



Center for the  
Advancement of  
Wearable Technologies



University of Puerto Rico  
Central Administration  
Rio Piedras: (787) 765-5170  
ext. 2117  
Mayaguez: (787) 832-4040  
ext. 3766

**IRG 3 EXPLORATORY FUNDS COMPETITION**  
**FY 2023-2024**  
SUBMISSION DEADLINE: **September 30, 2023**

## INTRODUCTION

**IRG3 Overall goal:** The main goal of the CAWT IRG3 is to create a synergy between multiple fields to facilitate scientific advances in materials selection and discovery enabled by big data analytics and machine learning. This will be accomplished through the following:

- 1) recruitment of graduate students, post-docs, and new faculty hires
- 2) acquisition of state-of-the-art instrumentation and high-performance computational infrastructure
- 3) support research activity in the following areas:
  - Development of general infrastructure and tools for big data analytics and deep learning applied to materials engineering.
  - Development of bioinformatics methods in response to newly collected data and materials
  - Materials discovery and selection via data analytics and computer simulations
  - Understanding human interactions with materials and wearable technologies

## EXPLORATORY FUNDS:

The objective of the exploratory research grants within CAWT is to provide a small “seed” funding for developing novel and innovative ideas that will provide the means to obtain preliminary results for collaborative proposals within IRG3 members and other members of the jurisdiction, as applicable. Specifically, they are intended to:

- 1) Leverage on collaborations within the CAWT/IRGs, other jurisdiction researchers, and CAWT facilities.
- 2) Target high-risk/high-payoff research work.
- 3) Be catalytic in seeking competitive (federal) funding.
- 4) Pave the way for long-term, externally funded research sub-projects
- 5) Be within the scope of the NSF cooperative agreement.
- 6) Lead to tangible outcomes.
- 7) Capitalize on existing IRG resources.

The participation and inclusion of existing IRG members is encouraged but optional. Evaluation **priority** will be given to those proposals that:

- demonstrate the ability to mature into externally funded projects.
- contain at least one junior faculty (defined as a faculty member that does not possess the rank of full professor).



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Four-year college faculty are encouraged to apply. An investigator may serve as Principal Investigator (PI) on only one proposal and two as participant.

The exploratory seed funds in IRG3 will be used to explore novel emerging areas that are of interest to IRG3. A total of 2-3 projects are expected to be funded per year at a level of up to \$50K in total funds. These funds can be used for materials, publications, small instrumentation (less than \$5k), and student research stipends. Support for travel to conferences or the like is covered only for activities in the U.S.

**For YEAR 5 (2023-2024), the exploratory funds in IRG3 will be targeted to:**

- 1) Develop AI, data mining, and Big Data software tools to build a computational pipeline to guide the design, discovery or selection of materials for wearable technology.**
- 2) Develop AI and computational methods to predict material properties, parameterize material structures, and discover interactions of materials used for sensors and other wearable devices.**

Software tools shall be compatible with frameworks such as R, TensorFlow, Apache Spark, and Hadoop. Moreover, these tools shall assume a cloud-based deployment environment and automated operations. Open access databases such as PubChem or the Materials Project should be used as part of the set of data sources for materials information. Proposed AI and computational methods must be realized using the aforementioned software frameworks. Use of proprietary software, or niche programming libraries is discouraged.

## PROPOSAL CONTENT

### FORMAT:

The proposal consists of a cover letter, project description, budget, and other documents. All documents should be formatted using a 0.5 in margin and Arial 11 font. The project description is limited to 3 pages, and shall only include: project summary, innovation, summary from previous exploratory funds (if any), IRG 3 relevancy statement, personnel description, research plan, outcomes, and sustainability statement.

COVER LETTER (1 page max, not included within the 3-page max)

Each proposal must contain a cover letter, addressed to the IRG3 leaders, highlighting the important aspects of the proposal.

### 1. TITLE

Should be located at the top of the first page of the proposal. Below the title the names of the faculty members and corresponding organizations should be included. Make sure that you distinguish which faculty member will serve as **principal investigator** of the proposal.



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## 2. PROJECT SUMMARY

This should be a brief description of the project, what challenge(s) it intends to address, and what is the preliminary hypothesis of the proposed work. It should also include the **intellectual merit** (encompasses the potential to advance knowledge) and the **broader impact** (encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes).

## 3. INNOVATION

This section intends to briefly describe the innovative aspect of the project. Some questions that can be used to guide the discussion are but not limited to: (i) Does the application challenge and seek to shift current research paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions? (ii) To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts? (iii) Does the project address an important problem or a critical barrier to progress in the field? (iv) Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense?

## 4. SUMMARY OF WORK FROM PREVIOUS EXPLORATORY FUNDS (only if applicable)

Provide a brief summary of the main outcomes of any previous exploratory funds.

## 5. IRG 3 RELEVANCY STATEMENT

Here you must address:

- How is this project of interest to IRG 3?
- How will you capitalize on existing IRG3 resources?

## 6. PERSONNEL DESCRIPTION

Provide a brief summary of the members of the project, their expertise, and why the team is qualified to successfully conduct the research plan.

## 7. RESEARCH PLAN

Provide a brief summary of how the proposed research will be conducted, which can include methodologies, experiments, innovative software development, etc. Make sure that the proposed research can be conducted within the time scale of the proposal.

## 8. PROJECT OUTCOMES

Provide a set of scientific, educational, infrastructure, or human-resources development outcomes for the project.

## 9. SUSTAINABILITY STATEMENT

Provide a brief summary on how this project will be grown into a full-fledged project, which agency/programs this project will be submitted for full funding, and in which time frame.



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## **OTHER REQUIRED DOCUMENTS (excluded from the 3 page limit):**

### **8. REFERENCES (2 pages max)**

Provide necessary references in any appropriate format.

### **9. BUDGET (2 pages max)**

You can request up to \$50,000 in direct funds to cover expenses associated to research assistant (graduate or undergraduate students), materials, publications or any small equipment (<\$5,000) that is fully justified within the scope of the proposed work. Support for travel to conferences or the like is covered only for activities in the U.S. Provide a justification for the funds requested and their distribution.

### **10. MANAGEMENT PLAN (1 page max)**

This section must include a Gantt chart, which should include only the proposed milestones, tasks, and outcomes, the time frame for each task and outcome, and the person responsible for it. Also, it should include a paragraph providing an explanation of the roles, expertise, and responsibilities of each member of the team. You must address how well qualified is the team to conduct the proposed activities. If a junior faculty member is part of the team a brief description of his/her development plan should be included.

### **11. REVIEWERS LIST (1 page max)**

Provide a list of 3-4 reviewers that could or should not review your proposal.

***NOTE: Incomplete applications will be disqualified and will not be considered for funding.***

SUBMISSION DEADLINE: **September 30, 2023**

### **SUBMIT MATERIALS AS A SINGLE PDF file to:**

Yeiza M. Hernandez Bianchi at [yeiza.hernandez@upre.edu](mailto:yeiza.hernandez@upre.edu) and (cc) IRG3 leaders Dr. Ubaldo Cordova ([ubaldom.cordova@upr.edu](mailto:ubaldom.cordova@upr.edu)) and Dr. Manuel Rodriguez-Martinez ([manuel.rodriquez7@upr.edu](mailto:manuel.rodriquez7@upr.edu))