

PROVOST'S LEARNING INNOVATIONS GRANTS

2016 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. More than 200 RIT faculty projects have received funding since the program was initiated in AY 2000-2001. (Examples of previously funded projects are available at the PLIG website, rit.edu/ili/plig).

The launch of the Innovative Learning Institute (ILI) in 2012, and its charge to assist in the creation of exceptional learning experiences for students, led to an evaluation of PLIG and a revitalization of the program to:

- Better support dissemination of individual faculty learning to the wider faculty population
- Provide funding for the implementation of successful pilot projects
- Integrate funding with Institute priorities
- Support the scholarship of teaching and learning

The 2016 Application Form is found on page 3 of this document.

I. ELIGIBILITY

The principal applicant(s) must be tenured or tenure-track RIT faculty. PLIG 2016 projects can include visiting assistant professors, lecturers, adjunct faculty, staff, students, and other contributors.

II. PLIG TYPES

There are two types of grants—Exploration and Focus Grants—for PLIG 2016. Full details are available at rit.edu/ili/plig.

III. USE OF GRANT FUNDS

Provost's Learning Innovations Grants for 2016 may range from \$1,000-\$5,000.

Examples of the use of PLIG funds include:

- Course release (reasonable, actual replacement costs for full-time, tenure-track or tenured faculty members removed from teaching)

- Development of new technology-based learning tools and/or environments
- Technologies or equipment required by the project 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

The grant timeline assumes that most recipients will use Summer 2016 to plan and develop their PLIG funded project for delivery or implementation during the Fall 2016 and/or Spring 2017 semester(s). The full timeline is at rit.edu/ili/plig.

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)

Details on proposal evaluation and selection committee membership is on the website (rit.edu/ili/plig).

VI. QUESTIONS OR COMMENTS

Please email plig@rit.edu with any questions or comments.

PROVOST'S LEARNING INNOVATIONS GRANTS 2016 APPLICATION

INSTRUCTIONS

Complete this form in its entirety and email it to plig@rit.edu no later than January 27, 2016. Please note to save and rename this document substituting your name (in place of "NAME") in the file name.

Ask your Department Head to complete the Department Head Certification and return the signed copy along with your application. *Note: the signed copy may be scanned and emailed.*

If you have any questions about completing this application, please email them to plig@rit.edu or call Michael Starenko at 585-475-5035.

APPLICANT INFORMATION

This application is for a:

☐ **FOCUS GRANT**

☒ **EXPLORATION GRANT**

Principal Applicant Name: Dr. Linda Gottermeier Email: lggnc@rit.edu

Faculty Title: Associate Professor/Rehabilitative Audiologist Phone: (585)475-6429
(Full-time, tenured and tenure track only)

College: NTID Department: Communication Studies and Services

Department Head name: Lawrence Scott Email: lcsnca@rit.edu

Proposed Project title: Exploring Automatic Speech Recognition Technologies in NTID Classrooms

Total funds requested (requests of \$1,000 to \$5,000 will be considered): -5,000.00

Others involved in the project (if any): ((Dr. Raja Kushalnagar

Bonnie Bastian

BUDGET

There is a fillable PDF worksheet to calculate your budget. You can download the worksheet at rit.edu/plig.

- The total shown on this worksheet must match the "Total funds requested" in the Applicant Information section 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

TIMELINE

Please indicate any variances to the planned PLIG 2016 schedule and your reasons. 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	Aug. 24, 2016	
Preliminary findings submitted	Jan. 25, 2017	
Summary of final findings submitted	Aug. 23, 2017	
Final budget accounting submitted	Aug. 23, 2017	
Faculty Teaching and Learning Commons posting (a summary of findings, examples of teaching designs or materials, etc.) due	On or before Oct. 24, 2017	
Participation in Teaching and Learning Services PLIG dissemination event	On or before Nov. 17, 2017	

STATEMENT OF UTILITY (two pages maximum)

Using the proposal evaluation criteria outlined in the Evaluation section of the website (rit.edu/ili/plig), 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 the priority area and/or how this approach has been successfully used at RIT already.

In the NTID Communication Access Now Statement and Demand proposal dated 12/7/15 (<https://docs.google.com/document/d/10NTNKYEI37iqc4MUz6niHd9hIfgf-nL3oQLVniTZ7Ho/edit>), concerned NTID and Cross-Registered RIT students demand that "sustainable initiatives be developed and implemented to ensure actual equal access to communication". Among the potential tools for ensuring equal access of spoken communication may be Automatic Speech Recognition (ASR) applications/software available on mobile devices (iOS/Android).

Project objectives:

The goal of the proposed project is to explore the use of Automated Speech Recognition (ASR) applications and software in NTID classroom settings, as a means of increasing the educational success of deaf and hard-of-hearing students. Initial collaboration and development efforts with developers have shown positive impact in terms of key word access for American Sign Language (ASL) users (Gottermeier, DeFilippo, Kushnagar & Bastian, 2016). A more expansive pilot study will be conducted asking deaf and hard-of-hearing students to use a variety of ASR apps/software on their mobile devices in NTID classrooms for lectures and group discussions and provide evaluative feedback on their experience. Specifically the students will be asked to evaluate: 1) ease of use; 2) latency of transcription; 3) accuracy of text translation and appropriateness of word choice; and 4) ability of the technology to improve communication access of spoken English.

Impact on students outcomes:

NTID students with significant hearing loss (<http://www.ntid.rit.edu/apply/checklist0>) face significant challenges with spoken language communication in large-group and multiple-talker settings such as in the classroom and in discussion group settings. Auditory speech recognition in the presence of such levels of hearing loss, even under ideal conditions, may provide little to no information unless supplemented by visual speech (lipreading) or written/printed text. In the classroom, the listening experience of individuals with severe-to-profound hearing loss is especially affected due to poor room acoustics that interfere with the quality of the signal, extensive technical vocabulary, multiple information sources, and/or talkers with dialects or accents (Kushnagar, Lasecki, & Bigham, 2014). Assistive hearing technologies with noise reduction algorithms, while capable of improving listening-alone performance, cannot make up for the adverse effects on comprehension and memory of competing tasks such as taking notes or shifting attention to a whiteboard or projection screen (Anderson, 2015).

Speech-to-text technologies, such as Automatic Speech Recognition, transform and display speech as text. This technology potentially can reduce the challenges of spoken language communication for persons with hearing loss, especially when hearing levels are severe or profound. In addition to displaying the words of a talker as text to listeners with hearing loss, ASR could, in theory, also be of use during situations when a person with normal hearing is the listener and the deaf or hard-of-hearing individual is the talker. By displaying the speech of the deaf or hard-of-hearing individual, problems of unclear speech could be reduced for the normal-hearing listener.

Significance of the project:

Through ongoing data collection and established dialogue with various speech-to-text app and software developers (Apple, Ava [Transscence.com], Baidu, IBM), the goals will be to:

1. Educate and coach NTID deaf and hard of hearing students on ASR app and software and their potential use applications in educational settings. Instruction is essential because preliminary data shows a lack of awareness of such technologies among NTID students (Gottermeier, DeFilippo, Kushnalagar & Bastian, 2016).
2. Potentially enhance user performance evaluations of existing ASR technologies through collection of feedback data early, mid and late fall semester in three NTID classrooms. (Preliminary exploratory data is being collected on an ongoing basis during spring semester 2016 in one NTID classroom in order to refine the data collection process). Areas that will be explored include ease of use, latency, accuracy, appropriateness of word choice and ability to improve communication access of spoken communication. Typically, these areas are reported in the literature on ASR. Also deaf speech samples will be run through cloud-based ASR systems to improve recognition of deaf talkers' speech.

After official release of Ava (Spring, 2016), the app developers intend to have an export function of transcripts from group conversations. Such development may potentially allow the mobile phone app to become like a "real-time notetaker" in classes throughout RIT.

Other projects at RIT that have been used:

C-print technologies (ASR interfaced with real time captioning) has been used where deaf and hard of hearing are enrolled in classes where most of their peers are hearing. Research indicates that the deaf and hard of hearing students understand and remember the teacher's lecture and other classroom information at least as well with C-print as with interpreting (<https://www.rit.edu/ntid/cprint/research/research-summary>). Potentially third generation ASR systems will offer an additional tool to improve communication access for deaf and hard of hearing students.

References:

Anderson, K. (2015). Access is the issue, Not hearing loss: New policy clarification requires schools to ensure effective communication access. *Perspect Hear Hear Dis Child*, 25(1): 24-36.

Gottermeier, L., DeFilippo, C., Kushnalagar, R. and Bastian, B. (2016). User evaluation of speech recognition systems for deaf-hearing interactions at school and work. (Accepted for publication in *Audiology Today* March, 2016).

Kushalnagar, R., Lasecki, W. and Bigham, J. (2014). *ACM Transactions on Accessible Computing*. 5 (3, 7): (January 2014).

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 an entirely new paradigm. *(Please note that special consideration will be given to proposals that demonstrate a new use/application of a model, system, or technology already in use at RIT.)*

Currently 440 of approximately 1200 NTID-supported students have cochlear implants. Often these students do not know or use sign language but they have intelligible speech. The novelty of the project is that newer third generation Automatic Speech Recognition (ASR) applications/software have not been trialed and evaluated in depth in NTID classrooms and group discussions where students might have lower levels of competency in comprehension of English

By communicating student feedback to app/software developers and running deaf speech samples through their cloud-based systems, the hope is to potentially enhance the user experiences with such systems and further increase the educational success of deaf and hard-of-hearing students, especially in NTID classrooms.

STATEMENT OF EFFICACY (two pages maximum)

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

Each participant will attend an orientation meeting with the course instructor or speech-language instructor and an individualized demonstration of the apps or software that will be used in the study. Participants will then download the chosen app(s) to their personal iPhone or Android device or a device borrowed from the college speech lab for this project.

The participants will use the app/software for 30 days. After the 30-day trial period, each participant will complete an evaluation questionnaire including comments, concerns, and numerical ratings of app/software performance on a scale of 1 (poor performance) to 5 (outstanding performance). They also will attend an individual face-to-face interview with the course instructor and/or speech-language instructor to clarify and expand on their responses. Participant input will be summarized according to relevant factors in speech recognition technology, namely: (a) effectiveness (delivering what was promised by the developers) and ease of use (ease in obtaining the expected functions), (b) accuracy when used receptively and/or expressively, and (c) latency/lag time. Participants also will be asked to provide an overall rating using a 5-point scale similar to that used on iTunes or Google Play.

DISSEMINATION PLAN (optional)

Provide details about the journal, conference, show, or other external vehicle with strong potential for dissemination of your results. 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.)*

ILLI will arrange channels for disseminating results within RIT.

Below is a list of prior presentations that included initial ASR work:

Gottermeier, L., DeFilippo, C., Kushnalagar, R. and Bastian, B. (2016). User evaluation of speech recognition systems for deaf-dearing interactions at school and work. (Accepted for publication in Audiology Today March, 2016).

Gottermeier, L. and Bastian, B. (2015). Evaluative trials with communication-bridging applications for deaf and hard-of-hearing users. UNYTE Scientific Session. UNYTE. Rochester, NY. (December 3, 2015). Poster Session.

Gottermeier, L. and Bastian, B. (2015) App-licable trials of communication bridging apps. Effective Access Technology Conference. RIT/AI Sigl. Rochester, NY. (November 10, 2015). Poster Session.

Gottermeier, L. DeFilippo, C., Kushnalagar, R., Bastian, B., Duchemin, T. and Doevendans, P. (2015). Automatic speech recognition systems as tools to enhance spoken communication in the classroom. Spoken Communication Strategies and Techniques. National Technical Institute for the Deaf. Rochester, NY. (October 23, 2015). Lecture. ~

Gottermeier, L. DeFilippo, C., Kushnalagar, R., Bastian, B., Duchemin, T. and Doevendans, P. (2015) Automatic speech recognition systems as tools to enhance spoken communication in the classroom. NYSETA. National Technical Institute for the Deaf. Rochester, NY. (October 22, 2015). Conference Presentation

Gottermeier, L., Bastian, B., and Kushalnagar, R. (2015). App-licable Networking for Enhanced Communication Access. NTID Scholarship Symposium. (May 28, 2015).

I expect the same audiences to show continued interest. For those with hearing loss globally. textual support to spoken communications is desired.

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?

Costs of running deaf speech samples through ASR systems. (Most are being picked up by the app/software companies).

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.

I sign and speak when providing classroom lectures. Video notes done by two native American Sign Language users support each lecture. Also I hand out written notes plus iconic drawings of lecture topics. The ASR applications and software will provide an added element of support.

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.

Data is reported in the aggregate. Privacy policies regarding ASR apps will be shared with students prior to downloading. IRB approval is being sought. Raja Kushalnagar has received IRB approval to share encrypted deaf speech samples with app developers.

DISSEMINATION AGREEMENT

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

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)
- Overview of preliminary findings (may include experiment/study design, lessons learned, initial data collection, and/or literature review summary)
- Final project summary (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)
- Teaching and Learning Commons posting (a summary of findings and examples of teaching designs or materials)
- Participation in a faculty dissemination event
- Final budget accounting (reconciliation of budget provided with your application and the actual project expenses)

By submitting this application, I accept this agreement. LG (*Applicants initials*)

DEPARTMENT HEAD CERTIFICATION

I support this PLIG application and budget, and verify that the principal applicant _____
is a full-time, tenured or tenure-track faculty member in good standing in my department.

Department Head Name (PRINT): _____ Email: _____

Department Head Signature: _____ Date: _____

PLIG Budget Worksheet

Applicant's Name: _____

Personnel	Purpose/Justification	Amount
Full-Time Faculty/Staff		
1		
2		
3		
Adjuncts, Part-Time Faculty/Staff, Summer Salary		
1		
2		
3		
Student Workers, Graduate Assistants		
1		
2		
3		
Personnel Total		

Equipment	Purpose/Justification	Amount
1		
2		
3		
Equipment Total		

Travel	Purpose/Justification	Amount
1		
2		
3		
Travel Total		

Other (Specify)	Purpose/Justification	Amount
1		
2		
3		
4		
5		
6		
Other Expenses Total		

Total Award Request