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EDUCATION

- Ph. D.**, Applied Chemistry (Materials). University of Puerto Rico-Mayagüez, PR, 2008.
Thesis title: "Theoretical and Experimental Vibrational and NMR Studies of α and β -RDX"
- M. Sc.**, Organic and Physical Chemistry. University of Puerto Rico-Mayagüez, PR, 1997.
Thesis title: "Experimental and theoretical studies of the molecular structure of new derivatives of 2-methylbenzimidazole"
- B. Sc.**, Chemistry (Chemical Education). National Pedagogic University, Colombia, 1990.
Thesis title: "Using concept maps in teaching chemistry"

Puerto Rico Chemist license #4661

RESEARCH INTEREST

- Organic Synthesis; Structure characterization and biological activity of new derivatives of 2-Methylbenzimidazole (experimental and theoretical studies)
- Materials chemistry; Vibrational spectroscopy of energetic compounds (experimental and theoretical studies)
- Computational chemistry; Theoretical exploration of the relationship between explosive properties and electronic structures of energetic Materials
- Assessment, evaluation and teaching methodologies in science

RELEVANT SKILLS

- Instrumentation Knowledge: NMR, IR, Raman, UV-Vis, GC-MS/FID/TCD, AA (Flame, Graphite Furnace), HPLC, digital Polarimeter, digital refractometers, elemental analyzer.
- Computational Skills: Gaussian, Gaussview, Spartan, Hyperchem.
- Environmental Studies.
- Water analysis, drilling fluids control, environmental impact studies.
- Educational Strategies: Assessment, evaluation and teaching methodologies.

EXPERIENCE

1997-	Full Professor (Catedrático), UPR-Arecibo.
2012-2014	Vice-president of Real Media Experts.
1998- 2006	Coordinator program of TRC (Transitions to Research Careers).
1994-1997	Teaching Assistant, UPR-Mayaguez.
1991-1994	Analytical Chemist, HOLSAN Chemicals. Ecuador / Colombia
1990-1991	Chemistry Professor, Marist College

PROFESSIONAL ACTIVITIES

Academic Committees

2017	<i>Personal</i> Faculty
2015-2016	CIPPI Member
2000-	<i>Personal</i> Department
2004-	Accreditation
2000-	Program and UPRA assessment
2005	Senator

Accreditation

- ABET Active member of PACAC (Program's Assessment/Curriculum/Accreditation Committee) since origin.

Laboratory Manuals (currently used)

1. Laboratory Experiments for Analytical Chemistry (1st **2009**, 2^{do} **2016**, 3^{er}, **2018**)
2. Techniques and Experiments for Instrumental Analysis (1st **2007**, 2^{do} **2015**, 3^{er}, **2017**)
3. A Microscale Approach to Organic Chemistry Laboratory, Part A. (1^s **2002**, 2^{do} **2010**, 3^{er} **2015**)

Proposals Approved

2017-2018	Research Team Program for Minority Serving Institutions. U.S. Department of Homeland Security.
2017	Summer Award. U.S. Department of Homeland Security.
2017	Environmental Protection Agency
2016/17	Seed funds for scientific research. UPRA 2016-2017
1999/09/11/15	Centro de investigación y creación UPRA "Química Computacional: Una Alternativa para el Aprendizaje del concepto de Acidez" "Cálculos teóricos de Resonancia magnética nuclear para sistemas orgánicos" "Predicción de Propiedades Explosivas de Compuestos a través de Cálculos Computacionales". Síntesis y evaluación de la actividad biológica de nuevos derivados del 2-metilbenzimidazol
2000-	"Transitions To research Careers" Steering Committee member. UPR-Rio Piedras. NIH

Administrative Activities

Academic	Budget management of the DHS and NIH proposals \$150k
Non-Academic	Budget management of Real Media Experts \$ 100K per year

Academic Services

- Ph. D. in Applied Chemistry Graduate Committee member. UPR-Mayaguez, 2017.
- STUDENT's project. Instructional Chemistry Module Design. UPR & Catholic University Consortium, 2017.
- Puerto Rico aqueduct and sewer authority. PRASA's Training Program. Using TOC analysis for DBP control, 2017.
- Workshops for science teachers K9-K12: ISMUL, University of Puerto Rico at Arecibo, 1999-Present.
- **Referee for Peer-Reviewed Journals:** Journal of Molecular Structure, THEOCHEM, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 2012-Present.

Recent Presentations

- Bio-Activity Studies of New 2-methylbenzimidazole Derivatives. Inter-American University & XEROX foundation, 2016.
- Synthesis of New 2- methylbenzimidazole Derivatives. 36 th Puerto Rico Interdisciplinary Meeting and the 51st ACS Junior Technical Meeting (PRISM/JTM), Catholic University of Ponce, 2016.

Recent Publications

✓ Journal Articles

1. Predicting Heats of Explosion of Nitroaromatic Compounds through NBO Charges and N NMR Chemical Shifts of Nitro Groups, **Advances in Physical Chemistry** Volume 2012 (2012), 11 pages. **Ricardo Infante-Castillo** and Samuel P. Hernández-Rivera.
2. Predicting heats of explosion of nitrate esters through their NBO charges and ¹⁵N NMR chemical shifts on the nitro groups. **Computational and Theoretical Chemistry**, Volume 963, Issues 2-3, **February 2011**, Pages 279-283, Samuel P. Hernández-Rivera, **Ricardo Infante-Castillo**.
3. A systematic theoretical investigation of the relationship between heats of detonation and NBO charges and ¹⁵N NMR chemical shifts of nitro groups in nitramines and nitro paraffins. **Journal of Molecular Structure: THEOCHEM**, Volume 960, Issues 1-3, **30 November 2010**, Pages 57-62, Samuel P. Hernández-Rivera, **Ricardo Infante-Castillo**.
4. Vibrational spectra and structure of RDX and its ¹³C- and ¹⁵N-labeled derivatives: A theoretical and experimental study. **Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy**, Volume 76, Issue 2, July **2010**, Pages 137-141. **Ricardo Infante-Castillo**, Leonardo Pacheco-Londoño, Samuel P. Hernández-Rivera.
5. Monitoring the $\alpha \rightarrow \beta$ solid–solid phase transition of RDX with Raman spectroscopy: A theoretical and experimental study. **Journal of Molecular Structure**, Volume 970, Issues 1-3, **30 April 2010**, Pages 51-58. **Ricardo Infante-Castillo**, Leonardo C. PachecoLondoño, Samuel P. Hernández-Rivera.

6. Experimental and theoretical studies of the molecular structure of 1-(2-pyridinylmethyl)2methylbenzimidazole. **Journal of Molecular Structure**, Volume 968, Issues 1-3, 8 April 2010, Pages 6-12. **Ricardo Infante-Castillo**, Samuel P. Hernández-Rivera.
7. On the choice of optimal protocol for calculation of ^{13}C and ^{15}N NMR isotropic chemical shifts in nitramine systems **Journal of Molecular Structure: THEOCHEM**, Volume 940, Issues 1-3, 30 January 2010, Pages 124-128. **Ricardo Infante-Castillo**, Samuel P. Hernández-Rivera.
8. DFT studies of the structure and vibrational and NMR spectra of 1-(2-methylpropenyl)2methylbenzimidazole, **Journal of Molecular Structure**, Volume 917, Issues 2-3, 15 January 2009, Pages 158-163; **Ricardo Infante-Castillo**, Samuel P. Hernández-Rivera
9. Theoretical DFT, vibrational and structural characterization of 1-propenyl-2-methylbenzimidazole and its isomers, **Journal of Molecular Structure**, Volume 892, Issues 1-3, 15 December 2008, Pages 477-484. **Ricardo Infante-Castillo**, Samuel P. Hernández-Rivera.
10. Theoretical DFT, vibrational and NMR studies of benzimidazole and alkyl derivatives, **Journal of Molecular Structure**, Volume 877, Issues 1-3, 17 April 2008, Pages 10-19. **Ricardo Infante-Castillo**, Samuel P. Hernández-Rivera. **Top 25 article first semester 2008.**
11. Effects of isotopic substitution on the vibrational spectra of α -RDX. **R. Infante-castillo** and S. P. Hernandez, **Proc. of SPIE**, 6538 (2007) 653825.
12. Theoretical and experimental vibrational and NMR studies of RDX. **R. Infante-Castillo** and S. P. Hernandez, **Proc. of SPIE**, 6201 (2006) 62012F.

✓ **Chapters in Books:**

1. Espinosa-Fuentes, E.A., Peña-Quevedo, A.J., Pacheco-Londoño, L.C., **Infante-Castillo, R.** and Hernández-Rivera, S.P., A Review of Peroxide Based Homemade Explosives: Characterization and Detection, in "Explosive Materials: Classification, Composition and Properties", Janssen, T.J., ed., **Chemical Engineering Methods and Technology Series**, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter 2010, ISBN: 978-161761188-9.
2. **Infante-Castillo, R** and Hernandez-Rivera, S. P. Experimental and Theoretical Studies of the Molecular Structure of Five New 2-methylbenzimidazole Derivatives, in "**Advances in Chemistry Research**", Volume 11, Nova Science Publishers, Inc. Hauppauge, NY, fourth quarter 2011, ISBN: 978-1-61324-815-7.

Selected Recent Development Activities

1. Workshop: Instructional Strategies and Learning Evaluation. Inter-American University. 2017.
2. Workshop: **CLICKERS** as a Learning Tool. UPR-Arecibo, 2017.
3. Workshop: **SOCRATIVE** platform UPR-Arecibo, 2017.
4. Workshop. Chemistry Hygiene Plan. ISMUL, UPR-Arecibo, 2017.

5. Workshop: Standard Operation Procedure for Elemental Analyzer. Perkin-Elmer UPR-Arecibo, 2017
6. Conference: Biotechnology Undergraduate Research. Inter-American University, 2016.
7. Conference: 16th Forum of Research. Physics and Chemistry department, 2016.
8. Conference "Professional Careers in Industrial Biotechnology". Amgen BioTalents and Biotechnology Lecture Series, UPR-Arecibo, 2016
9. Conference: 36th Puerto Rico Interdisciplinary Meeting and the 51st ACS Junior Technical Meeting (PRISM/JTM), Catholic University of Ponce, 2016.
10. 2nd Symposium of Research (CIC), UPR-Arecibo, 2016.
11. Conference: 15th Forum of Research. Physics and Chemistry department, 2015.
12. Conference "Professional Careers in Industrial Biotechnology". Amgen BioTalents and Biotechnology Lecture Series, UPR-Arecibo, 2015
13. 1st Symposium of Research (CIC), UPR-Arecibo, 2015.
14. Workshop: "Base de Datos", Biblioteca, UPR-Arecibo, 2015.

Selected Workshops (+ 40)

2017-2018	TOC y productos de desinfección. AAA (Autoridad de Acueducto y Alcantarillado) Audiencia: Supervisores de planta e ingenieros. Diferentes áreas en PR
2014	Certificado Profesional en Operaciones Farmacéuticas. DECEP-UPRA. Audiencia: Personal Farmacéutica Janssen ortho, Manati PR
2013	"Chemistry for non-chemist". Abbott laboratories. DECEP-UPRA Audiencia: Personal Farmacéutica Abbot
2012	Ciclo de talleres. ISMuL-UPRA 1. Diferencias entre Medición, "assessment" y evaluación 2. Metodología para la preparación de pruebas objetivas en ciencia 3. Análisis de Preguntas, Correlación y niveles de confiabilidad de una prueba 4. Reglas para la Construcción de Mapas Conceptuales en Ciencias 5. "Pensamiento organizado; éxito garantizado. Metodología para la Resolución de Problemas en Ciencias Audiencia: Maestros de Ciencias Área Norte
2011	"Designing a science lesson plan according to Puerto Rico educational standards". ISMuL-UPRA Audiencia: Maestros de Ciencias Área Norte
2011	Metodología y didáctica en la enseñanza de la química". Audiencia: Maestros de Ciencia
2006-	"Chromatography and Statistical Analysis" Biotechnology Certification. DECEP-UPRA Audiencia: Empleados Abbot
2002	Implementación de Talleres Preparatorios en las Áreas de Equilibrio Químico, Cinética y Electroquímica para estudiantes de Ciencia y Tecnología. Convención Annual CETP. Ponce. Audiencia: Maestros de Ciencias y Profesores Universitarios de PR
2001	College Board. Conference. "Componentes de Innovación Curricular en Química para Estudiantes Universitarios de Nuevo Ingreso de Ciencia y Tecnología. San Juan, P.R.. Audiencia: Maestros de Ciencias y Profesores Universitarios de PR