Rolando Oyola-Martínez, Ph.D.
University of Puerto Rico - Humacao
Department of Chemistry
Humacao PR 00792
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Tel: (787)850-9387

EDUCATION

University of Pennsylvania
Post-Doc Biophysical Chemistry **2002-03**

University of Puerto Rico-Río Piedras
Ph.D. in Analytical Chemistry **2001**
Dissertation: Design, Construction and use of a nanosecond laser transient absorption spectrokinetic system in the study of the photochemical and photophysical properties of relevant biological molecules: dTpA, dApT and tricylic antidepressive drugs

University of Puerto Rico-Río Piedras
M.S. Analytical Chemistry **1996**
Thesis: Photochemistry and Photophysics of Gilvocarcin V and M

University of Puerto Rico - Humacao
B.S. Industrial Chemistry **1990**

AWARDS

Postdoctoral Fellowship: *NIH Post-Doctoral Scholar, USA* **2002 - 03**
Doctoral Student: *GAAN-Fellow, Department of Education, USA* **1998 - 2001**
Doctoral Student: *Puerto Rico Industrial Development Company Scholar, PR* **1998 - 2001**

PROFESSIONAL POSITIONS

University of Puerto Rico - Humacao
Professor **2013**

University of Puerto Rico - Humacao **2006 - 2013**
Associate Professor

University of Puerto Rico - Humacao **2003 - 2006**
Assistant Professor

University of Puerto Rico – Río Piedras **2001**
Assistant Professor

University of Puerto Rico – Río Piedras **1992 - 96**
Teaching Assistant

University of Puerto Rico – Humacao **1998**
Instructor

TEACHING EXPERIENCE

Courses:
General Chemistry II, Analytical Chemistry, and Undergraduate Research Electives

Laboratories:
General Chemistry I and II, Organic Chemistry I, Analytical Chemistry, and Physical Chemistry I and II

RELATED EXPERIENCE

Academic Positions:
Member of the Academic Senate (University of Puerto Rico-Humacao) **2012 - 2015**
Member of the Faculty Affairs Sub-Committee of the Academic Senate (UPRH) **2012 - 2015**
Mentor Future Pharmacists Association UPR-Humacao Student Chapter **2015 - present**
Member of the University of Puerto Rico Chemistry Systemic Committee **2005 - present**
Member of the Personal Committee (University of Puerto Rico – Humacao, Department of Chemistry) **2009 - 13**

Member of the Institutional Faculty Committee (University of Puerto Rico-Humacao) **2009 - 12**

Reviewer:
Journal of Physical Chemistry, Journal of Photochemistry and Photobiology, Biomacromolecules, Biochemistry, Peptide Letters, "Avances de Química"**,** Macromolecules, Langmuir, and Photochemistry & Photobiology.

PUBLICATIONS

1) VERGARA DEL TORO, N., MELÉNDEZ, A., RAMOS, I., RIVERA-CLAUDIO, M., CASTILLO, J., AND OYOLA, R. **(2022)** SENSING FERROCENE DERIVATIVES USING A MODIFIED GLASSY CARBON ELECTRODE WITH A PEDOT/CARBON MICROSPHERES THIN-FILM. *UM OLHAR SOBRE OS SENSORES NA PENÍNSULA IBÉRICA E AMÉRICA LATINA: AÑO 2022, UA EDITORA UNIVERSIDADE DE AVEIRO, SERVIÇOS DE DOCUMENTAÇÃO, INFORMAÇÃO DOCUMENTAL E MUSEOLOGIA, 1ª EDIÇÃO – JULHO 2022*, PAG. 34-37. HTTPS://DOI.ORG/10.48528/H76T-T092\

2) N. V. FALCÓN-CRUZ, A. MELÉNDEZ, I. RAMOS, AND R. OYOLA **(2022)** SURFACE MODIFICATION OF GALLIUM NANOPARTICLES AND THEIR INTERACTION WITH HUMAN SERUM ALBUMIN, *UM OLHAR SOBRE OS SENSORES NA PENÍNSULA IBÉRICA E AMÉRICA LATINA: AÑO 2022, UA EDITORA UNIVERSIDADE DE AVEIRO, SERVIÇOS DE DOCUMENTAÇÃO, INFORMAÇÃO DOCUMENTAL E MUSEOLOGIA, 1ª EDIÇÃO – JULHO 2022*, PAG. 383-387. HTTPS://DOI.ORG/10.48528/H76T-T092\

3) N.V. FALCÓN-CRUZ, A. S. DELGADO, K. M. TORRES, A. MELÉNDEZ, I. RAMOS, D. DU, AND R. OYOLA **(2022)** GALLIUM NANOPARTICLES INTERACTION WITH IAPP: CAN GANPS INHIBITS OLIGOMERIZATION?, *UM OLHAR SOBRE OS SENSORES NA PENÍNSULA IBÉRICA E AMÉRICA LATINA: AÑO 2022, UA EDITORA UNIVERSIDADE DE AVEIRO, SERVIÇOS DE DOCUMENTAÇÃO, INFORMAÇÃO DOCUMENTAL E MUSEOLOGIA, 1ª EDIÇÃO – JULHO 2022*, PAG. 396-400. HTTPS://DOI.ORG/10.48528/H76T-T092\

4) NITZA V. FALCON-CRUZ, NATHALY VERGARA-TORO, ALONDRA BRITO-PÉREZ, DANIEL RIVERA, ANAMARIS MELÉNDEZ, IDALIA RAMOS, ROLANDO OYOLA **(2021)** ONLINE LAB FOR HIGH SCHOOL STUDENTS: CALIBRATION CURVE USING FLUORESCENCE OF A YELLOW HIGHLIGHTER SOLUTION. *JOURNAL OF LABORATORY CHEMICAL EDUCATION*, 9(4), 51-56. DOI: 10.5923/J.JLCE.20210904.01

5) ROLANDO OYOLA, DEGUO DU, IDALIA RAMOS, KYABETH TORRES, AMBAR S DELGADO, ERIKA R SERRANO, ANAMARIS MELÉNDEZ, AND NITZA V FALCÓN-CRUZ **(2021)** GALLIUM NANOPARTICLES AS NOVEL INHIBITORS OF AB40 AGGREGATION. *MATER. ADV., 2, 5471-5478*, DOI: 10.1039/D1MA00461A.

6) CESAR SANTIAGO-HUERTAS, JORGE CASTILLO, ROLANDO OYOLA **(2020)** ATR-FTIR EXPERIMENT FOR INSTRUMENTAL ANALYSIS LABORATORY: DETERMINATION OF ACETAMINOPHEN IN PANADOL TABLETS. *CHEM EDUCATOR,* 25, 178-183. HTTPS://DOI.ORG/10.1333/S00897202930

7) LUIS M. RIJOS, ANAMARIS MELENDEZ, ROLANDO OYOLA, NICHOLAS J. PINTO **(2019)** EFFECT OF POLYETHYLENE OXIDE ON CAMPHOR SULFONIC ACID DOPED POLYANILINE THIN FILM FIELD EFFECT TRANSISTOR WITH IONIC LIQUID GATING. *SYNTHETIC METALS,* 257, 116176. HTTPS://DOI.ORG/10.1016/J.SYNTHMET.2019.116176

8) CHRISTIAN J. ORTIZ-HERNANDEZ, ADRIANA N. SANTIAGO-RUIZ, ADALIZ J. TORRES-ROSADO, JOMARIE JIMÉNEZ-GONZALEZ, SEAN B. YELDELL, ROLANDO OYOLA, IVAN J. DMOCHOWSKI, JOSE SOTERO-ESTEVA, VIBHA BANSAL, EZIO FASOLI **(2019)** IN SITU ANALYSIS AND IMAGING OF AROMATIC AMIDINE AT VARYING LIGAND DENSITIES IN SOLID PHASE. *ANAL BIOANAL CHEM*. 411, 1549. HTTPS://DOI.ORG/10.1007/S00216-019-01588-6

9) HAIYANG LIU, RICHARD LANTZ, PATRICK COSME, NELSON RIVERA, CARLOS ANDINO, WALTER G. GONZÁLEZ, ANDREW C. TER-ENTIS, EWA P. WOJCIKIEWICZ, ROLANDO OYOLA, JAROSLAVA MIKSOVSKA, AND DEGUO DU **(2015)** SITE-SPECIFIC DYNAMICS OF AB1-23 AMYLOID FORMATION AND FIBRILLAR CONFIGURATION USING AN UNNATURAL AMINO ACID. *CHEM.COMM.,51, 7000-7003. DOI: 10.1039/C5CC00149H*

10) BEATRICE N. MARKIEWICZ, ROLANDO OYOLA, DEGUO DU, AND FENG GAI **(2014)** AGGREGATION GATEKEEPER AND CONTROLLED ASSEMBLY OF TRPZIP ß-HAIRPINS. *BIOCHEMISTRY*, 2014, 53 (7), 1146–1154.

11) PIÑERO-SANTIAGO, L.E., GARCÍA, C., LHIAUBET-VALLET, V., TRZCIONKA, J., OYOLA, R., TORRES, K., LEGUILLÚ, J., AND MIRANDA, M.A. **(2013**) PHOTOOXIDATION MECHANISM OF LEVOMEPROMAZINE IN DIFFERENT SOLVENTS. *PHOTOCHEM. PHOTOBIOLOGY*, 89(6), 1479-89, DOI: 10.1111/PHP.12147. [PMID: 23909411]

12) PIÑERO, L.E., LEBRÓN, I., CORREA, J., DÍAZ, J., VIERA, L., ARCE, R., GARCÍA, C., AND OYOLA, R. **(2012)** THE EFFECT OF 2-HYDROXYPROPYL-B-CYCLODEXTRIN ON THE EXCITED TRIPLET STATE OF PROMAZINE AND CHLORPROMAZINE. *J. PHOTOCHEM. PHOTOBIOL. A: CHEM.* 228, 44-50.

13) XU, Y., DU, D., AND OYOLA, R., **(2011)** INFRARED STUDY OF THE STABILITY AND FOLDING KINETICS OF A SERIES OF B-HAIRPIN PEPTIDES WITH COMMON NPDG TURN. *J. PHYS. CHEM. B.* 115(51):15332-8. [PMID: 22136248]

14) PIÑERO, L.E, GARCÍA, C., LHIAUBET-VALLET, V., MIRANDA, M.A., AND OYOLA, R. **(2011)** SOLVENT DEPENDENCE OF THE PHOTOPHYSICAL PROPERTIES OF 2-CHLOROTHIOXANTHONE, THE PRINCIPAL PHOTOPRODUCT OF CHLORPROTHIXENE. *PHOTOCHEM. PHOTOBIOL.*, 87(3), 611- 617. [PMID: 21294748]

15) OYOLA, R., AND ARCE, R. **(2010)** NANOSECOND LASER INDUCED TRANSIENT ABSORPTION FLASH PHOTOLYSIS EXPERIMENT FOR UNDERGRADUATE PHYSICAL CHEMISTRY. *THE CHEMICAL EDUCATOR*, 15, 365-369. DOI 10.1007/S00897102303A

16) GARCÍA, C., PIÑERO, L., OYOLA, R., AND ARCE, R., **(2009)** PHOTODEGRADATION OF 2-CHLORO SUBSTITUTED PHENOTHIAZINES IN ALCOHOLS. *PHOTOCHEM. PHOTOBIOL.*, 85, 160-170. [PMID: 18673321]

17) PIÑERO, L., CALDERÓN, X., RODRÍGUEZ, J., NIEVES, I., ARCE, R., GARCÍA, C., OYOLA, R., **(2008)** SPECTROSCOPIC AND ELECTROCHEMICAL PROPERTIES OF 2-AMINOPHENOTHIAZINE, *J. PHOTOCHEM. PHOTOBIOL. A: CHEM.*, 198, 85 - 91. [PMID: 19582136]

18) GARCIA, C., OYOLA, R., PIÑERO, L., HERNÁNDEZ, DIONNE, AND ARCE, R **(2008)** PHOTOPHYSICS AND PHOTOCHEMISTRY OF IMIPRAMINE, DESIMIPRAMINE AND CLOMIPRAMINE IN SEVERAL SOLVENTS: A FLUORESCENCE, 266 NM LASER FLASH AND THEORETICAL STUDY. *J. PHYS. CHEM. B.*, 112, 168-178. [PMID: 18085762]

19) TUCKER, M. J., R. OYOLA AND F. GAI **(2006)** A NOVEL FLUORESCENT PROBE FOR PROTEIN BINDING AND FOLDING STUDIES: P-CYANO-PHENYLALANINE. *BIOPOLYMERS*, 83 (6), 571-576. [PMID: 16917881]

20) COLÓN, L., C.E. CRESPO-HERNÁNDEZ, R. OYOLA, C. GARCÍA AND R. ARCE **(2006)** ROLE OF SEQUENCE AND CONFORMATION ON THE PHOTOCHEMISTRY AND THE PHOTOPHYSICS OF A-T DNA DIMERS: AN EXPERIMENTAL AND COMPUTATIONAL APPROACH. *J. PHYS. CHEM. B.*, 110, 15589-15596. [PMID: 16884283]

21) PURKAYASTHA, P., J. W. KLEMKE, S. LAVENDER, R. OYOLA, B.S. COOPERMAN, AND F. GAI **(2005)** ALPHA 1-ANTITRYPSIN POLYMERIZATION: A FLUORESCENCE CORRELATION SPECTROSCOPY STUDY. *BIOCHEM.*, 44(7), 2642-2649. [PMID: 15709777]

22) GARCÍA, C., R. OYOLA, L. E. PIÑERO, R. ARCE, J. SILVA, AND V. SÁNCHEZ **(2005)** SUBSTITUTION AND SOLVENT EFFECTS ON THE PHOTOPHYSICAL PROPERTIES OF SEVERAL SERIES OF 10-PHENOTHIAZINE DERIVATIVES. *J. PHYS. CHEM. A.*, 109(15), 3360-3371. [PMID: 16833671]

23) TUCKER, M. J., R. OYOLA, AND F. GAI **(2005)** CONFORMATIONAL DISTRIBUTION OF A 14-RESIDUE PEPTIDE IN SOLUTION: A FLUORESCENCE ENERGY TRANSFER STUDY. *J. PHYS. CHEM. B.*, 109(10), 4788-4795. [PMID: 16851563]

24) GARCÍA, C., L. PIÑERO, R. OYOLA, R. ARCE, I. NIEVES AND N. CRUZ **(2003)** PHOTOCHEMICAL AND PHOTOPHYSICAL PROPERTIES OF AMITRIPTYLINE AND NORTRIPTYLINE HYDROCHLORIDE: A 266 NM LASER FLASH AND THEORETICAL STUDY. *J. PHOTOCHEM. PHOTOBIOL. A: CHEM.*, 154(2-3), 245-257.

25) XAO, Y., R. OYOLA AND F. GAI **(2003)** INFRARED STUDY OF THE STABILITY AND FOLDING KINETICS OF A 15-RESIDUE B-HAIRPIN. *J. AM. CHEM. SOC.*, 125, 15388-15394. [PMID: 14664583]

26) GARCÍA, C., L. PIÑERO, R. OYOLA, R. ARCE, I. NIEVES, N. CRUZ AND F. ALEJANDRO **(2002)** PHOTOPHYSICAL, ELECTROCHEMICAL, AND THEORETICAL PROPERTIES OF PROTRIPTYLINE IN DIFFERENT SOLVENTS. *J. PHYS. CHEM. B.*, 106(38), 9794-9801.

27) ARCE R., OYOLA R., ALEGRÍA A. E. **(1998)** THE PHOTOBIOLOGICAL DIFFERENCES OF GILVOCARCINS V AND M ARE NOT RELATED TO THEIR TRANSIENT INTERMEDIATES AND TRIPLET YIELDS. *PHOTOCHEM. PHOTOBIOL.* 68, 25-31.

28) OYOLA R., ARCE R., ALEGRÍA A. E., GARCÍA C. **(1997)** PHOTOPHYSICAL PROPERTIES OF GILVOCARCINS V AND M AND THEIR BINDING CONSTANTS TO CALF THYMUS DNA; *PHOTOCHEM. PHOTOBIOL.*, 65, 802-810.

Research:

Field of Interest: Analytical and Physical Chemistry; Photochemistry and Photophysics; Biophysical Chemistry
Special topics: transient absorption spectroscopy; fluorescence spectroscopy, and protein folding/unfolding.

The research in our laboratory is directed towards three main areas:

1) Understanding the structure, function, and dynamics of proteins under different conditions.
2) Identification of new drugs for amyloid diseases.
3) Photochemistry and photophysics of drugs
4) Nanomaterials for biomedical applications

Research Collaborators:

1) Dr. Deguo Du (ddu@fau.edu) – Department of Chemistry and Biochemistry, PS55, Room301G, 777 Glades Road, Boca Raton, FL 33431-3390. Web page = http://www.science.fau.edu/chemistry/2008faculty/2011deguo.htm
2) Dr. Ángel Martí (amarti@rice.edu) - Assistant Professor of Chemistry, Rice University, Department of Chemistry, MS60, 6100 S Main St., Houston, TX 77005 Office: 320B Dell Butcher Hall, Phone: 713-348-3486. Web page = http://amarti.web.rice.edu/Lab/Home.html
3) Dr. Carlos Crespo-Hernández (cxc302@case.edu) - Professor of Chemistry, Case Western Reserve University, Department of Chemistry, Millis Science Center, Office 219A 10900 Euclid Avenue, Cleveland, OH 44106-7078 USA. Web page = http://www.case.edu/artsci/chem/faculty/crespo/group
4) Dr. Feng Gai (gai@sas.upenn.edu) – Professor of Chemistry, University of Pennsylvania, Department of Chemistry, 231 S. 34th Street, Philadelphia, PA 19104. Tel: 215-573-6256; Fax: 215-573-2112 Web page = http://gaigroup.chem.upenn.edu/
5) Dr. Carmelo García (Carmelo.garcia@upr.edu) – Professor of Chemistry, University of Puerto Rico – Humacao, Department of Chemistry, Call box 860, Humacao, PR 00792-4300, Tel 787-850-9387.
6) Dr. Margarita Ortiz (margarita.ortiz1@upr.edu) - Professor of Chemistry, University of Puerto Rico – Humacao, Department of Chemistry, Call box 860, Humacao, PR 00792-4300, Tel 787-850-9387.
7) Prof. Idalia Ramos (idalia.ramos@upr.edu) – Professor of Physics, University of Puerto Rico – Humacao, Department of Physics, Call Box 860, Humacao, PR 00792-4300. Tel: 787-850-9344. Web page: http://prem.uprh.edu/
8) Dr. Nicholas Pinto (nicholas.pinto@upr.edu) - Professor of Physics, University of Puerto Rico – Humacao, Department of Physics, Call Box 860, Humacao, PR 00792-4300. Tel: 787-850-9344.

Research Proposals

1) NSF-DMR-PREM- -2122102 **2021 – 2026**
   Total Cost Direct Cost ≈ $4.5 million
   Role: Co-PI
   Title: Gallium nanoparticles and fibers for sensing applications

The specific aims of this work are: 1) to develop new sensors using gallium nanofibers; 2) to determine characterize and quantify the factors that affect the stability and dynamics of protein/peptides binding to gallium nanoparticles, and 3) to train minority undergraduate students in a nanomaterials research field.

2) NSF-DMR-PREM- 1523463 **2015 – 2020**
Total Cost Direct Cost ≈ $3.0 million
Role: Co-PI
Title: Interaction of Nanoparticles with Human Serum Albumin and Amylin (IAPP)
The specific aims of this work are: 1) to characterize and quantify the factors that affect the stability and dynamics of protein binding to nanoparticles; 2) to determine how the proteins' structure change upon the interaction, and 3) to train minority undergraduate students in a nanomaterials research field.

3) University of Puerto Rico-Central Administration (P.D. Antonio Alegría) **2014 - 2015**
Role: Subproject PI
Total Cost Direct Cost ≈ $13,000
Title: Understanding Au Nanoparticle- IAPP peptide interactions
The specific aims of this work are: 1) to characterize and quantify the factors that affect the stability and dynamics of protein binding to NPs; 2) to determine how the proteins' structure change upon the interaction, and 3) to train minority undergraduate students in a highly interdisciplinary research field using current analytical methods.

4) University of Puerto Rico – Central Administration – PES Program **2012-2014**
Total cost Direct Cost ≈$10,500
Role: Subproject PI (PD = Dr. Antonio Alegría)
Title: Multifunctional inhibitors for Aβ-oligomerization self-assembly.
The objective of this particular application was to synthesize and identify effective multifunctional molecules against the self-assembly of Aβ. These molecules will consist in phenothiazines (PH) with different substitution pattern covalently bonded to small peptides.

5) University of Puerto Rico – Humacao – FOPI Program **2014**
Total cost Direct Cost ≈$4,500 plus 3 credits/semester
Role: PI
Title: Structure-activity relationship of phenothiazines in inhibition of Aβ(1-40) oligomeric formation.
The major goal of this project is to understand the structural relationship between PH derivatives and Aβ inhibition.

6) NIH-INBRE P20 - RR016470 (P.D. Sandra Peña) **2009 - 2012**
Total cost Direct Cost ≈$400,000
Role: Subproject PI
Title: Conformational studies of beta-hairpins using ^{13}C-labeling.
The major goal of this project is to study the beta-hairpin folding mechanism at the single residue level.

7) University of Puerto Rico – Humacao – FOPI Program **2007 – 2009**
Total cost Direct Cost ≈$4,300 plus 6 credits/year
Role: PI
Title: Laser flash photolysis of promazine derivatives in the presence of β-cyclodextrins.
The major goal of this project is to determine if the phenothiazine's triplet state properties change in the presence of cyclodextrin, a membrane mimic system.

8) NIH-SCORE Supplementary SO6-M008216 **2005 - 2007**
Total cost Direct Cost ≈$425,000
Role: PI
Title: A β-hairpin conformational study using ^{13}C-isotope labeling and infrared detection.
The major goal of this project is to understand the physical and chemical factors that regulate the beta-hairpin folding/unfolding mechanism.

9) NIH-COBRE - University of Puerto Rico-Mayaguez **2002 - 2003**
Total cost Direct Cost ≈$30,000
Role: subproject PI
Title: A β-hairpin conformational study using ^{13}C-isotope labeling and infrared detection.
The major goal of this project is to understand the physical and chemical factors that regulate the beta-hairpin folding/unfolding mechanism.