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 2018. 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)
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.
INSTRUCTIONS

Complete this form in its entirety and email it to pilg@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 pilg@rit.edu or call Michael Starenko at 585-475-5035.

APPLICANT INFORMATION

This application is for a:

- [ ] FOCUS GRANT
- [x] EXPLORATION GRANT

Principal Applicant Name: Daniel Ashbrook, Ph.D.  Email: daniel.ashbrook@rit.edu

Faculty Title: Assistant Professor  Phone: 678-637-6888
(Full-time, tenured and tenure track only)

College: GCCIS  Department: IST

Department Head name: Steve Zilora  Email: stephen.zilora@rit.edu

Proposed Project title: Teaching prototyping skills for wearable and IoT devices

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

Others involved in the project (if any): ________________________________
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.

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
<th>Proposed variance and reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full project plan submitted</td>
<td>Aug. 24, 2016</td>
<td></td>
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<tr>
<td>Preliminary findings submitted</td>
<td>Jan. 25, 2017</td>
<td></td>
</tr>
<tr>
<td>Summary of final findings submitted</td>
<td>Aug. 23, 2017</td>
<td></td>
</tr>
<tr>
<td>Final budget accounting submitted</td>
<td>Aug. 23, 2017</td>
<td></td>
</tr>
<tr>
<td>Faculty Teaching and Learning Commons posting (a summary of findings, examples of teaching designs or materials, etc.) due</td>
<td>On or before Oct. 24, 2017</td>
<td></td>
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<tr>
<td>Participation in Teaching and Learning Services PLIG dissemination event</td>
<td>On or before Nov. 17, 2017</td>
<td></td>
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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.

Project summary

Software is no longer the only domain that practitioners of Human-Computer Interaction (HCI) find themselves involved in. There is a "hardware renaissance" underway in Silicon Valley [1], and as a result the computing industry is in need of user experience designers, interaction designers, and HCI specialists who understand how to work with people and hardware as well as with software. This renaissance has resulted in an explosion of so-called "smart objects" or "Internet of Things" (IoT) devices. Recent examples of these kinds of products include the Pebble Smart Watch, the Nest Learning Thermostat, the Amazon Echo, and the August Smart Lock, Doorbell Cam, and Smart Keypad. Each of these products has a hardware component that must be designed as carefully as its accompanying software.

In this project, I propose to conduct a class focused on prototyping, understanding, and interacting with hybrid hardware/software systems. The class will teach students how to rapidly prototype and evaluate systems that combine user experiences with both hardware and software. This class will be a continuation of my successful graduate course HCIN-720, Designing User Experiences for Internet-Enabled Devices. This previously-taught class was highly enjoyed by students, with comments on the course evaluation such as "the course was amazing" and that the class "encouraged and nurtured creative thinking".

In HCIN-720, I introduce students to ideas and theories around interacting with IoT and ubiquitous computing technologies. We study and sketch solutions to various use cases, such as a connected home security system. I teach the students a wide variety of prototyping skills, including 3D printing, laser cutting, basic electronics, soldering, hardware platforms such as Arduino, and the basics of integrating hardware and software via the cloud. The class is project based, with students proposing and implementing their own ideas in small groups; for example, in Fall semester of 2015, students built a display to visualize collaborative editing activity in Google Docs, a desktop notification robot, and a smart TV watching system to automatically turn off the lights and order pizza with a simple gesture.

The main objective of this proposal is to support students' learning to develop, prototype, and evaluate objects that exist at the intersection of hardware and software. To accomplish this objective, I aim to teach prototyping skills for a wide range of areas related to hybrid hardware/software devices, including: digital fabrication (e.g. 3D modeling, 3D printing, laser cutting); electronics (e.g. basic electronics theory, motors and servos, sensors); wearable electronics (e.g. conductive fabric, sewing); interactive cloud hardware (e.g. Arduinos, Bluetooth, WiFi); prototyping software (e.g., Processing, node.js, data visualization); and other techniques such as machine learning and generative design.

HCIN-720 was very successful but was a prototype course with limited equipment and supplies available to the students. In order to fully support the course's learning objectives, I am requesting funds to purchase necessary equipment and supplies to outfit a lab for teaching the course.

References

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.)

This model for teaching prototyping skills is in use at other universities, but as far as I am aware, it is not available at RIT for HCI graduate students. Similar courses at other universities include:

- **CMSC838f: Tangible Interactive Computing** taught by Jon Froehlich at the University of Maryland.
- **CSCI7000: Physical Computing** taught by Shaun Kane at the University of Colorado Boulder.
- **CS294-84: Interactive Device Design** taught by Bicen Hartmann at the University of California Berkeley.
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.

The course itself will act as a gauge of efficacy. As students progress through the course, they will demonstrate the skills they have learned via teacher-directed and self-directed projects. Students will also be required to document their learning via reports, publishing source code on public forums such as github.com, and producing understandable tutorials around how to make their projects via sites such as instructables.com.
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.)

ILI will arrange channels for disseminating results within RIT.

Students will demonstrate their learning via publishing their projects in public forums such as github.com (source code) and instructables.com (instruction documentation).
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?

No

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.

Yes

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
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. DA (Applicants initials)
DEPARTMENT HEAD CERTIFICATION

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

Department Head Name (PRINT): Stephen J. Zilora Email: sjzilora@rit.edu
Department Head Signature: ___________________________ Date: 1/27/16
## PLIG Budget Worksheet

**Applicant’s Name:** Daniel Ashbrook

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<th>Personnel</th>
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<th>Amount</th>
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<td>Adjuncts, Part-Time Faculty/Staff, Summer Salary</td>
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<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>Student Workers, Graduate Assistants</td>
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<td>1 Sewing machine</td>
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<td>2 3D printer</td>
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<tr>
<td>1 Particle Photons</td>
<td>IoT device prototyping platform kits x 10</td>
<td>$ 890</td>
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<tr>
<td>2 Light Blue Beans</td>
<td>Wearable device prototyping platform x 10</td>
<td>$ 270</td>
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<td>3 Component kits</td>
<td>additional electronic components</td>
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<td>4 Conductive fabric supplies</td>
<td>for teaching conductive fabrics</td>
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<tr>
<td><strong>Other Expenses Total</strong></td>
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**Total Award Request** $ 5,000