*Request for Proposals 2022-2023*

# Learning Lab's Grand Challenge: Building Critical Mass for Data Science

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# I. Funding Opportunity

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 from California's public colleges and universities to incorporate the science of learning and adaptive learning into their curriculum and pedagogy, with the express purpose of improving learning outcomes and closing equity gaps in science, technology, engineering, and mathematics (STEM) and other disciplines. **For the 2022-23 grant cycle, Learning Lab is soliciting proposals for "*Learning Lab Grand Challenge: Building Critical Mass for Data Science*."**

## The Grand Challenge

> *Data science is emerging as a field that is revolutionizing science and industries alike…. The ability to measure, understand, and react to large quantities of complex data can shape scientific discovery, social interaction, political interactions and institutions, economic practice, public health, and many other areas.*
>
> -- National Academy of Sciences, 2018[1]

In 2016, the National Academies of Sciences, Engineering, and Medicine (NASEM) convened a committee[2] to "set forth a vision for the emerging discipline of data science at the undergraduate level" given the centrality of data and data-driven work to scientific discovery and societal change in the modern era. Often regarded as the intersection between computation, statistics, mathematical foundations, and domain specific knowledge, NASEM's Data Science for Undergraduates (DS4U) report describes data science as encompassing a broad array of activities, including "data collection, storage, integration, analysis, inference, communication, and ethics."

Yet, as a young field that draws from multiple disciplines, uncertainty exists over how higher education institutions can introduce and sustain data science, meet the needs of

[1] National Academies of Sciences, Engineering, and Medicine 2018. Data Science for Undergraduates: Opportunities and Options. Washington, DC: The National Academies Press. https://doi.org/10.17226/25104.

[2] The Committee on Envisioning the Data Science Discipline: The Undergraduate Perspective

industry, and student demand. The DS4U report describes the institutional challenge in the following way:

> "The popularity of data science courses and programs will affect the entire academic institution by influencing enrollment, budgets, classroom allocation, computing resources, and scheduling. Institutions may need to consider how to create incentives for faculty in multiple departments and fields to collaborate to develop and deliver curricula that best meet students' needs. Today, there is a shortage of faculty in this rapidly evolving area. Enlisting and training existing faculty will be essential in the short term, and developing new faculty will be important in the long term. These challenges, among others, will need to be addressed to ensure the success of undergraduate data science students." (Page 4)

**Through this RFP, Learning Lab's Grand Challenge seeks to incentivize public higher education institutions to embrace data science as an opportunity to build new pathways, modernize majors, attract historically underrepresented students into STEM[3], and deepen both civic and interdisciplinary learning.** By offering the following grants and supporting collaboration among awarded projects through a cohort model[4], Learning Lab hopes to promote the buildout of a **data science educational infrastructure** that will further educate and engage faculty, mobilize intersegmental collaboration, and create both clarity and plenty in the options students can pursue for their interest and future careers.

**Learning Lab intends to award the following categories of grants:**

- Up to 3 **Pathways Development Grants** of up to $1.3 million each over 3-4 years
- Up to 5 **Faculty Development Grants** of ~$200K to ~$350K each over 2-3 years
- Up to 9 **Interdisciplinary Collaboration Grants** of ~$100K to ~$200K each over 2-3 years
- Up to 1 **Cohort Coordinator Grant** of up to $500k over up to 5 years

[3] By STEM, we mean Science, Technology, Engineering, and Mathematics, including the following: life and biological sciences; engineering, computer science, information/data science, math and statistics; and physical sciences (including earth and environmental sciences).

[4] See Grand Challenge Cohort Coordinator Grant section for more about the cohort model and related grant activity.


**The following recommendations from the DS4U report** further inform the foundations of this Grand Challenge, providing both rationale and guideposts relative to the grant opportunities, which are further described below:

**Recommendation 2.1 – Pathways | Faculty**[5]
Academic institutions should embrace data science as a vital new field that requires specifically tailored instruction delivered through majors and minors in data science as well as the development of a cadre of faculty equipped to teach in this new field.

**Recommendation 4.1 - Pathways | Interdisciplinary**
As data science programs develop, they should focus on attracting students with varied backgrounds and degrees of preparation and preparing them for success in a variety of careers.

**Recommendation 2.2 – Pathways**
Academic institutions should provide and evolve a range of educational pathways to prepare students for an array of data science roles in the workplace.

**Recommendation 2.4 – Pathways | Faculty | Interdisciplinary**
Ethics is a topic that, given the nature of data science, students should learn and practice throughout their education. Academic institutions should ensure that ethics is woven into the data science curriculum from the beginning and throughout.

[5] The designation of Pathways, Faculty, or Interdisciplinary is Learning Lab's suggested guide for considering how a recommendation from the DS4U report may be relevant to Grand Challenge grant categories. Applicants may, however, use or refer to any recommendations in any way they see fit.

**Recommendation 5.3 – Pathways**
Academic institutions should ensure that programs are continuously evaluated and should work together to develop professional approaches to evaluation. This should include developing and sharing measurement and evaluation frameworks, data sets, and a culture of evolution guided by high-quality evaluation. Efforts should be made to establish relationships with sector-specific professional societies to help align education evaluation with market impacts.

**Recommendation 5.1 – Pathways | Faculty | Interdisciplinary**
Because these are early days for undergraduate data science education, academic institutions should be prepared to evolve programs over time. They should create and maintain the flexibility and incentives to facilitate the sharing of courses, materials, and faculty among departments and programs.

**Recommendation 5.2 – Faculty**
During the development of data science programs, institutions should provide support so that the faculty can become more cognizant of the varied aspects of data science through discussion, co-teaching, sharing of materials, short courses, and other forms of training.

**Recommendation 2.3 - Interdisciplinary**
To prepare their graduates for this new data-driven era, academic institutions should encourage the development of a basic understanding of data science in all undergraduates.

**Pathways Development Grants**. These grants, up to $1.3 million each to be expended over three to four years, will be awarded to institutions that develop 2-to-4-year pathways (community college to CSU or UC) in data science that result in relevant degrees and certificates that respond to industry needs and opportunities. Institutions may develop data science options in existing degree and certificate programs or develop new majors, minors, or certificates. Two-year pathways or certificates that are developed must segue to a four-year pathway. At least two institutions from different segments must be part of the project team and work in collaboration to build a seamless pathway. Additional collaboration with high schools is welcome. Pathways that are developed should demonstrate how they can attract students from varied backgrounds (especially students historically underrepresented in STEM) and degrees of preparation and prepare them for success in a variety of careers that require data acumen. For these grants, scale and reach of these pathways as well as potential to close STEM equity gaps will be a significant factor in making an award. Learning Lab intends for this award to incentivize acceleration of the pathway approval process.

**Faculty Development Grants.** These grants, between $200,000 and $350,000 each to be expended over two to three years, will be awarded to institutions that are committed to increasing faculty capacity to teach in the data science field. Approaches can include (but are not limited to) enhancing the ability of data-science adjacent faculty[6] to teach data science, incentivizing data-science adjacent graduate students to teach data science, accessing existing faculty development programs, or creating new programs. At least two institutions from different segments must be part of the project team and work in collaboration to build, enhance, or extend a program of faculty development. For these grants, prior success in developing and administering faculty development programs and ability to improve faculty development programs will be important considerations for awarding the grant. The proposed reach of a faculty development program that is able to attract faculty from more than one segment will be strongly considered.

**Interdisciplinary Collaboration Grants.** These grants, between $100,000 - $200,000 to be expended over two to three years, will be awarded to institutions that are committed to exploring curricular collaboration between data science and application domains (e.g., business, medicine, natural science, social sciences, or engineering) and/or across domains in the humanities, such as philosophy, rhetoric, history, and literary studies. Because the focus of this grant is to work across disciplines, intersegmental collaboration is encouraged but not required. For these grants, commitment at the department level (minimum of two departments must be involved in these grants) and sustainability beyond the grant period will be important factors to consider, as will the potential for newly designed or redesigned courses to attract students from varied backgrounds (especially students historically underrepresented in STEM) and levels of preparation. For these grants, scale and reach of these courses will be a significant factor in making an award. Promotion of data and computational proficiency across non-STEM majors will also be valued.

**Cohort Coordinator Grant**. This grant of up to $500,000 for up to five years will support a team that will serve a critical role in promoting collaboration across awarded projects. Because the Cohort Coordinator will be serving projects that have varying goals and approaches given the three different types of grants (see above), a significant factor in making the award will be the diversity and strength of expertise and experience possessed by the Cohort Coordinator team members related to data science as a discipline, group facilitation skills, knowledge of pedagogical and curricular innovations, understanding of articulation and transfer programs and policies, and best practices in faculty professional development among other factors.

[6] By data-science adjacent, we mean, for example, faculty in math, statistics, and computer science, or in applied fields.

# II. Application Requirements

## A. Grand Challenge Project Grants

For this Grand Challenge, Learning Lab intends to award:

- **Up to 3 Pathways Development Grants of up to $1.3 million each over 3-4 years**
- **Up to 5 Faculty Development Grants of ~$200K to ~$350K each over 2-3 years**
- **Up to 9 Interdisciplinary Collaboration Grants of ~$100,000 to ~$200,000 each over 2-3 years**

**Eligibility.** To apply for a Learning Lab Grand Challenge Grant, projects must:

- Be hosted by a public, postsecondary institution in California[7];
- **Consist of an intersegmental team** (except for Interdisciplinary Collaboration Grants)**.** Teams must include faculty and/or administrative co-principal investigators (PIs/co-PIs) from at least two of California's public higher education segments. Additional partnerships, such as with private independent/nonprofit institutions, high schools, and/or industry partners, are permitted. One institution will serve as the host institution, which will be responsible for distributing grant funds.
- **Have support and endorsement from leadership.** Projects must submit an **institutional cover letter** signed by the PIs/co-PIs and the host institution's president, chancellor, vice chancellor/vice president of instruction, or provost or equivalent. *The equivalent leadership from the partnering institution(s) must also provide endorsement by either signing the host institution's cover letter or by submitting their own letter(s).*
- **Incorporate other key statutory elements.** Projects must incorporate principles of human learning and adaptive learning and incorporate online or hybrid learning environments.

[7] Other institutions, their employees, or private consultants may be contracted as sub-grantees on the project if their expertise would support project implementation.

**Application Process.** The grant application process consists of three stages:

- Statement of Intent
- Self-Assessment and Initial Proposal
- Final Proposal

All applicants must submit a Statement of Intent as well as a Self-Assessment and Initial Proposal. Learning Lab's Selection Committee will then invite a select group of applicants to submit Final Proposals. All applicants must submit their application materials through Learning Lab's online Grand Challenge Application.

Additionally, a PI or co-PI must participate in one workshop sponsored by Learning Lab on data science. Learning Lab will host a web-based workshop in January 2023 (to be confirmed). Learning Lab will send out notifications and post information on our website about the schedule. (See below for additional information and sign up for Learning Lab's Data Science Hub listserv to receive updates.)

## B. Grand Challenge Cohort Coordinator Grant

Inspired by Networked Improvement Communities, Learning Lab has incorporated a structured cohort model to enable the sharing of ideas, approaches, experiences, findings, and data; to support the success of awarded projects; and to provide critical social connections necessary to accelerate positive systemic change. One institution or project team will be selected to receive $500,000 for up to five years to keep track of Grand Challenge projects, provide advice, and foster collaboration among the Grant Challenge projects.

The Cohort Coordinator will be expected to meet regularly with project teams to understand and create synergies between projects and project teams; communicate the latest developments in the fields of data science; periodically host webinars, forums, convenings on data science; seek out efficiencies or economies of scale related to project administration that may benefit the cohort; catalog and curate relevant data science resources; create and sustain a data science network of faculty and industry professionals; and generally develop approaches and undertake activities that will help California lead the nation in undergraduate data science education.

The up-to-five-year timeframe for this award reflects one additional year after the Pathways Development grants conclude, in order to host final convenings and catalog final resources, and consider ways to sustain the network beyond the grant period.

As stated previously in the RFP, because the Cohort Coordinator will be serving projects that have varying goals and approaches given the three different types of grants (Pathways Development | Faculty Development | Interdisciplinary Collaboration), a significant factor in making the award will be the diversity and strength of expertise and experience possessed by the Cohort Coordinator team members related to data science as a discipline, group facilitation skills, knowledge of pedagogical and curricular innovations, understanding of articulation and transfer programs and policies, and best practices in faculty professional development among other factors

The grant application process consists of three parts:

- Statement of Intent
- Grand Challenge Coordinator Application
- Grand Challenge Coordinator Follow-up Questionnaire (for finalists only)

**The Grand Challenge Coordinator application window will open on April 10, 2022**. Learning Lab recommends that Cohort Coordinator applicants tailor their application responses to reflect the breadth of Grand Challenge project awardees, which will be announced after project applicants are notified by May 12, 2023 (see Timeline section below). Only California institutions of public higher education, including segment central offices, may apply. An institution(s) of public higher education may apply solely for the Coordinator grant or may apply for both a Grand Challenge grant and a Coordinator grant. All institutions and project teams interested must submit their application materials through Learning Lab's online Grand Challenge Cohort Coordinator Application.

## Timeline

Both the projects and cohort coordinator will be selected and finalized through the process outlined below. Please consult Learning Lab's website and sign up for our Data Science Hub listserv for updates to this RFP and the timeline.

| APPLICATION PROCESS | GRAND CHALLENGE | COHORT COORDINATOR |
|---|---|---|
| Release of Request for Proposals | September 2, 2022 | September 2, 2022 |
| Submit Questions to Learning Lab: info@calearninglab.org | October 21, 2022, 5:00PM | October 21, 2022, 5:00PM |
| Virtual Q&A Session on RFP | October 28, 2022, 2:00PM | October 28, 2022, 2:00PM |
| **Statement of Intent Deadline** | **December 9, 2022, 5:00PM** | **December 9, 2022, 5:00PM** |
| Data Science Workshop | TBD January 2023 | TBD January 2023 |
| **Project Summary, Self-Assessment, Institutional Cover Letters, and Initial Proposal Deadline** | **February 1, 2023, 5:00PM** | **N/A** |
| Review Period #1 | February 2 - March 1, 2023 | N/A |
| Selection Committee Meeting #1 | March 6-8, 2023 | N/A |
| Notification of Finalists | By March 10, 2023 | N/A |
| **Final Proposal Deadline** | **April 7, 2023, 5:00PM** | **N/A** |
| Review Period #2 | April 8-28, 2023 | N/A |
| Selection Committee Meeting #2 | May 1-5, 2023 | N/A |
| Notification of Award | By May 12, 2023 | N/A |
| Grant Agreement Webinar | May 15 or May 16, 2023 | N/A |
| Grant Agreement Negotiation and Finalization | May 17 - June 16, 2023 | N/A |
| **Cohort Coordinator Application Open** | **NA** | **April 10, 2023** |
| **Cohort Coordinator Application Deadline** | **N/A** | **May 29, 2023, 5:00PM** |
| **Coordinator Follow-up Questionnaire Deadline** | **N/A** | **June 12, 2023, 5:00PM** |
| Notification of Award | N/A | By June 23, 2023, 5:00PM |
| Grand Challenge Projects Commence | By July 1, 2023 | N/A |
| Grand Challenge Cohort Coordinator Activities Commence | N/A | By August 1, 2023 |

## Statement of Intent

All applicants for the Grand Challenge Project and/or Cohort Coordinator awards must file a Statement of Intent that identifies the anticipated host and partnering institutions and provides the names of PIs/co-PIs as well as brief project information. The Statement of Intent must be submitted by logging on to Learning Lab's Grant Portal and filling out the Statement of Intent form(s) linked below. **The deadline to file a Statement of Intent is 5:00pm PT on Friday, December 9, 2022.**

- **Grand Challenge Project Statement of Intent Form**
- **Grand Challenge Cohort Coordinator Statement of Intent Form**

## Project Summary, Self-Assessment(s), Institutional Cover Letter(s), and Initial Proposal

Teams applying for Grand Challenge Project awards that have submitted a Statement of Intent by the deadline will be asked to fill out the following summary information regarding their project on Learning Lab's Grant Portal and submit a Self-Assessment (per institution), an Institutional Cover Letter(s), and an Initial Proposal. **The deadline to file the Project Summary, Self-Assessment(s), Institutional Cover Letter(s), and Initial Proposal is 5:00pm PT on Wednesday, February 1, 2023.**

### Project Summary Information:

- **Project Title:** Teams must develop a short title (less than 10 words) for their proposed project. This title should be used in all related documents of the proposal.
- **Grant Category and Project Abstract:** Please identify which grant category the project is applying for and provide a short project abstract (150-200 words).
- **Estimated Project Impact:** Please indicate the number of students and/or faculty that will be directly impacted by project activities during the project period. Please share the basis of the calculation.
- **Tags:** Please list the technology tools and platform, and pedagogical practices your project will be using.

### Self-Assessment(s):

For **each of the institutions** involved in the proposed project, please respond to the following questions in your self-assessment (Limit: **2 pages per institution**.)

**What are the relevant data at your institution?**
Please provide relevant institutional, departmental, and/or course-level data to help us understand who the project will impact. Please disaggregate data by race, gender, ethnicity, and please outline specific racial and gender equity gaps that your team plans to address through your project.

**What is the state of data science offerings at your institution?**
Please provide a description of what your institution offers related to data science, how long it has been offered, and the history/evolution of the offering. Please consider majors, minors, certificates, courses, faculty-led projects or research opportunities in responding to this question.

**How is your institution ready to engage in Learning Lab's Grand Challenge?**
Please describe efforts that are currently underway at your institution to offer or integrate data science into courses or develop data science majors, minors, pathways or options. What is your assessment of your institution's capacity for supporting change? What can you point to that would support your department/institution's readiness to take part in this challenge? What are the obstacles, plans for addressing the obstacles, and how would a grant help?

**Additional Context (optional)**
Please provide any additional context that you believe is relevant to this self-assessment activity.

## Institutional Cover Letter(s)

Each host institution must respond to the following bullets in a brief cover letter **(maximum 2 pages, not including signatures)** at this stage. *Partnering institutions must also provide endorsement by either signing the host institution's cover letter or by submitting their own brief cover letter.* If partner institutions choose to submit an additional cover letter, please include the same project title as the host institution's identified project title. All cover letters should be submitted along with the project narrative through Learning Lab's Grant Portal.

- **Listing of host and partner institutions:** Identify the host institution that will be responsible for receipt/administration of the grant funds, if awarded. Also identify

anticipated partner institutions that will engage in the project.

- **Institutional focus:** Describe each host and partner institution's expected commitment (e.g., faculty release time, funding, administrative support) to the proposed project.
- **Lasting impact/program integration/readiness:** Describe how the proposed project's innovations and changes will be sustained after the end of the grant period. Explain also how the proposed project will fit into or leverage any existing related initiatives. Please also describe the readiness to engage with other awardees and the Grand Challenge Cohort Coordinator.
- **Principal investigators:** Identify the investigators who will serve as PI(s) and co-PI(s). Please address each person's capacity to execute this project.
- **Required signatures:** The institutional cover letter must be signed both the PI/Co-PI responsible for administering the project and by the PI/Co-PI's dean AND the institution's president, chancellor, vice chancellor/vice president of instruction, or provost or equivalent. Co-PIs from partner institutions must also provide their signature, along with a signature from their institution's president, chancellor, vice chancellor/vice president of instruction, or provost or equivalent.

### Initial Proposal:

Please describe succinctly and clearly in 8-10 pages the proposed project, responding to the prompts identified in the Final Proposal section below.

## Final Proposal

For applications that have been selected to move to the Final Proposal stage, please enhance your responses provided in your Initial Proposal and provide additional responses to prompts labeled Final Proposal Only. **The deadline to file the Final Proposal is 5:00pm PT on Friday, April 7, 2023.**

**Project Narrative (maximum 8-10 pages Initial Proposal; 10-12 pages Final Proposal)**
The project narrative document should use Arial 11 font, single spaced, and no less than 0.5" margins. Applicants ***must*** retain the section headings underlined below; however, within each section, applicants may respond to the prompts with flexibility to allow for a natural writing flow. Applicants should be as concise and specific as possible in their responses to the prompts. (Page length *recommendations* for each of the prompts is provided below.) Project teams should consider including a logic model to explain the project, which may follow the application and will *not* be included in the page maximum specified above. For the initial proposal, a reference section is recommended but optional and may follow the application; it will *not* count toward the narrative page count. A reference section is required for the final proposal stage and will not count toward the narrative page count. A Scoring Rubric will be posted on Learning Lab's Grand Challenge Data Science webpage no later than September 30, 2022. Please consult the Scoring Rubric before responding to prompts below.

A. Executive Summary (Up to 1 page, both Initial and Final Proposal)
Please provide an executive summary of your project, drawing from the sections below.

B. Project Summary, Approach and Rationale (estimated 2 pages, both Initial and Final Proposal)

- Describe your project, including its goals and intended outcomes. (See RFP FAQs, Project Outcomes and Impact section for guidance on developing outcomes.) What are you trying to solve for?
- Who is/are the target population(s) of the proposed project? Please include the size or scope of each, using an asset-based framework and language.
- Why are the approach(es) you selected best suited to achieve your goals and intended outcomes? What's your theory of change that ties your approach with your goals and intended outcomes? What barriers exist for your project (policy or otherwise), and how does your approach overcome them?
- Provide an example of how the project will work in practice.

C. Outreach, Recruitment, Leadership (estimated 1 page, both Initial and Final Proposal)

- How will the project bring together relevant stakeholders (e.g., faculty and/or graduate instructors, institutional administrators, workforce/industry, high schools)

to coordinate implementation efforts and reflect/evaluate on the project?

- If outreach or recruitment is needed for planning and/or implementation, how will the project team approach or solicit buy-in? Is professional development needed?
- What is your assessment of your institution(s)' and/or department(s)' capacity for successfully implementing the change you propose (e.g., pedagogical change, curricular change, professional development)? Include any related efforts currently underway at your institution or relevant efforts your institution has executed or attempted in the past.
- If the project includes intersegmental partnership and/or interdepartmental partnership, how will you manage this partnership and support authentic collaboration? Does the partnership build upon existing relationships or past/current collaborative efforts?

D. Project Implementation, Assessment, and Sustainability (estimated 2-3 pages, both Initial and Final Proposal)

This section is intended to capture how applicants are envisioning project implementation, assessment, and sustainability.

i. Project Implementation

- Describe narratively your approach to project implementation.
- Outline your team's implementation plan. Include a timeline and any expected milestones or deliverables. You may include a table or chart, which will count toward your page maximum length.
- Describe each team member's specific role(s) in project implementation and/or assessment. (This can include named participants, or participants by role.)
- Provide very brief descriptions of key members of the project team highlighting their relevant skills or capabilities.
- If external contractors are included, describe their expertise for the project.
- Describe any departments, such as Institutional Research and Grants/Finance offices, at the host and/or partner institutions that the team will be relying on to assist with implementation, and any dedicated staff time for project management and/or administrative coordination that will be necessary. What is the role and/or commitment of these other departments to support the project?

- Please identify any resources that your project can leverage (e.g., existing materials or Open Educational Resources, existing partnerships, or matching/braided funding).
- Outline the technology tools your team will be using and/or developing, including the project's approach to adaptive learning.

ii. Project Assessment
- Describe your team's assessment plan that will be used to evaluate the effectiveness of the selected strategy or strategies. You may include a table or chart for this section, which will count toward your page maximum. Include the type of data your project team intends to collect and data collection methods.
- Include intended impacts on students and faculty, as appropriate for the scope of work. Consider whether student feedback will be incorporated.

iii. Sustainability
- Describe how the proposed project may have lasting impact at your institution and on all participating campuses.
- Describe how your project may have potential for others to utilize your work.
  - Describe how your project has the potential to be scaled and/or replicated at other institutions and how others will be able to utilize your work.
  - Describe how your team plans to disseminate results.
  - Include references to other successful models that may indicate your project has potential for success.

E. Ethics, Open Educational Resources, and Accessibility (up to 1 ½ pages, both Initial and Final Proposal)

If not included in any of the above, please discuss: a) how your project will incorporate ethical considerations of data science; b) how your project will make materials developed with Learning Lab funds available as open educational resources; and c) how materials developed with Learning Lab funds will meet the diverse needs of learners (such as through a Universal Design for Learning framework) and be accessible for participants with disabilities.

F1. Budget Narrative (estimated ½ page, both Initial and Final Proposal)
Provide a budget narrative summarizing the project budget categories and high-level descriptions of how funds will be used. For Final Proposal, the narrative should align with the uploaded budget (detailed below) in Excel format.

F2. Detailed Budget in Excel (**Final Proposal Only**)
Upload a budget in Excel format through the application portal using the template provided. To help you prepare the budget, see the Budget section of the RFP FAQs, and the sample budget provided. All of these materials are available through Learning Lab's Grand Challenge Data Science RFP website page.

Learning Lab requests that applicants reserve $2,000 per year in the project budget for travel to attend annual intersegmental grantee convenings. This amount is based upon two team member attendance, with an estimated travel cost of $1,000 per person.

**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. Funds may not be used for travel to states with discriminatory laws.

G. Logic Models (Optional for Initial and Final Proposal)

H. Endnotes/References (Recommended but optional for Initial Proposal; Required for Final Proposal)
Please provide endnotes/references supporting the project's approach. Endnotes should be used for source references only (i.e., no substantive material) **(no limit)**.

I. Response to Selection Committee Feedback (**Final Proposal Only**)
Please provide responses to Selection Committee feedback (maximum of 3 pages).

J. Additional Team Member Information (**Final Proposal Only**)
Please provide statement of qualifications on team members not covered in the project narrative **(maximum 2 pages total for all additional team members).**

# III. Guidance for Crafting a Successful Proposal

The following are intended to be helpful tips to crafting a successful proposal.

1. *Demonstrate knowledge about the students and/or faculty groups your project intends to impact, including historically underrepresented student groups.*
2. *Include any relevant data and disaggregated data that will help us understand the student and/or faculty groups you intend to impact.*
3. *Be specific about your goals and the impact or outcomes you are hoping to achieve with the project, and thread the needle about how or why your approach may lead to fulfilling the goals and outcomes of your project. Your theory of change will be important in threading the needle.*
4. *Highlight the research base that supports your theory of change.*
5. *Use asset-based language to describe your student/faculty populations.*
6. *Be ambitious but realistic.*
7. *Be specific about the how the project will apply practices that have demonstrated positive impacts on how students learn (e.g., active learning, adaptive learning, applied learning, culturally relevant/responsive pedagogy, project-based learning, etc.) and include interventions in the affective domain (e.g., sense of belonging/identity; social/emotional/cultural contexts; growth mindsets, including faculty growth mindset, etc.). Understand how practices impact specific populations, specifically historically underrepresented students.*
8. *Demonstrate authentic well-balanced collaboration among partner institutions and/or departments, and identify structures and/or processes to help sustain collaborative efforts.*
9. *Think through and spend time on your evaluation/assessment plan now (see Learning Lab's sample Final Project Evaluation template for reference).*[8]
10. *Given the difficulties of faculty recruitment and collaboration, include the project's proven strategies for recruitment and specify your approach to fostering inclusion and resolving conflict and disagreement.*
11. *Think about sustainability from the beginning.*

[8] Learning Lab is hosting an in-person workshop on October 14th, 2022: "Project Evaluation: Designing for the End" at UCLA's Luskin Conference Center. Please contact info@calearninglab.org for more details. We will make materials available on the Data Science Grand Challenge webpage afterwards.

# IV. Selection Process

Per statute, Learning Lab will convene an expert Selection Committee to review and evaluate proposals in the stages described above. Learning Lab may additionally use external reviewers to provide written qualitative and quantitative evaluations of proposals to aide Selection Committee members in their review process.

The Selection Committee will make final recommendations for award to the Director of the Governor's Office of Planning and Research (OPR) for approval. Awards and final award amounts are contingent on successful negotiation of a grant agreement between the Learning Lab staff, the Foundation for California Community Colleges (administrator of the grant), and the awarded project team and host institution. Selection Committee members and the Director of OPR may take into consideration geographic, disciplinary, and institutional diversity in order to balance the diversity of awards.

**Scoring Rubric**

Submitted proposals will be assessed for eligibility and evaluated using a scoring system across five evaluation areas; the maximum score will be 30 points. There will be no minimum or "cut off" score required for funded proposals. Scores will be used to inform a deliberative process among members of a Selection Committee. A scoring rubric can be found on Learning Lab's Grand Challenge Data Science webpage no later than September 30, 2022.

# V. Post-Award Agreements and Deliverables

Applicants whose proposals are selected and approved for award will be asked to enter into an agreement with the Foundation for California Community Colleges, which is under contract with the Governor's Office of Planning and Research to administer the Learning Lab grant program. Learning Lab personnel will administer the agreement, which will address project implementation, including the following:

**All post-award expectations will be specified in award agreements.**

- **Becoming part of the Grand Challenge Cohort**: In addition to executing on project deliverables, awardees will join the Data Science Grand Challenge Cohort through which they will share ideas, approaches, findings, data, and outcomes over the two- to four-year grant period. A coordinating institution or project team will be selected to receive up to $500,000 for up to five years to foster collaboration among grantees and serve as the Data Science Grand Challenge Cohort Coordinator.

- **Indirect Costs:** Up to 8 percent in indirect costs are allowed; for the University of California, GAEL, UCRP, and TIF must be included in the 8 percent of indirect costs. Combined direct and indirect costs cannot exceed the award amount. Consequently, for a project awarded a $100,000 grant, the total IDC cannot exceed $7,407 (i.e., 8 percent of total direct costs of $92,593, with indirect and direct costs totaling $100,000).

- **Budget Rules and Flexibility**: Grant agreements will have some budget flexibility; however, prior approval will be required for budget changes between approved budget categories above negotiated thresholds, and for certain activities such as travel and hosted convenings. Please note: Learning Lab funds may be used to pay students (stipends or hourly rates based on work performed on the grant project), pay related student fees, and fund nominal student participation incentives (example: gift card or bookstore voucher for participation in responding to a survey); however, Learning Lab funds may NOT be used to cover student tuition (undergraduate or graduate), student housing, or student stipends for summer bridge attendance.

- **Open Educational Resources:** Institutions must 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. Additional guidance will be provided prior to finalizing the grant agreement.

- **Start Date:** Initiate work within 30 days of signing the agreement. Grant agreements must be signed no later than 30 days after award notification.

- **Reporting and Deliverables:**
    - **Communication Materials:** In the first quarter of project, submit a project graphic, tag line, description, and optional team member photos for posting on the Learning Lab web site. An ADA-compliant TED Talk style video is due in the first quarter of the project, but teams may ask for an extension until August 31, 2024.
    - **Progress Reports:** Submit written progress reports every six months throughout the duration of the project, including tracking of milestones and expenditures. A Zoom conference with Learning Lab staff and/or advisors is required twice a year. A final report with an evaluation will be due at the end of the grant term.

- **Learning Lab Intersegmental Convenings:** Awarded teams will be invited to at least two intersegmental grantee convenings and expected to reasonably participate in events hosted by Learning Lab or the Cohort Coordinator. Please reserve $4,000 in your project travel budget to attend in-person Learning Lab hosted convenings, based upon two-member attendance at each convening.
- **Technical Assistance and Collaboration:** Awarded teams will be expected to participate in conference calls and convening activities and seek technical assistance from the Learning Lab Advisors or Learning Lab staff.
- **Use of Data:** Investigators and demonstration teams are expected to share data and research findings consistent with academic standards.
- **Data Collection:** By the end of the grant period, awarded projects should collect data relevant to the project. Examples may include changes in faculty mindset and practices, and/or including the adoption of more inclusive and effective teaching practices. Awarded projects should track outcomes and impact, particularly for women, Black/African American, Latino/a, Pacific Islander, and/or Native American students, to the extent possible.
- **Protection of Privacy and Personal Information:** Investigators and project teams are expected to follow state and federal law to protect privacy and personal information.

# VI. Terms and Definitions

**Achievement, Opportunity, and Equity Gaps:** Achievement gap refers to "Any significant and persistent disparity in academic performance or educational attainment between different groups of students" (The Glossary of Education Reform) while opportunity gap refers to "The ways in which race, ethnicity, socioeconomic status, English proficiency, community wealth, familial situations, or other factors contribute to or perpetuate lower educational aspirations, achievement, and attainment for certain groups of students" (The Glossary of Education Reform).

> **Equity Gap** refers to racial and gender disparities in educational access and attainment for historically underrepresented and underserved student populations that are the product of persistent social and institutional barriers to educational opportunities and educational success (Lumina Foundation and USC Center for Urban Education). From the perspective of the Learning Lab, we can understand equity gaps, in part, as the achievement gaps that opportunity gaps created. Our preferred term is to use equity gap, rather than achievement gap, in order to keep the focus on the multiple barriers to educational success, rather than on student performance alone.

**Adaptive Learning:** 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 produce better learning outcomes across the broad range of students.

**Asset-based Language:** Language that focuses on student (or faculty) strengths rather than their deficits. For example, an asset-based framework would acknowledge the ambition and persistence demonstrated by students from under-resourced communities who enroll in the course instead of focusing on students' lack of preparation from previous educational experiences.

**Authentic Collaboration:** Learning Lab funded projects are inherently collaborative, but achieving authentic collaboration requires intentionality. Projects seeking Learning Lab funding should demonstrate that power and responsibility is equitably distributed and that carrying out the vision for the project is a collective process. Awareness of the conditions/dynamics that can

lead to power struggles, conflicts, and other dysfunctions may lead to creative opportunities for collaborative partnership. Additionally, the project budget should be well-balanced and reflect the values of collaboration that the proposal describes by funding project team members and institutions fairly.

**Host Institution:** The project's host institution is the college or university that will act as grantee and fiscal intermediary for purposes of grant administration. The host institution will enter into a grant agreement with the Governor's Office of Planning and Research for receipt and management of grant funds and will distribute funds to the partner institutions based on sub-award agreements. The designation of an institution as "host" is for grant administration purposes only. Learning Lab expects awarded projects to exhibit meaningful, well-balanced collaboration among partner institutions, i.e., all the institutions involved in the project.

**Indirect Cost (IDC) Calculation:** Learning Lab calculates the 8 percent IDC rate based on combined project direct costs and does not permit layering of IDC in excess of 8 percent of total direct costs. Combined direct and indirect costs cannot exceed the award amount. Consequently, for a project awarded a $1 million grant, total combined IDC for all partner institutions cannot exceed $74,074 (i.e., 8 percent of total direct costs of $925,926, with combined indirect and direct costs totaling $1 million). Partner institutions may, however, divide their respective shares of IDC, as long as they conform to the Learning Lab's overall limit on IDC (i.e., no more than 8 percent of total direct costs). For instance, the host institution may apply 8 percent IDC to a portion of a sub-award, but the sub-awardee cannot then apply IDC to that same portion of the sub-award, since that would lead to total IDC in excess of 8 percent of total project direct costs.

**Intersegmental faculty team:** 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.

**Networked Improvement Community:** Networked improvement communities (NICs) aim to address targeted areas in educational reform by connecting diverse expertise from research, educational design, and practice in an effort to close the gaps between aspirations and outcomes. NICs are characterized as a group focused on a well-specified, common aim, guided by a deep understanding of a targeted problem, and coordinated as networks to accelerate the development, testing and refinement of the interventions, their rapid diffusion out into the field

and their effective integration into varied educational contexts.[9]

**Online/Hybrid Learning Environments:** 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. Hybrid courses or blended courses are those that use both "online" and in-person interactions as part of the formal course environment or requirements. Hybrid courses allow some component of the course to be available or accessible in an online environment. For the purposes of this 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.

**Science of Human Learning:** Learning science, or the science of human learning, is the study of how human learning takes place. Interdisciplinary in nature, drawing from fields such as cognitive science, neuroscience, computer science, education, psychology, sociology, design studies and more,[10] the science of learning strives to understand how people learn, how to support learning, how to facilitate and enhance learning, discipline-based learning, and the role of technology in enhancing learning and collaboration[11]. The science of learning addresses how people process, gather, and interpret information; how they develop knowledge, skills, and expertise; and the extent to which social and physical context and design environments influence learning[12]. Scaffolding, inquiry or problem-based learning, collaborative learning, game and simulation-based learning, and metacognition are all examples of how teaching methods and approaches to curriculum can be influenced by what we understand about learning. Additionally, strategies linked to social psychology and multicultural education emphasize the importance of attending to students' identity and culture when addressing achievement gaps—we view such achievement gaps as invitations to apply the science of learning in new or improved ways.

One of the goals of the science of learning is to create a positive feedback/continuous improvement loop between theories of learning and practice, which would result in improved

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[9] LeMahieu, P.G., Grunow, A., Baker, L., Nordstrum, L.E. and Gomez, L.M. (2017), "Networked improvement communities: The discipline of improvement science meets the power of networks", *Quality Assurance in Education*, Vol. 25 No. 1, pp. 5-25. https://doi.org/10.1108/QAE-12-2016-0084

[10] Sawyer, R.K. (2006). The Cambridge Handbook of the Learning Sciences. Cambridge, U.K.: Cambridge University Press.

[11] Sommerhoff, D., Szameitat, A., Vogel, F., Chernikova, O., Loderer, K. & Fischer, F. (2018). What Do We Teach When We Teach the Learning Sciences? A Document Analysis of 75 Graduate Programs. Journal of the Learning Sciences, 27:2, 319-351. https://doi.org/10.1080/10508406.2018.1440353.

[12] Ibid.

student learning and advance the field of learning science. For the purposes of Learning Lab, as public higher education strives to educate more students with diverse backgrounds in a rapidly changing world, leveraging, increasing and applying our knowledge of human learning is a challenge we must embrace.

**Theory of Change:** Several definitions for theory of change can be found in evaluation literature and other contexts. Learning Lab provides a broad definition of theory of change to indicate an understanding of the process of change that underlies and guides a change effort, project, or program. Included in a theory of change are the assumptions about the conditions for change and the interventions or strategies that are believed to lead to a desired result at different stages of intervention or implementation, such as short and intermediate outcomes toward long-term goals or impact. Learning Lab recommends reviewing "Change theory and theory of change: what's the difference anyway?", by Daniel L. Reinholz and Tessa C. Andrews.

**Underrepresented Students:** By underrepresented, we mean historically underrepresented in STEM higher education, including Black/African Americans, Latinx, Native American, some Asian American subgroups, Pacific Islanders, and women.