

Cristian J. Aviles-Martin, Ph.D.

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PROFESSIONAL SUMMARY

Ph.D. chemist with 3+ years of industrial R&D experience in analytical method development and validation, organic synthesis, and cross-functional scientific collaboration. Proven ability to develop, validate, and deploy quantitative analytical methods (HPLC, GC-MS, FTIR, GPC, NMR, UV-Vis) across complex chemical matrices. Experienced in translating analytical data into actionable development decisions, authoring technical reports, and supporting regulatory compliance documentation. Skilled in mentoring scientists at multiple career stages and managing concurrent projects with minimal supervision.

CORE COMPETENCIES

Analytical Method Development & Validation · HPLC, GC-MS, FTIR, GPC, NMR, UV-Vis · Organic & Polymer Chemistry · Impurity Characterization Process Optimization · DOE & Statistical Analysis (Minitab, JMP) · Technical Report Authorship · Cross-Functional Collaboration · Mentoring & Technical Leadership · IP Generation · EHS Compliance

PROFESSIONAL EXPERIENCE

R&D Chemist III | MacDermid Alpha Electronic Solutions — Shelton, CT | Aug 2022 – Present

- Developed and validated quantitative HPLC, GC-MS, FTIR, and UV-Vis analytical methods for characterizing organic additive formulations and monitoring chemical composition in complex aqueous-organic matrices.
- Established an in-house GPC method from the ground up, including system suitability parameters, calibration standards, and precision/accuracy criteria, eliminating \$16,000/year in outsourcing costs and improving turnaround for structural characterization.
- Applied FTIR and NMR (¹H, ¹³C) for structural confirmation of synthesized compounds, identification of degradation products, and monitoring reaction conversion.
- Designed and executed DOE-driven optimization studies, critically analyzed multivariate data sets, and communicated findings to cross-functional teams including QA, production, and engineering.
- Authored technical reports and internal documentation in support of new product development and regulatory compliance; maintained records consistent with EHS regulatory frameworks.
- Directed a microwave-assisted synthesis project that reduced reaction cycle times from 24 hours to 45 minutes through systematic process evaluation and analytical monitoring.
- Implemented a chemical inventory and safety management system, improving EHS audit outcomes and compliance documentation quality.
- Mentored junior chemists and graduate interns in experimental design, analytical best practices, and laboratory safety; provided peer review of experimental data and methods.
- Contributed to IP generation through novel compound design, familiar with internal documentation processes for invention disclosures.
- Evaluated AI and LLM tools for R&D process integration, organizing department-wide trials of large language model platforms, benchmarking AI-powered scientific literature analysis tools, and participating in enterprise-level pilot deployment of Microsoft Copilot.

Research Chemist & EHS Manager | Debogey Molecular — Farmington, CT | Aug 2021 – Nov 2021

- Developed and applied surface analytical methods (FTIR, adhesion testing) to characterize antibacterial polymer coatings on surgical implant substrates, requiring precision characterization of thin-film chemical composition.
- Built the company's EHS initial compliance framework, including chemical waste management protocols and regulatory documentation; established practices meeting FDA-adjacent standards for an early-stage biomedical device company.

Analytical Chemistry Consultant | Clean Crop Technologies — Remote | Jul 2020 – Oct 2020

- Developed and validated UV-Vis spectroscopic methods for quantitative monitoring of photochemical reaction progress in prototype systems, including linearity, range, and method robustness assessments.

Graduate Researcher | University of Connecticut — Storrs, CT | Aug 2017 – Jul 2022

- Dissertation: *Elucidating Polymerization Mechanisms Inside Vesicle-Templated Reaction Systems* — designed in situ kinetic and spectroscopic methods (FTIR, fluorescence, DLS, NMR) to characterize polymer formation under photochemical conditions in complex confined environments.
- Developed novel analytical approaches for monitoring reaction kinetics in systems without established methods, requiring the same creativity in analytical strategy that pharmaceutical development demands.
- Presented data at group meetings, departmental seminars, and national conferences; authored and contributed to scientific manuscripts.

EDUCATION

- Ph.D. in Chemistry — University of Connecticut, Storrs, CT | Aug 2022
Dissertation: Elucidating Polymerization Mechanisms Inside Vesicle-Templated Reaction Systems
- B.S. in Chemistry — Pontifical Catholic University of Puerto Rico, Ponce, PR | May 2017
Minor in Biology | Undergraduate Research: Photodegradation of Organic Molecules Catalyzed by Quantum Dots

TECHNICAL PROFICIENCIES

Analytical Techniques: HPLC, GC-MS, FTIR, UV-Vis, NMR (1H, 13C, TopSpin), GPC, DLS
Organic Chemistry: small molecule synthesis, methacrylate and glycol systems, photopolymerization kinetics, functional group reactivity, degradation analysis.

Software: Minitab, JMP, MNovo, ChemDraw, ChemStation, Signals ELN, Microsoft Office Suite

Laboratory Operations: analytical method validation, EHS management, 5S implementation, scale-up support, technical report authorship.

Languages: Spanish (Native), English (Native)

PROFESSIONAL DEVELOPMENT & INVOLVEMENT

American Chemical Society (ACS) — Member since 2013

National Younger Chemists Committee, Communications Subcommittee (2023 – present)

- Manage competitive travel award and scholarship evaluation for early-career scientists and students, author award assessment criteria and review documentation.

National Committee on Minority Affairs, Programming Subcommittee (2026 – present)

- Coordinate symposia at national ACS meetings; develop programming supporting professional development for scientists from underrepresented backgrounds.

Division of Professional Relations — Newsletter Editor

- Compile and publish monthly division newsletter covering resources, advocacy, and programming for ACS membership.