Center for Innovation, Research and Education in Environmental Nanotechnology (CIRE²N) (NSF-CREST GRANT NUMBER HRD-1736093)





Department of Chemistry, University of Puerto Rico, Río Piedras Campus

IRG 1. Nanomaterials for Water and Soil Remediation

Lead: Elvira Cuevas, Environmental Sciences, UPR-RP	Ι
Participants:	
Carlos R. Cabrera, Chemistry, UPR-RP	Dr. Rubé
Dedre Corriere Corredre del Versiere Cotere DD	

Pedro Carrion, Corredro del Yaguazo, Cataño, PR Zhongfang Chen, Chemistry, UPR-RP Liz Diaz, Chemistry, UPR-RP Eduardo Nicolau, Chemistry, UPR-RP Jose R. Ortiz, Environmental Sciences, UPR-RP Keyla Soto, University High School, UPR-RP

>Monitor gas emissions of: CO , NH_3 , NO_2 , H_2S , VOCs at El Yagüazo. >Advance gas sensors technology based on nanostructures: sensitivity, selectivity, energy consumption, humidity.

10 2 2 12 2 2 2

Subproject 1:Nanozerovalent iron, core-shell Fe⁰/Fe_xO_y nanopartcles, for remediation heavy metals in wetland soils and its reusability for energy applications



Subproject 2: Development of pH switchable polymer nanofibers for the recovery of polyphenolic compounds



Subproject 3: A synergistic combination of algal wastewater treatment, hydrothermal biofuel production and fabrication of algal base nanomaterials.



1.45 A

GOALS: Sensitivity: ppm to ppb Operate in high humidity conditions (RH>80%) Selectivity to the target gases Low power consumption

Lead: Dr. Liz Diaz-Vázquez, Department of Chemistry, UPR-RP Dr. Ileana Feliciano, Department of Chemistry, UPR-RP

•The Center will enhance the capabilities of the informal education community by: **–providing access** to CIRE²N staff, research, environmental nanotechnology, knowledge and facilities, with opportunities for informal science educators.

-partnerships between the informal and formal education communities such as Museums, Malls, Community libraries and community-based organizations. -Science Community Service course



Liz M. Díaz-Vázquez and Carlos R. Cabrera

IRG2: Sensors for Environmental Monitoring

Lead: Dr. Luis F Fonseca, Physics, UPR Rio Piedras Participants:

én Díaz. Professor. Mechanical Engineerin, UPR Mayagüez Dr. Peter X Feng, Physics, UPR Rio Piedras Dr. Luis F Fonseca, Physics, UPR Rio Piedras Dr. Wilfredo Otaño, Physics and Math, UPR Cayey Dr. Dalice Piñero, Chemistry, UPR Rio Piedras

Education and Outreach Division

• **CIRE**²**N website** will be created to provide information for the general community; it will include animations and videos to educate non-scientist professionals and the general public. **Community-based Participating Research (CBR)**. In this initiative, the knowledge of the

communities near El Yaguazo will come together with the knowledge of CIRE²N researchers and students to look for alternative directions to solve the site problems.

Cataño Schools

_	Francisco Oller High School
_	Luis Muñoz Rivera School
	Rosalina Middle School
_	Onofre Carballeira Elementary School
Juan and Metropolitan Area Schools	
_	CEDIN
_	Amalia Marin School K-12
_	Sotero Figueroa Middle School
_	CIMATEC
_	Bernandino High School, Ponce
_	Berwin Middle School and High School,

Lending Library and Web-Based Materials Teacher's Professional Development After School Programs Environmental Nanotechnology Discovery Center Summer Research Camp Program



Participants: Carlos R. Cabrera, Chemistry, UPR-RP

Lead: Zhongfang Chen, Chemistry, UPR-RP Liz Diaz-Vázquez, Chemistry, UPR-RP Ileana González-González, Chemistry, U. Turabo Cornell University

Subproject 1. Microbial Fuel Cells







IRG 3. Nano Materials for Energy Conversion Partners Institutions and National Laboratory

Brookhaven National Laboratory **BROOKHAVEN**

CATEC-University of Puerto Rico (C)

Morgan State University

Universidad de Alicante

Universidad de la Laguna Universidad de La Laguna

University of Texas at El Paso

University of Wisconsin WISCONSIN



Create a direct Educational pipeline

Engage Communities and General Public.

Provide Research Experiences



Subproject 2. Ammonia Fuel Cell Stack

CREST-CIRE²N Center Based Research Experience





Cornell University

niversitat d'Alacant iversidad de Alicante