that will leave the state. The amount of funds that can leave the state will be subject to the final award agreement.

   c. **Common data-sharing/technology platform (maximum 1 page)**: Please discuss the potential for using a common data-sharing platform to deliver the project. A strong proposal will discuss the robustness of the technology approach and interoperability with other systems.

   d. **Accessibility (maximum 1/2 page)**: Please describe your plan for ensuring access for individuals with disabilities, compliant with your institution's policies.

   e. **Information requested by the Selection Committee**, pursuant to concept proposal feedback **(maximum 1/2 page per response)**.

II.   *Seed Grant*

Learning Lab Seed Grants will provide initial funding for promising projects of curricular and pedagogical innovation that are still in early planning stages. For this RFP, up to $900,000 will provided from the Learning Lab to fund approximately nine seed grant projects (approximately $100,000 per project) for 1-2 years.

Like the larger Innovation Grants, Learning Lab Seed Grants are intended to support projects proposing curricular and pedagogical innovations that aim to improve learning outcomes, transform the culture of learning, and close equity and achievement gaps in online and hybrid learning environments within lower division STEM undergraduate curriculum. Seed grants, however, will provide support for project teams that are in earlier stages of project design or conceptualization and that would benefit from additional development or preliminary testing before proceeding to full-scale implementation. The goal of the seed grants is to provide projects with funding that will support initial project research and development and will lead to concrete deliverables, including, but not limited to, proof-of-concept testing, data collection and analysis, development of pedagogical/curricular resources, and/or development of a strong intersegmental team that features meaningful collaboration among the partner institutions and includes experts in the science of learning, discipline-based education research, learning assessment, and sources of equity and achievement gaps.

Please note: seed grants are specifically oriented toward pedagogical and curricular course improvements. Opportunities for seed grant funding for faculty professional development projects are discussed in the professional development grants RFP.

Seed grant projects should:

- Demonstrate how seed funding will support the design, development, and/or implementation of pedagogical/curricular innovations with potential to transform the culture of learning, improve learning outcomes, and close equity and achievement gaps in online and hybrid learning environments.
- Result in concrete deliverables that will contribute to full-scale development and/or implementation of the planned pedagogical/curricular innovations.
- Include a well-articulated and clearly defined research strategy that includes an explicit hypothesis (grounded in the science of human learning, discipline-based education research, or another relevant research literature), measurable objectives, and a well-developed plan for valid and reliable assessment to evaluate the implementation and effectiveness of the planned deliverables.
- Feature meaningful, well-balanced collaboration among partner institutions or develop greater and more balanced collaboration among the partner institutions.

- Include project team members, or lead to the development of a project team, with expertise in the science of human learning, learning assessment, pedagogical/curricular evaluation, and the sources of equity and achievement gaps.

A. Application Process

Please submit all application materials through the Learning Lab's application portal for Seed Grants:
Link to Seed Grant Application Submission Portal

Stage 1: Letter of intent to submit a Seed Grant proposal (**DUE:** ~~October 22, 2019 by 5:00pm Pacific Time~~ **REVISED DEADLINE: November 15, 2019 at 5:00pm**)
See Section C below.

Stage 2: Institutional cover letter(s) and proposal (**DUE: December 9, 2019 by 5:00pm Pacific Time**)
See Sections D and E below.

B. Eligibility

1. Applicant teams must include faculty co-principal investigators (PIs/co-PIs) from at least two public higher education segments. Representation from all three public higher education segments is encouraged. Additional partnerships, such as with private independent/nonprofit institutions and/or industry partners, are also encouraged.

2. Seed grant projects should aim to contribute to the development of pedagogical/curricular innovations that improve learning outcomes and close equity/achievement gaps for STEM undergraduate students in lower division course series[4] where the mode of learning is online or hybrid, i.e., makes use of both online and in-person interactions as part of the formal course environment or requirements. Courses are also expected to incorporate concepts of the science of learning and adaptive learning technologies. Please see the definitions of adaptive learning technology and online/hybrid courses in the Introduction.

3. Projects should address courses and course series in life and biological sciences, computer science, engineering, information/data sciences, math and statistics, or physical sciences (including earth and environmental sciences).

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[4] High school dual enrollees may also be captured as part of this population.

C. Letter of Intent

Applicants should submit a brief, one-page letter of intent. The letter should note the anticipated host institution (which will act as grantee and fiscal intermediary for purposes of grant administration), expected partner institutions, and co-principal investigators and provide a tentative title of the proposal and a tentative total budget. The letter should also characterize the discipline-specific problem that co-PIs are trying to solve and/or investigate and include a brief description of the proposed project.

D. Institutional Cover Letter (to be submitted with the Seed Grant Proposal)

For each faculty team application, the relevant departments/schools/institutions should provide answers for Section D1, D2 & D3, in a brief cover letter (limit one page, not including signatures); minimum Arial 11 font; single spaced; 0.5 inch margins; no appendices.

Please note: teams may submit *either* one cover letter with all required signatures from partner institutions, *or* individual cover letters from each partner institution. All pages should be included in a single PDF, together with the Proposal.

1.   Partner institutions: Identify the institutions that are submitting the proposal, including the host institution.

2.   Institutional focus: Describe each department/school/institution's commitment (e.g., faculty release time, funding, administrative support) to the proposed project.

3.   Principal investigators: Identify the investigators who will serve as faculty (co-)PIs. Please briefly describe each PI's capacity, including any previous and/or current grant funding received, strength of faculty and student engagement activities, and history of successful intersegmental partnerships.

4.   Authorized signatures: For each faculty (co-)PI, the institutional cover letter should be signed by the appropriate department chair AND dean, vice chancellor/vice president of research or provost or equivalent.

E. Proposal (Seed Grants)

Please provide a Proposal including Institutional Cover Letter(s), Project Summary, Project Narrative, Endnotes/References, and Appendices, as described below; Arial 11 font; single spaced; 0.5 inch margins. Please submit the Proposal and Institutional Cover Letter(s) as a single PDF.

A seed grant proposal will include five components:

i. **Institutional Cover Letter(s) (maximum 1 page per letter, not including signatures)**
ii. **Seed Grant Summary (maximum 1 page)**
iii. **Seed Grant Narrative (maximum 8 pages)**
iv. **Endnotes/References that ground the proposal in the current and pertinent research literature (no page limit)**
v. **Appendices**
   a. Additional information on team members (maximum 3 pages)
   b. Budget overview (maximum 2 pages)

Proposal Instructions

i. **Institutional Cover Letter(s)**: Please provide institutional cover letter(s) as specified in Section D.

ii. **Seed Grant Summary (maximum 1 page)**: Describe as succinctly and clearly as possible how seed grant funding will be used, and explain how this funding will contribute to design or full-scale implementation of a project developing significant pedagogical and/or curricular innovations aimed at students in lower-division STEM courses. Discuss briefly how this intended or planned project will differ from the status quo, or what is currently the norm in the discipline or course.

iii. **Seed Grant Narrative (maximum 8 pages):** The seed grant narrative should describe the full-scale project toward which the project team is working, and explain how the team will use seed funding to support the design, development, and/or implementation of this project. The narrative should identify the problem the full-scale project aims to solve (using institutional data disaggregated by course and student characteristics to illustrate the campus-, school- or department-specific equity issues that the project will address), and explain how the team intends to solve this problem through the planned pedagogical/curricular innovation(s). The narrative should then clearly link the use of seed grant funds to the development, implementation, and/or assessment of the pedagogical/curricular innovation through pilot implementation, data collection and analysis, creation of initial resources, or another approach.

The narrative should articulate a clear plan for the use of seed grant funds, with a project timeline and a plan for using assessments that are valid and reliable within the context of the project's course(s) and innovation(s) to evaluate the effectiveness of resources developed with seed funding or of initial project implementation. The narrative should further identify the planned deliverable(s) that the team will produce with seed funding and explain how the project team would propose to scale the planned deliverable(s) from the seed grant toward a full-scale project. Finally, the seed grant narrative should include a high-level description of the project team, including team member qualifications, a discussion of their specific roles in the project, and, if applicable, discussion of how the seed grant will support the development of a strong intersegmental team.

Helpful tips for writing a strong seed grant narrative

A strong proposal for a seed grant will include the following elements within the overall context of the seed grant narrative:

- A clear description of what the project team will accomplish with seed grant funding and of the deliverable(s) it intends to produce, and discussion of how these deliverables will contribute to design and implementation of a full-scale project.
- A well-articulated research strategy that includes an explicit hypothesis, analytic framework, research design and evidence gathering, as well as a plan for valid and reliable assessment to evaluate the effectiveness of deliverables produced with seed funding. The assessment plan should include specific discussion of how the project team will identify assessments that are valid and reliable within the context of the proposed project's course(s) and innovation(s).
- Grounding in the literature of the science of learning and discipline-based education research and connection of the different parts of the seed grant project to the research cited.
- Discussion of how the project intends to approach student engagement, including engagement of students who may not identify as STEM proficient, by increasing students' sense of belonging and/or their engagement with subject matter content and with the relevant STEM discipline.
- Discussion of how the project intends to build on student strengths. As much as possible, the proposal should discuss student learning from an asset-based perspective rather than a deficit-based perspective (i.e., building on student strengths rather than cataloguing what is "wrong" with learners that needs to be "fixed").
- Grounding in research literature on sociocultural barriers to student learning.
- A clear plan for building on the seed grant and scaling seed grant deliverables toward full-scale implementation, including discussion of how the full-scale project would use data and technology tools, **including adaptive learning technology** (see definition in Introduction), to improve pedagogy and/or curriculum.

iv. **Endnotes/References (no page limit):** Please provide endnotes/references that ground the proposal in the current and pertinent research literature. Endnotes should be used for source references only; do not include substantive material in endnotes.

v. **Appendices**

    I. **Additional information on team members (maximum 3 pages total)**: Please provide additional information on team members (i.e., statement of qualifications), not covered in the proposal.

    II. **Budget overview (maximum 2 pages)**: Briefly outline how Learning Lab funds (approximately $100,000) will be used and how other resources may be leveraged

including any outside funds or institutional funds. (A budget template will be provided.)

Note: Learning Lab funds are intended to be used in California. If the project necessitates the use of Learning Lab funds outside of California, provide a brief justification and estimate of the funding that will leave the state. The amount of funds that can leave the state will be subject to the final award agreement.

III. Professional Development Grant

For this RFP, up to $1.6 million will be provided from the Learning Lab to fund up to eight faculty professional development grant projects (approximately $200,000 each) for 1-2 years. Professional development grants will provide funding to intersegmental partnerships to support the creation or expansion of faculty professional development programs that contribute to improvement in learning outcomes or reduction in equity gaps in undergraduate STEM courses. These grants may be used to scale existing programs of faculty professional development, tailor existing programs in a local context, and/or as seed funding for the creation of new faculty professional development programs.

The proposed program should include both online and in-person components for faculty in a particular STEM discipline or in STEM disciplines, and should be designed to address professional development needs with the goal of improving learning outcomes or closing equity/achievement gaps in STEM fields. Funded programs will participate in follow-up surveys to assess the impact of the program on faculty pedagogy and teaching practice. Follow-on rounds of funding (beyond the 1-2 year grant period) may also be available for programs that demonstrate success.

Learning Lab professional development grants will support both the creation and/or dissemination of programs of professional development. Intersegmental partnerships may focus on: 1) scaling an existing program of professional development with demonstrated effectiveness to additional institutions or to larger faculty populations; 2) encouraging collaboration among existing programs of faculty professional development and making existing professional development services/resources more applicable to STEM faculty or adapting them to a local context; or 3) use the grant as seed funding for the establishment of a new professional development program oriented toward STEM faculty.

The proposed program of faculty professional development should feature a program team that includes expertise in the science of human learning, learning assessment, and discipline-based research and should support understanding and incorporation of principles of the science of learning, discipline-based education research, learning engineering, and/or instructional design and assessment into STEM pedagogy and curricula. It should also include at least one of the following areas of focus:

- Incorporating greater cultural relevance/components into STEM pedagogy/curricula.
- Incorporating greater career relevance/connections into STEM pedagogy/curricula.
- Learning how to use and incorporate adaptive learning and technology tools into STEM pedagogy/curricula.

- Incorporating other best practice(s) with demonstrated value in teaching excellence in order to improve learning outcomes or close equity/achievement gaps in an online or hybrid course.

In addition, programs should:

- Include a clearly defined path for wider dissemination of the professional development program through faculty learning communities, mentoring networks, workshops, etc.
- Explain how the program will be sustainable, either through leveraging existing institutional resources, or through utilizing other sources of funding.
- Include a well-defined plan for valid and reliable assessment and evaluation that may include but does not rely exclusively on faculty self-assessment and/or student satisfaction surveys.
- Address the professional development needs of contingent faculty, in addition to the professional development needs of tenure-track or tenured faculty.
- Explain how funding will complement existing programs of professional development at applicants' campuses, or within applicants' STEM discipline(s).
- Feature a meaningful, well-balanced collaboration among partner institutions.

Note: Learning Lab professional development grants are intended to fund costs associated with the creation and/or dissemination of well-designed professional development programs that incorporate best practices and support communities of practice among participating faculty. Although programs may use Learning Lab grant funds to develop or scale professional development conferences and/or workshops, the Learning Lab **will not fund** programs whose primary focus or expense lies in supporting faculty attendance at professional development events, without providing structure for sustained faculty engagement and iterative pedagogical improvement.

A. Application Process

Please submit all application materials through the Learning Lab's application portal for Professional Development Grants:
[Link to Professional Development Grant Application Submission Portal](#)

Stage 1: Letter of intent to submit a proposal (**DUE:** ~~October 22, 2019 by 5:00pm Pacific Time~~ <mark>REVISED DEADLINE: November 8, 2019 by 5:00pm Pacific Time</mark>)
See Section C below.

Stage 2: Institutional cover letter(s) and concept proposal (**DUE: November 15, 2019 by 5:00pm Pacific Time**)
See Sections D and E below.

Stage 3: Full proposal (**DUE: February 3, 2020 by 5:00pm Pacific Time**)
See Section F below.

B. Eligibility

1.   Applicant teams must include faculty co-principal investigators (PIs) from at least two public higher education segments. Representation from all three public higher education segments is encouraged. Applicant teams are also encouraged to include participation from campus centers of teaching and learning and other existing professional development centers/resources. Additional partnerships, such as with private independent/nonprofit institutions and/or industry partners, are similarly encouraged.

2.   Professional development programs should aim to support pedagogical and teaching excellence in lower division STEM courses or course series[5] where the mode of learning is online or hybrid, i.e., makes use of both online and in-person interactions as part of the formal course environment or requirements, and where concepts of the science of learning and adaptive learning technologies may be used. Please see the definitions of adaptive learning technology and online/hybrid courses in the Introduction.

3.   Programs should address faculty who teach courses and course series in life and biological sciences, computer science, engineering, information/data sciences, math and statistics, or physical sciences (including earth and environmental sciences).

C. Letter of Intent

Applicants should submit a brief, one-page letter of intent. The letter should note the anticipated host institution (which will act as grantee and fiscal intermediary for purposes of grant administration), expected partner institutions, and co-principal investigators and provide a tentative title of the proposal and a tentative total budget. The letter should also characterize the professional development needs that co-PIs are trying to address and include a brief description of the proposed project.

D. Institutional Cover Letter (to be submitted with the Concept Proposal)

For each faculty team application, the relevant departments/schools/institutions should provide answers for Section D1, D2, D3, & D4 in a brief cover letter (limit 2 pages, not including signatures); Arial 11 font; single spaced; 0.5 inch margins; no appendices.

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[5] High school dual enrollees may also be captured as part of this population.

Please note: teams may submit *either* one cover letter with all required signatures from partner institutions, *or* individual cover letters from each partner institution. All pages should be included in a single PDF, together with the Concept Proposal.

1. Partner institutions: Identify the institutions that are submitting the proposal, including the host institution.

2. Institutional focus: Describe each department/school/institution's commitment (e.g., faculty release time, funding, administrative support) to the proposed program of faculty professional development.

3. Program integration: Describe how the proposed program will fit into the department/school/institution's existing systems of faculty professional development and of faculty promotion/reward, and how the program will work with and enhance existing programs of faculty professional development (including, but not limited to, centers for teaching and learning).

4. Principal investigators: Identify the investigators who will serve as faculty (co-)PIs. Please briefly describe each PI's capacity, including any previous and/or current grant funding received, strength of faculty and student engagement activities, and history of successful intersegmental partnerships.

5. Authorized signatures: For each faculty (co-)PI, the institutional cover letter should be signed by the appropriate department chair AND dean, vice chancellor/vice president of research or provost or equivalent.

E. Concept Proposal (Professional Development Grants)

Please provide a short Concept Proposal: maximum three pages, not including endnotes/references (please use endnotes for source references only; do not include substantive materials in endnotes); Arial 11 font; single spaced; 0.5 inch margins; no appendices. Please submit the Concept Proposal and Institutional Cover Letter(s) as a single PDF.

The concept proposal should identify the faculty professional development need that the program team aims to address, and explain how the team will address that professional development need through the proposed program of professional development. The proposal should use institutional data, disaggregated by course and student characteristics, to illustrate the campus-, school-, or department-specific equity issues that the professional development program aims to address.

The concept proposal should briefly describe the program plan and research strategy, including an explicit hypothesis, measurable objectives and an assessment plan that identifies

assessments that are valid and reliable within the context of the proposed professional development program. It should discuss how the team will assess the implementation and effectiveness of the proposed professional development program and use the results of that assessment to support iterative improvement. It should further describe the program team and their specific roles in the program, and discuss how the team plans to disseminate/scale the program. The proposal should also briefly describe how Learning Lab funds (approximately $200,000) will be used to carry out the program plan.

The proposal should be grounded in research literature relating to professional development, the science of learning, and discipline-based education research, as well as in research literature relating to sociocultural barriers to student learning. It should also demonstrate awareness of potential barriers to faculty participation in professional development programs, and discuss how the project team plans to overcome those barriers.

F. Full Proposal (Professional Development Grants)

Please provide a Full Proposal including Institutional Cover Letter(s), Project Summary, Project Narrative, Endnotes/References, and Appendices, as described below; Arial 11 font; single spaced, 0.5 inch margins. Please include the official name or short name of the project in a footer, together with the last name of the PI or of a Co-PI responsible for project team correspondence. Please submit all Full Proposal components as a single PDF.

A full proposal will include five components:

i. **Institutional Cover Letter(s) (maximum 2 pages per letter, not including signatures)**
ii. **Program Summary (maximum 1 page)**
iii. **Program Narrative (maximum 8 pages, not including footnotes/endnotes)**
iv. **Endnotes/References that ground the proposal in the current and pertinent research literature (No page limit. Please use endnotes for source references only; do not include substantive material in endnotes.)**
v. **Appendices**
    a. Additional information on team members (maximum 3 pages)
    b. Budget overview (maximum 2 pages)
    c. Information requested by the Selection Committee (maximum 2 pages)

<u>Full Proposal Instructions</u>

i. **Institutional Cover Letter(s)**: Please provide the institutional cover letter(s) included with the concept proposal, updated for content and/or signatories.

ii. **Program Summary (maximum 1 page)**: Describe the proposed program of professional development as succinctly and clearly as possible, explaining how the program will meet the professional development needs of STEM faculty in the partner institutions.

Please include in the project summary responses to the following questions:

a. How many faculty will participate over the grant period?
b. How many faculty are anticipated to participate beyond the grant period?
c. How many students will be impacted over the grant period?
d. How many students are anticipated to be impacted beyond the grant period?

iii. **Program Narrative (maximum 8 pages):** The program narrative should identify the professional development need(s) that the program aims to address, explain how the program will address these needs, and detail the program's specific goals and evaluation strategy. The narrative should also clearly articulate a program plan, with a timeline, and provide a plan for valid and reliable assessment that evaluates the implementation and effectiveness of the proposed program plan. Finally, the program narrative should include a high-level description of the program team, including team member qualifications, and a discussion of their specific roles in the project.

Helpful tips for writing a strong program narrative

A strong proposal for a faculty development grant will include the following elements within the overall context of the program narrative:

- A clear example of how the proposed professional development program will work in practice.
- Discussion of how the project will address the professional development needs of contingent faculty, as well as of tenure-track or tenured faculty.
- Discussion of how the program will complement existing programs of professional development at the applicants' campuses or within their discipline(s).
- A description of how the project team will assess the efficacy of the proposed program of professional development and how the project team will measure or evaluate program success. Project assessment may include but must not rely exclusively on faculty self-assessment and/or student satisfaction surveys. The assessment plan should further include specific discussion of how the project team will identify assessments that are valid and reliable within the context of the proposed program of faculty professional development. There should also be discussion of how evaluation results will be used iteratively to develop or improve the program's approach.
- Demonstration of knowledge of best practices in faculty professional development, grounding in research literature relating to professional development, the science of learning, and discipline-based education research, and connection of the different parts of

the program to the research cited. This should include discussion of barriers to faculty participation and a description of how the program will overcome those barriers.

- Grounding in research literature relating to sociocultural barriers to student learning and to best practices for encouraging student engagement, especially among students who may not identify as STEM proficient.

- A clear plan for dissemination, which explains both how the program will be made available to faculty at the partner institutions during the grant period, and how the program can be more widely scaled and/or replicated at additional institutions. The discussion of dissemination should include consideration of how the program can be made available and implemented at additional institutions.

- A clear plan for lasting impact, which explains how the program will be sustained after the end of the grant period.

iv. **Endnotes/References (no page limit):** Please provide endnotes/references that ground the proposal in the current and pertinent research literature. Endnotes should be used for source references only; do not include substantive material in endnotes.

v. **<u>Appendices</u>**

a. **Additional information on team members (maximum 3 pages total)**: Please provide additional information on team members (i.e., statement of qualifications), not covered in the full proposal.

b. **Budget overview (maximum 2 pages)**: Briefly outline how Learning Lab funds (approximately $200,000) will be used and how other resources may be leveraged including any outside funds or institutional funds. (A budget template will be provided.)

Note: Learning Lab funds are intended to be used in California. If the project necessitates the use of Learning Lab funds outside of California, provide a brief justification and estimate of the funding that will leave the state. The amount of funds that can leave the state will be subject to the final award agreement.

c. **Information requested by the Selection Committee (maximum 2 pages total)**, pursuant to concept proposal feedback.