

2019 PROVOST'S LEARNING INNOVATIONS GRANTS CALL FOR PROPOSALS

The **Provost's Learning Innovations Grants** (PLIG) program was developed to broaden and enrich the learning experience of RIT students by funding faculty-initiated projects that enhance student learning. Managed by the Innovative Learning Institute (ILI), this program has been designed to:

- Better support dissemination of individual faculty learning to the wider faculty population
- Integrate funding with Institute priorities
- Support the scholarship of teaching and learning

I. ELIGIBILITY

All full-time RIT faculty (tenured, tenure-track, visiting, lecturers, etc.) are eligible to apply.

II. GRANT TYPES

There are two types of grants—Exploration and Focus—for PLIG 2019. Full details are available on the [Grants Types](#) page of the PLIG website (www.rit.edu/plig).

III. USE OF GRANT FUNDS

Provost's Learning Innovations Grants for 2019 may range from \$1,000-\$5,000.

Examples of the use of PLIG funds include:

- Course release (reasonable, actual replacement costs for faculty members removed from teaching)
- Development of new technology-based learning tools and/or environments
- Technologies or equipment required that are not normally provided by the department/college
- Resources for research design and consultation, data collection and aggregation, instrument development and/or purchase, secure data storage, data analysis, and report generation
- Travel to support research activity and/or meet with potential funding sources

IV. PLIG TIMELINE AND TASKS

The grant timeline assumes that most recipients will use the Spring 2019 and/or Summer 2019 term(s) to plan and develop their PLIG-funded project for delivery or implementation during the Fall 2019, Spring 2020, and/or Summer 2020 term(s). The full [timeline](#), including grantee tasks, is available on the PLIG website.

V. SELECTION COMMITTEE AND EVALUATION CRITERIA

Applications for PLIG funds are evaluated by the [PLIG selection committee](#) according to the following criteria:

- *Utility* (solves a defined problem; has potential to benefit many courses/faculty)
- *Creativity* (is a novel approach or application; represents a new paradigm)
- *Efficacy* (uses an evidence-based approach; impact to student learning and/or the student experience can be demonstrated)

The criteria are further defined, illustrated, and explained in the [Proposal Evaluation](#) section of the PLIG website.

VI. QUESTIONS

Please email plig@rit.edu with any questions about the PLIG process.

(Examples of previously funded projects are available in the [Previous Awards](#) section of the PLIG website).

2019 PROVOST'S LEARNING INNOVATIONS GRANTS

APPLICATION

INSTRUCTIONS

1. Complete this Application Form and save as "Lastname_Firstname_APP" (*using your name*).
2. Ask your Department Head to complete the Department Head Certification, scan and save as, "Lastname_Firstname_SIG" (*using your name*).
3. Email all documents to plig@rit.edu, **no later than 11:59pm ET, January 21, 2019.**

If you have any questions about completing this application, please contact Michael Starenko at 585-475-5035 or mssetc@rit.edu.

APPLICANT INFORMATION

This application is for a (please select *one* type of grant):

Exploration Grant

Focus Grant – Active Learning Across All Course Modes

Principal Applicant Name: Jennifer Swartzenberg

Faculty Title: Lecturer **Email:** jlsch2@rit.edu **Phone:** 475-2203
(*Full-time only*)

College: NTID **Department:** Mathematics and Sciences

Department Head Name: Matthew Lynn **Email:** malntm@rit.edu

Others involved in the project (if any): Miriam Lerner (ASLCORE), Tina Goudreau (professor), William DeGroot (interpreter), Todd Thieu (interpreter), Justin Anderson (interpreter), Asma Sheikh (student), Morgan Bauer (student), Kaitlyn Clark (student), Ashley Gleason (student), Cristophorus Budidharma (student), Michelle Mailhot (student), Cody Cummings (student)

Project Name: Organic Chemistry in ASL

Total Funds Requested (*as calculated on the budget worksheet on the next page*): \$5000.00
(*requests of \$1,000 to \$5,000 will be considered*)

BUDGET

Complete the table below to calculate your budget

- The total shown on this worksheet must match the “Total funds requested” in the Applicant Information section on page 1 of this application form.
- If awarded, additional funds will be provided to cover any benefits and ITS expenses associated with the salary budget requested.
- Note that any equipment or other materials purchased with grant funds are the property of your department and revert to the department after your project is completed

****Please note that this budget will not satisfy all funding required for the project so I broke it down in the simplest way possible to fit with the \$5000 budget scheme.**

Personnel	Purpose/Justification	Amount
<i>Adjuncts, Part-time Faculty/Staff, Summer Salary</i>		
Reviewers of Video Content (2)	Review developed signs for ASL merit and approval for upload to ASLCORE site (\$50/hr x 40 hr for each reviewer – this is the going rate for ASLCORE reviewers)	4000.00
<i>Student Workers, Graduate Assistants</i>		
Students Hired for Summer work	Sign development over the summer (\$20/hr x 40 hr for each student)	1000.00
Personnel Total		\$ 5000.00
Total Award Requested		5000.00

STATEMENT OF UTILITY (two pages maximum)

Using the evaluation criteria outlined in the [Proposal Evaluation](#) section of the PLIG website, please provide an overview of the project you are proposing, including:

- Project objectives
- An explanation of the teaching/learning problem(s) it is designed to address
- An explanation of the significance of the project to student outcomes and/or the student experience.
- A brief description of how the project integrates with activity already underway at RIT in a priority area and/or how this approach has been successfully used at RIT already.

Project Objectives:

- To enhance the learning, comprehension, and recall of organic chemistry terms, reactions, and concepts by deaf students.
- To establish new signs for terms, reactions, and complex concepts that have no established ASL signs but are conceptually accurate and foundationally based in ASL.
- To establish a video database on an already existing RIT/NTID site (<http://aslcore.org/>) for organic chemistry that will aid students, teachers, tutors, and interpreters outside of the classroom.

The ultimate goal of this project is to develop ASLCORE, the RIT/NTID website of established ASL signs arranged by discipline. At this point, there is no chemistry category, let alone an organic chemistry category. I would like to help change that by video documenting the signs currently being used by deaf students, tutors, and interpreters in their various chemistry courses and, as appropriate, developing signs where none currently exists. This will establish a new paradigm in the realm of ASL as there are virtually no established signs for organic chemistry on record in academic literature and only a few mentions in the other areas of chemistry that are not generally related to ASL expression of content. This project is already a work in progress, but on a smaller scale since revenue sources must be generated in order to progress at a more reasonable rate.

This project began with my collaborative work with Tina Goudreau, who is teaches organic chemistry in the College of Science. I have been the NTID support tutor for her organic chemistry courses for the last five and a half years. Over that time period, my sign language skills have increased substantially from where I began. Everyday conversation in ASL is a totally different ballgame than trying to tutor abstract organic chemistry concepts without fingerspelling and writing everything, which is very time consuming. Over the last three years there has been one specific interpreter for the course and due to the prolonged exposure to the course material he has gained a better understanding of the content, which helped strengthen his interpreting abilities in this subject area. The combination of my tutoring and the increased understanding of the interpreter, the deaf students in the organic chemistry course were markedly improving their understanding of the course content and, in turn, their grades increased year after year in comparison to that of the hearing students and their previous deaf peers. Tina and I began seeing these trends and, after discussing them, realized that it must be the sign language that was helping the deaf students in the course be more successful than their deaf peers of years past. The course content hadn't changed, the only change was an improvement in the use of ASL in the realm of organic chemistry. Tina wanted to try to develop signs with the help of myself, the interpreter in the course, and some of the deaf students who had been successful in the courses so we could share the knowledge with the hearing students in an experiment on embodied cognition. Together we were able to come up with conceptually accurate signs, some of which had already been adopted and others were newly developed that were also foundationally based in ASL. The first signs were introduced to the hearing students this past fall semester. More will be introduced this spring and we are currently in the process of video documenting the signs to be uploaded to the ASLCORE site now that they have been reviewed by deaf experts for their ASL merit. In the process of all of this, we met with Miriam Lerner from the ASLCORE team and she expressed an interest in my helping to establish chemistry and organic chemistry categories in the site. I agreed to this endeavor and this is why I am applying for the PLIG.

Organic chemistry is a tough class for any undergraduate student who must take it. I have heard endless horror stories about it both when I was a student and now that I am a faculty member at RIT. I have heard it described many times as being its own language, and that description is quite accurate. There is a lot of terminology and many abstract concepts that are tough to describe in words, let alone in ASL. Upon doing a literature search for deaf education + organic chemistry I got zero hits. There is no known established ASL in this realm whatsoever. That makes the interpreters, tutors, teachers, and deaf students' lives complicated. The idea has to be conveyed, but how? The way we have developed is novel since we are quite literally developing a new language within a language. However difficult this goal may be, it is an endeavor worth delving into. Deaf people are severely underrepresented in the sciences. There are a few reasons why, and this is a really big one. You can't interpret a meaningful message by fingerspelling everything. There has to be conceptually accurate sign language happening so understanding can occur and the educational experience of the deaf student can be on par with that of a hearing student.

Establishing these much needed categories in the ASLCORE website will have multiple impacts on the RIT/NTID community as a whole. First and foremost, it will help the students as a tool in their educational journey. In the ASLCORE website there are two videos for each term. The first video shows just the established sign for the term or concept. The second video is called an expansion and it explains the term or concept in detail in ASL. This will aid the student learning process to have a tool like this one. Secondly it will aid the interpreters in doing their jobs in the classroom and the laboratory. They can use the vocabulary in the site to not only figure out the signs to use, but also in enhancing their understanding of the topic or term they are trying to interpret. This will help in their ability to interpret a cohesive message for the deaf people in the classroom. Thirdly, it will aid the instructors of the courses who can refer to the site for their reference and education on how things can be expressed in their own discipline using ASL. Beyond deaf students, some of the terms in the ASLCORE site are the same signs developed for use in the organic chemistry courses in the project on embodied cognition mentioned above. This site can also be referenced by the hearing students who are trying to get a visual on the signs they learned in class. It can also broaden the hearing community's horizons if they delve beyond the videos of interest into other areas and start picking up other signs. Once organic chemistry and chemistry categories are developed, this site can be used across the board by all chemistry faculty, interpreters, and students to help facilitate communication between the hearing and deaf populations on campus. This project aims to develop the organic chemistry category first, and once completed begin the chemistry category. Some of the signs (electron for instance) will be complimentary and used in both categories and others will be exclusive to one or the other. Since we were already starting with organic chemistry doing the project with Tina, it made sense to finish that and then start the next category.

This project will require multiple areas of expertise all collaborating together to ensure a cohesive message to the receiver. The team of the three interpreters, seven students, all of whom have been signing for their entire lives, and myself will work together to document signs already in use and then develop signs where appropriate. Once the signs and expansions have been developed they will be recorded in video format and sent for review by hired ASL content experts. After feedback has been given and changes are made where needed, the signs and their respective expansions will be professionally recorded by the ASLCORE team and uploaded to the site. Once they are up, they are permanently available for use by the RIT/NTID community.

STATEMENT OF CREATIVITY (three paragraphs maximum)

Provide a brief description of how this is a novel approach, or a new application of an existing mode or model of teaching and learning, and/or research about how teaching and learning represents a new paradigm.

This approach is novel in that it is breaking new ground in the area of deaf education by developing the use of ASL in organic chemistry education. There is no literature that I was able to find showing the use of ASL in organic chemistry. Organic chemistry in and of itself is like learning a new language, but teaching organic chemistry in ASL is a feat we must accomplish as educators. It is through developing this new and powerful language tool that opportunity can be had by many. Not only will this project assist deaf students who are underrepresented in the sciences to begin with, it goes beyond that to hearing students, interpreters, and educators. This would be a permanent resource for the RIT/NTID community that is well worth the time and monetary investment to make it happen.

Further this project is novel in how it is being done. The new signs and expansions will be developed by a team of deaf students who have already successfully completed both organic chemistry courses and are native signers, interpreters who are experts in ASL, and chemists who are the content experts in that area. It is my intention to hire deaf RIT graduates who are native signers and have taken organic chemistry if possible to be part of the ASL content reviewer team for the videos. It is important to let the deaf lead this process and for me to facilitate that process in any way I am able to do so as a hearing individual.

STATEMENT OF EFFICACY (two pages maximum)

Provide a brief description of the experiment/research design, methodology, and methods of data collection and analysis you will use to gauge efficacy.

For the first part of the project I will be meeting with my team to go through a list of terminology I have compiled for both of the organic chemistry courses and the labs. In the first meeting(s) we will sort through the list of terminology to arrange the terms into three categories: terms that already have an established sign(s); terms that do not have an established sign but would be best left to fingerspelling; and terms that we think a sign should be developed for. Once the list of terms are divided up, we can proceed to take rudimentary videos of each of the terms that already have established signs currently in use.

The videos are two fold for each sign. The first video only shows the sign. The second video is called an expansion and it explains the sign/term in depth using ASL so the viewer can understand the sign/term fully and see it used in context. Once those videos are all made they will be sent to our team of reviewers. I hope to hire two deaf, native signing RIT graduates who have taken organic chemistry as part of the review team. The other two reviewers will be reviewers who are already a part of the ASLCORE team who are deaf ASL experts. These reviewers will review the signs and their expansion videos and critique them based on their ASL merit. In addition to just the videos, I also provide the review team a detailed definition of each term as well examples and mechanisms (a way of drawing the progress of a reaction showing electron movement) where appropriate. This aids the reviewers who don't know the chemistry content in understanding the process we are trying to convey with the sign. The reviewers will provide my team feedback and we will make any appropriate changes to our sign and/or expansion as applicable. Once the changes are made, the videos will be professionally recorded by the ASLCORE team and uploaded to the site (<http://aslcore.org/>).

Once the list of signs already in use is complete, the plan is to start working on the list of terms that signs need to be developed for. For this task it is best to break it into smaller chunks. I will hold meetings where I will provide the list of terms ahead of time to the team so everyone can start brainstorming. I will provide the team the same written definitions and background information as the reviewers will ultimately receive and provide them guidance on chemistry content/concepts that needs to be present to make the sign accurate from a chemistry perspective. Then I will set them loose and facilitate the discussion so things don't go too far off topic or to give reminders about the chemistry content that needs to be present in the sign. As a hearing person it is important for me not to try and influence the sign development beyond the chemistry input as ASL is not my native language. In that area the deaf students and the interpreters are the experts. Once signs are agreed upon, they are preliminarily recorded along with their expansions and sent to the review team.

It is my expectation that this project is going to take a significant amount of time as the list of terms is hefty and the process of sign development is time consuming. I am going to get as many terms and signs done by the completion of spring semester with my group as it is possible to accomplish doing weekly meetings, and then the rest will be left to summer. After speaking with Miriam Lerner, I envision that I will likely need to have at least one week of full time work by the team this summer in order to finish the project for organic chemistry.

The biggest measure of efficacy for this project will be student feedback. I plan to design a survey for the students to take as they have completed each organic chemistry course to gauge how they feel the new ASLCORE chemistry tab and the signs used there and in class have met their educational needs. One foreseen issue with this approach is that my sample size is always going to be small in comparison to that of the hearing population. Since the number of deaf students in courses is historically much lower than that of the hearing population, it is rough to give an exact number of students per semester that would be surveyed. Depending on the semester and course there is usually anywhere between 1 and 17 deaf students in the course among their 30 to 150 hearing peers. Additionally data can also be collected on student success rate in the courses for both deaf and hearing students for comparison purposes in the form of exam and final grade averages. Additionally this work will be presented in manuscript format to be peer reviewed by both the deaf and scientific communities.

ADDITIONAL CONSIDERATIONS

Please address these questions, if needed.

Will your project require assistance for extensive or unusual media, multimedia, simulation, and/or software development? If so, please explain?

N/A

All courses offered by RIT must be accessible to students with disabilities, according to Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act of 1990 (rit.edu/studentaffairs/disabilityservices/info). Is your proposed teaching approach accessible to all students, with reasonable accommodation? If not, please explain.

Accessible by all.

RIT abides by the Family Educational Rights and Privacy Act of 1974 (FERPA), which prohibits instructors from making students' identities, course work, and educational records public without their consent (rit.edu/xVzNE). Will any data gathering or sharing for your project raise any FERPA issues? If so, please explain.

No issues in this area are foreseen.

DISSEMINATION AGREEMENT

By completing this grant application, I agree to provide the materials and services described here, in support of disseminating what is learned from this project to the RIT community.

I also agree to return all/a portion of the funds that I receive for this project to RIT if I fail to complete or provide the materials described here:

- Full Project Plan (*including roles and responsibilities, milestone dates, and pertinent project details*)
- Preliminary Findings report (*may include experiment/study design, lessons learned, initial data collection, and/or literature review summary*)
- Participation in an ILI/TLS Preliminary Findings Roundtable dissemination event (*share and discuss your preliminary findings with your PLIG cohort*)
- Final Summary of Findings (*including data collection, lessons learned, implications for further study, and which may be in the form of an article abstract, conference presentation outline, or short report*)
- Final budget accounting (*reconciliation of budget provided with your application and the actual project expenses*)
- Participation in an ILI/TLS PLIG Showcase dissemination event (*present a poster or other display at the annual Showcase*)

By submitting this application, I accept this agreement. JLS (*applicant, please initial here*)

TIMELINE AND TASKS

Please indicate any variances to the planned PLIG 2019 schedule as described in the above Dissemination Agreement and the reasons for this variance. *If you do not intend to deviate from the schedule, you may leave this section blank.*

Task	Date	Proposed Variance and Reason
Full Project Plan submitted to TLS	August 16, 2019	
Preliminary Findings report submitted to TLS	January 10, 2020	
Participation in an ILI/TLS Preliminary Findings Roundtable dissemination event	February, 2020	
Summary of Final Findings report submitted to TLS	August 21, 2020	
Final Budget Accounting report submitted to TLS	August 21, 2020	
Participation in an ILI/TLS PLIG Showcase dissemination event	November 2020	

DISSEMINATION PLAN (*optional*)

Provide details about the journals, conferences, shows, or other external vehicles with strong potential for dissemination of your results (in addition to the ILI/TLS Preliminary Findings Roundtable and PLIG Showcase dissemination events). Include supporting documentation, such as preliminary interest or acceptance, with your application, if available. *(Please note that special consideration will be given to proposals that have a defined opportunity for external dissemination, such as an academic journal or professional conference.)*

It is my intention to show this work both internally and externally. Internally I would like to present my work to both the NTID and RIT communities. I would like to participate in the NTID Research and Scholarship Symposium in 2020 as well as do a presentation during the weekly seminar time within the Chemistry Department. Externally I would like to show my work within the Division of Chemical Education at the Northeast Regional Meeting of the American Chemical Society in 2020. It is also my intention to submit an article for publication to the Journal of Chemical Education and to the American Annals of the Deaf at the completion of this project detailing the work accomplished.

DEPARTMENT HEAD CERTIFICATION

I support this PLIG application and verify that the principal applicant is a full-time faculty member in good standing in my department.

Principal Applicant Name: Jennifer Swartzenberg

Department Head Name (PRINT): Matthew Lynn **Email:** malntm@rit.edu

Department Head Signature: _____ **Date:** _____

NOTE: When signed, please scan and email with your Application Form to: plig@rit.edu