

## 2019 PROVOST'S LEARNING INNOVATIONS GRANTS CALL FOR PROPOSALS

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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](http://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](mailto: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).

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## 2019 PROVOST'S LEARNING INNOVATIONS GRANTS

# APPLICATION

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### 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](mailto: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](mailto: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: Clark Hochgraf

Faculty Title: Associate Professor Email: cghiee@rit.edu Phone: 475 3167  
(Full-time only)

College: CET Department: ECTET

Department Head Name: James Lee Email: jhleme@rit.edu

Others involved in the project (if any): \_\_\_\_\_

Project Name: Wireless power transfer and Lidar – applications of ultrafast wide-bandgap devices

Total Funds Requested (*as calculated on the budget worksheet on the next page*): \$5000  
(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

Personnel	Purpose/Justification	Amount
<b>Full-time Faculty/Staff</b>		
<b>Adjuncts, Part-time Faculty/Staff, Summer Salary</b>		
<b>Student Workers, Graduate Assistants</b>		
<b>Personnel Total</b>		<b>\$ 0.00</b>
Equipment	Purpose/Justification	Amount
GaN Wireless charger Evaluation modules	For development of lab demos	1902
1GHz passive scope probes	For display and measurement of switching	1032
<b>Equipment Total</b>		<b>\$ 2934.00</b>
Travel	Purpose/Justification	Amount
Argonne National Lab – interoperability grid lab	Consultation on setup for demo of WBG wireless charging and fast pulse power measurement	1216
<b>Travel Total</b>		<b>\$ 1216.00</b>
Other (Specify)	Purpose/Justification	Amount
Conference fee APEC2020 Early registration	Dissemination	850
<b>Other Total</b>		<b>\$ 850.00</b>

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:**

This project aims to add hands-on demonstrations of wideband gap power transistor applications to a new power electronics course as a way to engage students more deeply in learning about the design and topologies of power electronic circuits. The proposed approach creates a context for learning about power electronics by demonstrating the application benefits and challenges of designing with very-high speed power switching devices, specifically eGaN MOSFETs. The demonstration setups will show how wideband gap devices enable wireless charging of batteries to be done with higher efficiency and how fast eGaN devices enable higher spatial resolution in LIDAR systems, which is the critical sensor component in self-driving vehicles and autonomous robots.

### **Significance of the project to student outcomes:**

Student learning is enhanced when a motivating context is provided that engages the student's interests. Often the motivating context is distant in traditional power electronics lecture courses. This project aims to bring the motivational context forward and make it observable and relevant to the students. Many students are interested in electric vehicles, wearable technologies and autonomous robots. This project will show students how power electronics directly influence how iPhones can be charged wirelessly and how robots can see using LIDAR.

### **Teaching/learning problem addressed:**

Student motivation plays a significant role in learning, as evidenced by the learning gains described in educational research literature. To the extent that a faculty member can help students find their motivation, increases in learning can be expected. This project seeks to find a motivational context that appeals to students and provides rich territory for exploration of issues related to the design of power electronics.

### **Integration with activity already underway:**

The proposed project is intended to supplement a lecture course in power electronics that will be offered in fall 2019. If this project is selected, a set of demonstrations will be created that students can make measurements on, observe, and interact with over the course of the semester. The goal is for students to see how their design choices in the lecture class affect real-world performance in the demonstration systems.

## **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.

Traditional power electronics courses are primarily based on the lecture modality focusing on content delivery. In some cases, a separate lab course provides opportunity for experimentation. What is proposed here is a hybrid approach where hardware demos are used to supplement lecture content but students are further given the opportunity to interact with the demonstration equipment. They can, over a period of several class sessions, explore a range of design choices to see the impact on performance. The demonstrations provide a grounding of the principles and also inspiration for further reading and exploration. For example, over what distance does inductive wireless charging work and how does efficiency change with distance? How does this compare to resonant charging topologies? How does this affect recharging of wearable devices, including those that are permanently worn? What gate driver techniques are needed to achieve ultra-fast current pulses in LIDAR laser diodes? What are instrumentation issues?

## 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.

### Research question:

The research question is whether or not the in-class demonstrations provide increased engagement with the material and therefore higher levels of learning, as well as more durable learning.

### Efficacy Assessment:

The approach will be considered successful if students identify the demonstrations as a positive point of interest/engagement in the SRATE survey at the end of the semester. To ensure a response on this area, students will be given a prompt to specifically comment positively, negatively, or neutrally on the impact the demonstrations had on their understanding of the material, and their interest/engagement with the course material.

## 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?

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](http://rit.edu/studentaffairs/disabilityservices/info)). Is your proposed teaching approach accessible to all students, with reasonable accommodation? If not, please explain.

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](http://rit.edu/xVzNE)). Will any data gathering or sharing for your project raise any FERPA issues? If so, please explain.

## 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. CGH (*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.)*

I will submit a paper to the Applied Power Electronics Conference for 2020. This a large conference in the field with tracks for academia and industry, as well as several tracks on wide band gap devices. I will also present at the PLIG showcase.

## 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:** Clark Hochgraf

**Department Head Name (PRINT):** James Lee **Email:** \_\_\_\_\_

**Department Head Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

NOTE: When signed, please scan and email with your Application Form to: [plig@rit.edu](mailto:plig@rit.edu)