

# Cesar E. Ramirez, PhD.

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## RESEARCH APPOINTMENTS

### Associate Director

March 2015-Present

[Advanced Mass Spectrometry Facility, Florida International University. Miami, FL.](#)

- Uses liquid chromatography (LC), gas chromatography (GC), and advanced mass spectrometry (MS) techniques to develop analytical workflows in support of university researchers in fields such as:
  - o Public health
    - Mosquito control research: femtomole detection of mosquito juvenile hormones
    - Cancer stressors: trace-level detection of nicotine and, polycyclic aromatic hydrocarbons (PAHs).
    - Disease and pollution exposure detection: biomarker detection in plasma and urine.
    - Water quality: trace-level detection of wastewater pollution markers.
  - o Metabolomics/proteomics
    - Lipidomics
    - Quantitative analysis of peptides and proteins
  - o Synthetic chemistry and natural product chemistry
    - Identification of organic compounds in plant extracts and synthetic products
- Supports teaching activities (instrumental analysis, forensic analysis and other courses) and facility outreach activities such as workshops for STEM promotion at high school level.
- Provides analytical support to principal investigators for grant writing and experimental design.
- Performs instrument preventive maintenance and executes repairs as necessary.
- Supervises and trains facility staff, manages budget and acquisitions, produces year-end reports, ensures safety compliance, among other tasks.

### Research and Development Officer

February 2015-March 2015

[Synergy Diagnostics Laboratory, Davie, FL.](#)

- Developed and validated methods to detect drugs of abuse and their metabolites in urine using LC-MS/MS (Agilent 6460 LC-QQQ).

### Postdoctoral Associate

February 2014-February 2015

[Southeast Environmental Research Center, Florida International University. Miami, FL.](#)

- Developed and validated methods for high throughput detection of markers of wastewater intrusion into usable water resources (Thermo TSQ LC-QQQ; Q-Exactive Orbitrap LC-HRMS).
- Performed certified, trace-level detection of toxic metals in waters and soils using inductively coupled plasma mass spectrometry (ICP-MS Agilent 4500, certified methods EPA 200.8, 6020A; 3050B).
- Performed interpretation and summarized results from government-led environmental pollutant and nutrient monitoring efforts.

### Research Assistant

August 2007-December 2013

[Department of Chemistry and Biochemistry, Florida International University. Miami, FL.](#)

- High throughput analysis to evaluate occurrence, fate and toxicological response of waterborne pollutants such as carcinogen PAHs, surfactants used during the Gulf of Mexico Oil Spill or the ecotoxic herbicide glyphosate.
- Used statistical methods to identify local sources of toxic metals by elemental analysis of airborne particulate matter collected over five years.

## Research Scientist

September 2006- July 2007

[Research and Development Foundation, Universidad Simon Bolivar \(Caracas, Venezuela\)](#)

- Environmental impact assessments using ICP-Optical Emission Spectroscopy (ICP-OES), Atomic Fluorescence Spectroscopy (AFS) and GC-MS to detect toxic metals and PAHs in soils, crude oil and surface waters.

## Undergraduate Researcher

September 2004- February 2006

[Department of Chemistry, Universidad Simon Bolivar \(Caracas, Venezuela\)](#)

- The goal was to identify bioactive organic compounds in extracts of plants with attributed medicinal properties. Obtained hands-on experience in techniques such as GC-MS, FT-IR, HRMS, nuclear magnetic resonance (NMR) spectroscopy, preparative liquid chromatography and toxicological assays such as lethality on *artemia salina* (brine shrimp).

## TEACHING APPOINTMENTS

### Adjunct Lecturer

August 2014-December 2014

[Department of Chemistry and Biochemistry, Florida International University](#)

- Introduction to Analytical Chemistry (CHM 3120, fall 2014).
  - o Independently prepared syllabus, classes and evaluations for students.

### Teaching Assistant

August 2007-August 2010

[Department of Chemistry and Biochemistry, Florida International University](#)

- Analytical Chemistry (CHM 3120L. Summer and fall 2009; spring and summer 2010).
- Organic Chemistry I (CHM 2210L. Summer and fall, 2008; Spring 2009).
- General Chemistry I and II (CHM 1045L Fall 2007; CHM 1046L Spring 2008).
  - o Supervised execution of experiments, graded reports and prepared evaluations.

## EDUCATION

### Ph.D., Chemistry.

Florida International University, Miami, Florida.

December 2013

Advisor:

Dr. Piero R. Gardinali.

Dissertation:

[Novel Analytical Methodologies for the Monitoring of Traditional and Non-traditional Pollutants in Different Environmental Compartments of South Florida.](#)

### B.S., Chemistry.

Universidad Simón Bolívar. Caracas, Venezuela.

March 2006

Thesis:

Structural elucidation of compounds with toxicity against Brine Shrimp (*Artemia salina*) in chloroformic extracts of "Urupaguita" (*Castela erecta ssp. erecta*).

## PEER-REVIEWED PUBLICATIONS

- Kendra J. Adams, **Cesar E. Ramirez**, Natalie F. Smith, Ana Celia Muñoz-Muñoz, Lawrence Andrade, Francisco Fernandez-Lima. Analysis of isomeric opioids in urine using LC-TIMS-TOF MS. *Talanta* (2018). <https://doi.org/10.1016/j.talanta.2018.02.077>
- Marcela Nouzova, Veronika Michalkova, Salvador Hernandez-Martinez, Crisalejandra Rivera-Perez, **Cesar E. Ramirez**, Francisco Fernandez-Lima, Fernando G. Noriega. JH biosynthesis and hemolymph titers in adult male *Aedes aegypti* mosquitoes. *Insect Biochemistry and Molecular Biology* (2018). (accepted)
- Yingxun Du, **Cesar E. Ramirez**, Rudolf Jaffé. Fractionation of Dissolved Organic Matter by Coprecipitation with Iron: Effects of Composition. *Environmental Processes* (2018) 5:5-21.

- Kendra J. Adams, Natalie F. Smith, **Cesar E. Ramirez**, Francisco Fernandez-Lima. Discovery and targeted monitoring of polychlorinated biphenyl metabolites in blood plasma using LC-TIMS-TOF MS. [International Journal of Mass Spectrometry \(2017\). https://doi.org/10.1016/j.ijms.2017.11.009](https://doi.org/10.1016/j.ijms.2017.11.009)
- Alyssa Garabedian, Paolo Benigni, **Cesar E. Ramirez**, Erin S. Baker, Tao Liu, Richard D. Smith, Francisco Fernandez-Lima. Towards Discovery and Targeted Peptide Biomarker Detection Using nanoESI-TIMS-TOF MS. ultra-trace detection of juvenile hormone III from mosquitoes using mass spectrometry. [Journal of The American Society for Mass Spectrometry \(2017\). https://doi.org/10.1007/s13361-017-1787-8](https://doi.org/10.1007/s13361-017-1787-8)
- **Cesar E. Ramirez**, Marcela Nouzova, Paolo Benigni, J. Martin E. Quirke, Fernando G. Noriega and Francisco Fernandez-Lima. Fast, ultra-trace detection of juvenile hormone III from mosquitoes using mass spectrometry. [Talanta \(2016\), 159: 371-378](https://doi.org/10.1016/j.talanta.2016.08.014)
- Nubia V. Heuett, **Cesar E. Ramirez** and Piero R. Gardinali. Analysis of Drugs of Abuse by Online SPE-LC High Resolution Mass Spectrometry: Communal Assessment of Consumption. [Science of the Total Environment \(2015\): 511:319-330.](https://doi.org/10.1016/j.scitotenv.2015.07.014)
- Sudha Rani Batchu, **Cesar E. Ramirez** and Piero R. Gardinali. Rapid ultra-trace analysis of sucralose in multiple-origin aqueous samples by online solid phase extraction coupled to high resolution mass spectrometry. [Analytical and Bioanalytical Chemistry \(2015\) 407\(13\):3717-25.](https://doi.org/10.1016/j.ab.2015.07.014)
- **Cesar E. Ramirez**, Sarah Bellmund and Piero R. Gardinali. A simple method for routine monitoring of glyphosate and its main metabolite in surface waters using lyophilization and LC-FLD+MS/MS. Case study: canals with influence on Biscayne National Park. [Science of the total environment \(2014\): 496:389-401.](https://doi.org/10.1016/j.scitotenv.2014.07.014)
- **Cesar E. Ramirez**, Chengtao Wang and Piero R. Gardinali. Fully automated trace level determination of parent and alkylated PAHs in environmental waters by online SPE-LC-APPI-MS/MS. [Analytical and Bioanalytical Chemistry \(2014\): 406:329-344.](https://doi.org/10.1016/j.ab.2014.07.014)
- Sudha Rani Batchu, **Cesar E. Ramirez** and Piero R. Gardinali. Stability of dioctyl sulfosuccinate (DOSS) towards hydrolysis and photodegradation under simulated solar conditions. [Science of the Total Environment \(2014\): 481:260-265.](https://doi.org/10.1016/j.scitotenv.2014.07.014)
- **Cesar E. Ramirez**, Sudha Rani Batchu, and Piero R. Gardinali. High sensitivity liquid chromatography tandem mass spectrometric methods for the analysis of dioctyl sulfosuccinate in different stages of an oil spill response monitoring effort. [Analytical and Bioanalytical Chemistry \(2013\): 405:4167-4175.](https://doi.org/10.1016/j.ab.2013.07.014)

## APPLICATION NOTES

- **Cesar E. Ramirez**, Sudha Rani Batchu, and Piero R. Gardinali. Simultaneous determination of oil dispersants in saltwater and crude oil by LC and tandem MS. (2013). [Thermo Scientific Application Note Number 586.](https://doi.org/10.1016/j.chrom.2013.07.014)
- **Cesar E. Ramirez**, Chengtao Wang, Piero R. Gardinali, Jennifer Massi and Jonathan Beck. Fully automated trace level determination of parent and alkylated PAHs in environmental waters by online SPE-LC-APPI-MS/MS. (2014). [Thermo Scientific Application Note Number 598.](https://doi.org/10.1016/j.chrom.2014.07.014)

## TECHNICAL REPORTS

- Piero R. Gardinali, Adolfo M. Fernandez and **Cesar E. Ramirez**. Providing Contaminant Data for Coastal Management: Assessing the Effects of Land Based Sources of Pollution on Collier County's Estuaries and their Associated Watersheds. Published by Collier County (September, 2014). <http://www.colliergov.net/modules/showdocument.aspx?documentid=58260>

## PLATFORM PRESENTATIONS AT NATIONAL AND INTERNATIONAL MEETINGS

- **Cesar E. Ramirez**, Chengtao Wang and Piero R. Gardinali. Fully automated, trace-level detection of PAHs in saltwater by online-preconcentration liquid chromatography tandem mass spectrometry (LC-MS/MS): The quest to eliminate sample preparation. *SETAC North America 33rd Annual Meeting. Long Beach, CA. November 15, 2012.*
- **Cesar E. Ramirez** and Piero R. Gardinali. Fast, ultra-trace level analysis of an oil dispersant in seawater using the Thermo Equan system. *Thermo Scientific Productivity Series 2012. Fort Lauderdale, FL. March 27, 2012.*
- **Cesar E. Ramirez** and Piero R. Gardinali. Novel method for the determination of Glyphosate and Aminomethylphosphonic Acid (AMPA) in Environmental Waters. *SETAC North America 30th Annual Meeting. New Orleans, LA. November 30, 2009.*

## POSTERS AT NATIONAL AND INTERNATIONAL MEETINGS (Presenter is underlined)

- Kendra Adams, **Cesar E. Ramirez**, Richard H. Gomer, Francisco Fernandez-Lima. Discovery and Targeted Monitoring of *D. discoideum* Lipids using Multidimensional LC-TIMS-MS/MS Separations. *65th American Society for Mass Spectrometry. Conference on Mass Spectrometry and Allied Topics. Indianapolis, IN. June 4-8, 2017.*
- Alyssa Garabedian, Paolo Benigni, **Cesar Ramirez**, Tao Liu, Erin Baker, Richard Smith, Mark Ridgeway, Melvin Park, Francisco Fernandez-Lima. Strategies for discovery and targeted analysis using nESI-TIMS-TOF MS and nESI-TIMS-FT-ICR MS. *ASMS Sanibel Conference on Peptidomics. Clearwater Beach, FL. January 19-22, 2017.*
- Kendra Adams, **Cesar E. Ramirez**, Richard H. Gomer, Francisco Fernandez-Lima, Daniel DeBord. Localization and Identification of Biomarkers during Cell Differentiation. *64th American Society for Mass Spectrometry. Conference on Mass Spectrometry and Allied Topics. San Antonio, TX. June 5-9, 2016.*
- **Cesar E. Ramirez**, Sudha Rani Batchu and Piero R. Gardinali. Fast, ultra-trace analysis of sucralose in multiple-origin aqueous samples by online SPE coupled to LC and high resolution mass spectrometry. *SETAC North America 35th Annual Meeting. Vancouver, BC. November 9-13, 2014.*
- Nubia V. Heuett, **Cesar E. Ramirez**, Sudha Rani Batchu, Adolfo Fernandez and Piero R. Gardinali. Target and non-target analysis of drugs of abuse by high resolution mass spectrometry. *SETAC North America 35th Annual Meeting. Vancouver, BC. November 9-13, 2014.*
- **Cesar E. Ramirez**, Sudha Rani Batchu and Piero R. Gardinali. Fast, ultra-trace analysis of sucralose in multiple-origin aqueous samples by online SPE coupled to HPLC and the Orbitrap high resolution mass spectrometer. *248th ACS National Meeting & Exposition. San Francisco, CA. August 10-14, 2014.*
- Nubia V. Heuett, **Cesar E. Ramirez**, Sudha Rani Batchu and Piero R. Gardinali. Communal assessment of drugs of abuse and identification of their transformation products by online SPE-LC-HRMS. *248th ACS National Meeting & Exposition. San Francisco, CA. August 10-14, 2014.*
- Chengtao Wang, **Cesar E. Ramirez** and Piero R. Gardinali. Detection of PAHs using LC-APPI-MS/MS assisted by a dopant gradient system. *SETAC North America 33rd Annual Meeting. Long Beach, CA. November 11-15, 2012.*
- Loreta Alvarez-Fraga, **Cesar E. Ramirez**, Brandy Echols, Gary Rand, Aaron Edgington, William Stubblefield, Piero R. Gardinali. Using silicone membranes to produce truly dissolved solutions of polyaromatic hydrocarbons (PAHs) used in toxicological testing. *SETAC North America 33rd Annual Meeting. Long Beach, CA. November 11-15, 2012.*
- **Cesar E. Ramirez**, Luisa Rojas de Astudillo, Luis E. Arroyo-Mora, Douglas Seba and Piero R. Gardinali. Elemental composition of airborne particulate matter collected at Port Everglades in South Florida. *First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas. San Juan, Puerto Rico. October 06-07, 2011.*

- **Cesar E. Ramirez**, Luis Arroyo, Douglas Seba and Piero R. Gardinali. Quantitative screening for airborne trace elements by in situ laser ablation ICP-MS: Assessment of dust depositions in South Florida. *First International Workshop on the Long-Range Transport and Impacts of African Dust on the Americas*. San Juan, Puerto Rico. October 06-07, 2011.
- **Cesar E. Ramirez** and Piero R. Gardinali. Detection of parent and alkylated polycyclic aromatic hydrocarbons in open ocean surface waters by online – SPE-UPLC-APPI-MS/MS. *7th Annual LC/MS/MS International Workshop on Environmental Applications and Food Safety*. Buffalo, NY. June 13-14, 2011.
- **Cesar E. Ramirez**, Sudha Rani Batchu and Piero R. Gardinali. Simultaneous determination of Corexit EC9500A & EC9527A components in seawater and crude oil by liquid chromatography/tandem mass spectrometry. *59th American Society for Mass Spectrometry. Conference on Mass Spectrometry and Allied Topics*. Denver, CO. June 05-09, 2011.
- **Sudha Rani Batchu**, **Cesar E. Ramirez** and Piero R. Gardinali. Identification of dioctyl sulfosuccinate sodium salt (DOSS) degradates in ocean waters by tandem mass spectrometry. *59th American Society for Mass Spectrometry. Conference on Mass Spectrometry and Allied Topics*. Denver, CO. June 05-09, 2011.
- **Cesar E. Ramirez** and Piero R. Gardinali. Trace-level determination of glyphosate and aminomethylphosphonic acid (AMPA) in aqueous samples with minimum pretreatment, followed by liquid chromatography with simultaneous fluorescence and mass spectrometry detection. *238th ACS National Meeting*. Washington, D.C. August, 16-20 2009.

#### **AWARDS**

- Received the “Cristina Menendez Fellowship” for research on the influence of the herbicide glyphosate on Biscayne National Park. Total funds granted: USD 5,000. Southeast Environmental Research Center, Miami, Florida. Funding cycle 2009-2010.
- Honored with the “Jose Felix Ribas” Award from the President of the Republic of Venezuela for Outstanding Academic Achievements. February, 1999.

#### **ACTIVITIES AND SOCIETIES**

- Member of the American Chemical Society (ACS).
- Member of the American Society for Mass Spectrometry (ASMS).
- Member of the Golden Key International Honor Society (From 2009).
- President of the Chemistry Students Association, Universidad Simón Bolívar. Caracas, Venezuela (2003-2004).

#### **INVITED PEER-REFEREE FOR:**

- Analytical and Bioanalytical Chemistry.
- Talanta.
- Environmental Earth Sciences.
- Journal of Environmental & Analytical Toxicology.
- Austin Chromatography.
- Journal of Petroleum and Environmental Biotechnology.
- International Journal of Environmental Analytical Chemistry.
- Acta Chimica Slovenica.
- Environmental Nanotechnology, Monitoring & Management.
- BMC Informatics.