

PK-12 Teaching and Learning Innovation Grants (TLIG): CS Teacher Education for Future

Background

With support from the Woodrow Wilson National Fellowship Foundation, MIT's Teaching Systems Lab announces the 2018-2019 call for proposals for the Teaching and Learning Innovation Grants. The WW Foundation established the Woodrow Wilson Academy for Teaching and Learning, a graduate school to prepare teachers and school leaders. TLIG grants, managed by TSL, will chart the future of teacher preparation and inform the development of curriculum at the WW Academy.

This year, we invite the MIT community to envision CS education for K-12 schools, focusing on both what students and teachers need to know. With the rapidly changing technology and economy, CS competency is increasingly becoming a new basic skill to be productive in the 21st Century. In spite of the high demand for CS education in K-12 schools, most schools do not offer a single course in computer science and programming, and the student population of the existing classes often do not represent diverse backgrounds and interests (Google & Gallup, 2016).

Reflecting this urgent need to support CS competency in K-12 education, there has been national initiatives led by both government agencies and industry leaders to bring more CS to all K12 schools for all students. To overcome the persisting diversity gap in STEM fields and frame the CS competency beyond programming, CS education shouldn't be limited to just advance coding classes, but we should introduce CS concepts and fundamental skills early on and thorough diverse models of learning. One of the key barriers to making CS education more available in K-12 schools is lack of qualified teachers (Google & Gallup, 2016).

Program Goal

TLIG aims to bring MIT CS educators together to tackle the problem of CS teacher licensing and teacher competencies--i.e. what are skills, concepts, dispositions that teachers need to have in relation to the licensure agency's requirements. We also want to leverage MITs rich history and innovative takes on CS education by emphasizing the role of creativity, playfulness, artificial intelligence, and affective computing. We are seeking to find innovative models of CS education within the MIT community and investigate implications of those models on K-12 education, particularly for teacher education. Some of the questions that we are hoping to answer include but not limited to:

- What can MIT say about "hands-on minds-on" ways of learning CS that goes beyond programming skills? How can we prepare teachers to facilitate those models of learning CS in their classrooms?
- How can we support teachers' work with an existing model of teaching CS skills and concepts?

The proposed work should meet the following requirements. First, the work needs to be evidence-based. That is, the team needs to clear articulate how they would define success of

the project and how the evidence for the success would look like. Second, the work needs to be aligned with the Massachusetts teacher licensure in CS and should focus on teacher ed. Finally, our goal is to coordinate related efforts in this area, so that people will need to be willing to work in a team. That is, we will encourage different groups with complimentary interests and foci to collaborate, and the team's willingness and commitment to do will be crucial for the success of the program.

Key Dates

- January 24th, 2018: Call for proposals released
- February 8th, 2018 from 10am-12pm: Open house at the office of Open Learning
- February 5-9th, 2018: Optional individual meetings with TSL Research Scientists and Learning Designers, available on a first come, first-served basis
- March 11th, 2018 by 5PM EST: Proposals due
- April 2nd, 2018: Decisions announced to grantees
- June 1st, 2018: Project starting date

Awards

Awards for the Teaching and Learning Innovation Grants range from between \$25,000 and \$100,000 and will be for 12 months in duration, ending in June 2019. The TLIG program anticipates awarding between 2-3 grants in spring of 2018, and we strongly encourage collaborative submissions--connecting multiple faculty work to be considered for additional funding. This program is expected to run for two additional years and awardees may reapply in subsequent years. For information on past awardees and their projects, visit our projects page (<https://tsl.mit.edu/see-the-future-first/>).

Eligibility

- The TLIG Grants program is open to any projects that have an MIT sponsor who has PI status. The proposal must be submitted and overseen by the PI. Research and development may also involve post-doctoral researchers, graduate students, teachers, and others.
- Proposals can sponsor research on projects at various phases. For example, projects might involve developing prototypes for ideas at early stages, taking an existing outreach project and improving the project through research, or scaling a small outreach project to reach new or larger audiences. Some projects might take the form of a "translational" project grant, where post-doctoral researchers or advanced doctoral students have part of their time bought out to pursue an educational project.
- PIs can sponsor up to two grants.

Research Community Commitments

Awardees will join a community of TSL staff, fellow grantees, and others from the MIT PK-12 community and the Woodrow Wilson Academy staff and students. TSL staff and researchers will support grantees in developing their ideas and projects for publication in educational research venues and dissemination among teachers and teacher educators. Awardees will be expected to attend occasional meetings throughout the year, to present at least one colloquium to disseminate research objectives and findings, and to submit a short report at the end of the grant. Selected projects will be highlighted on the TSL website and the executive summary of the final report will be published. Funding for this grant program is based on the expectation that the results of the projects will be made openly available by either open source or a license.

School and Teacher Partnerships

- Proposals that include partnerships with schools and teachers should list those partnerships in the research plan. Projects that are funded can also reach out to TSL staff, who may be able to assist in developing partnerships with schools and teachers.

Proposal Preparation and Submission

Proposals are [submitted online](#) through submittable.com.

Submissions are due on **March 11th, 2018 by 5PM EST**

Prior to submitting an application, there will be an open house/information session on **February 8th from 10am-12:00pm** at the Office of Open Learning (NE49). Applicants will have an opportunity to learn more about the Teaching Systems Lab, the Woodrow Wilson Academy, and the work both organizations are doing to develop innovative approaches to teaching and learning. We encourage everyone to attend.

In addition, meetings are available with TSL staff to help you prepare your proposal and discuss connections between your work and the Woodrow Wilson Academy. Meeting appointments can be made on a first-come, first-served basis by contacting Cindy Sambataro (csambata@mit.edu). Meetings can be scheduled Monday – Friday, February 5-9th. Applicants are encouraged to consult with TSL staff but meetings are not required. TSL staff may be available for consultations after February 9th.

Application Requirements

The proposal includes six sections.

- **Cover Letter** with summary of the project and short biographical statement (500 word limit).
- **Statement of Purpose:** identify the problem being addressed and its relevance to CS education, the significance of the proposed work, any prior research and results, objectives of the work, and the importance of funding (500 word limit).
- **Subsection:** How does this project advance our CS education, particularly related to teacher training? (200 word limit).

- **Research Plan:** include goals and objectives, describe the research approach; tasks and research timeline, and metrics for evaluating success (1500 word limit). Make sure you clearly answer the following questions in this section:
 - Describe your innovation. What is your CS learning and teaching model? Which aspects of CS education does it address?
 - Relevant work: What you have done so far and how this grant can help you to address the question of how your model of CS learning and teaching can impact K-12 education
- **Biographical Sketches:** List the members of the research team, include a brief summary of research responsibilities and roles.
- **Budget:** Include a budget as an excel document, using the template provided. Include indirect costs (at 15%) of total direct cost in your budget proposal. Upload your spreadsheet with your application.
- **Budget Narrative:** A brief justification of costs (500 word limit)

These sections correspond to a series of text entry boxes in the application. Applicants are encouraged to prepare the answers in a Word document and copy and paste them into relevant sections of the application.

Evaluation Criteria

A committee of faculty and staff affiliated with the MIT PK-12 action group and the Woodrow Wilson Academy will evaluate and consider the proposals based on the following criteria:

- Originality of Ideas and Approaches
- Potential to Significantly Improve CS Teacher Education or Advance our Understanding of How Students Learn Computer Science.
- Clarity of Project Design and Proposal
- Quality of Assessment/Evaluation Plan
- Feasibility: Resources and Team are Sufficient to Implement the Plan
- Expected Commitment and Involvement of Faculty Sponsor

Every application will be reviewed by at least 1 faculty and 1-2 staff members. After the review, the committee may request additional information or modifications to the proposal before funding decisions are made. All decisions by the committee are final.

Please direct inquiries to csambata@mit.edu

Apply at <http://mitteachingsystemslab.submittable.com/submit/>