

Eshani Hettiarachchi, Ph.D. (US Permanent Resident)

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STAFF RESEARCH SCIENTIST and LAB MANAGER at UC SAN DIEGO

SUMMARY

Ph.D. Analytical chemist with 10+ years of experience in method development, validation, and trace analysis across environmental, materials, and biologic systems. Demonstrated expertise in **high resolution mass spectrometry coupled with chromatography, spectroscopy, microscopy, materials characterization, and standardized methods** (USP/EP, e.g., Karl Fischer, EPA, ASTM). Proven ability **to leverage diverse analytical and computational tools to solve complex scientific problems**. Extensive experience in optimizing workflows, supporting R&D, and ensuring regulatory-compliant lab operations with zero safety incidents, and maximized research productivity.

CORE SKILLS

Leadership and Operations • Multi-user laboratory management • Safety compliance • SOP development • Budgeting & procurement • Vendor management • Personnel onboarding and training • Multi-Project leadership and management • Regulatory compliance (QA/QC, cGMP in progress)

Analytical & Technical Expertise

- **Mass spectrometry and chromatography**: High resolution mass spectrometry (**HRMS/MS**), ultra high-performance liquid chromatography (**U-HPLC-MS**), gas chromatography (**GC-MS**), Inductively coupled plasma mass spectrometry (**ICP-MS, ICP-OES**)
- **Advanced spectroscopy**: temperature controlled attenuated total reflection (**ATR**) & transmission-**FTIR**, **Raman**, **UV-vis**, Circular Dichroism (**CD**), Infrared reflectance absorption spectroscopy (**IRRAS**), photothermal infrared (**PTIR**) spectroscopy, atomic absorption spectroscopy (**AAS**)
- **Microscopy and materials characterization**: Scanning electron microscopy (**SEM-EDX**), transmission electron microscopy (**TEM**), Atomic force microscopy (**AFM-IR/FM**), X-ray diffraction analysis (**XRD**), Surface area analysis (**BET-SAA**), thermogravimetric analysis (**TGA**)
- **Computational tools**: Python, PHREEQC | Method development, troubleshooting, optimization
- **Classical and Compendial Methods**: Karl Fischer titration, TOC, pH, EPA, ASTM

Scientific & Business Impact • Proposal & grants development • Data-driven decision making • Mentorship and training • Communication and cross-functional scientific advising

EDUCATION

- **Ph.D. Chemistry** – New Mexico Tech, USA (2020)
- **B.Sc. Chemistry with double minors in Geology and Molecular Biology** – University of Peradeniya, Sri Lanka (2015)

EXPERIENCE

Staff Research Scientist and Lab Manager – UC San Diego (2023 – Present)

- Developed and optimized **HRMS/MS, U-HPLC-MS, FTIR**, and **AFM workflows**; integrated **Python scripts**, improving detection sensitivity of small organics (terpenes, alkaloids) and biomolecules (DNA, oligomers, and proteins).

- Developed and optimized **AFM-PTIR, O-PTIR Raman, and AFM-Force curve microscopy** workflows to mechanically and chemically characterize range of hard-materials for industry collaborators.
- Generated analytical datasets that **directly supported 3 grant renewals and new funding awards and 2 peer-reviewed publications and 2 project handoffs to junior scientists.**
- Supervised daily operations of **multi-user lab (15+ researchers)**, achieving **zero safety incidents** and sustaining UCSD Gold Green Lab certification.

Postdoctoral Scholar – UC San Diego (2020 – 2023)

- Designed and executed trace analysis of gas-surface interactions with **HRMS/MS, U-HPLC-MS, and FTIR** leading to **4 peer-reviewed publications** resulting in **2 successful grant renewals and 1 project handoff to junior scientists.**
- Authored SOPs that streamlined instrument training and **reduced onboarding time for new researchers significantly (over 50%).**
- Led EH&S compliance as Area Safety Coordinator, ensuring full adherence to UCSD standards and **reducing audit preparation time by almost 90%.**

Graduate Research and Teaching Assistant – New Mexico Tech (2016 – 2020)

- Conducted **ICP-MS, FTIR, SEM-EDX, TEM, and XRD** analysis to characterize dust, mineral, heavy metals, and metal organic frameworks (MOF) materials and their reactivity for environmental and CO₂ capture studies; integrated with **Python programs** for sensitivity analyses.
- Familiarity with following and adopting EPA and ASTM methods.
- Developed computational workflows (**PHREEQC**) to interpret geo-bio-chemical behavior in human body, improving predictive accuracy of lab-to-field results relating to human health implications.

Intern Chemist, Hemas Manufacturing, Sri Lanka (2014)

- Gained industrial chemistry experience in a manufacturing environment

CERTIFICATIONS:

- Lean and Six Sigma Black Belt Fundamentals – UC San Diego / PMI (2024)
- microMBA – Rady School of Management, UC San Diego (2024)
- Analytics Literacy for Business Professionals – UC San Diego (2023)

SELECTED AWARDS AND PUBLICATIONS

- ACS Geochemistry Division **Early Career Award** 2025
- Recipient of 12 additional research, teaching and leadership awards in the US
- 21 peer-reviewed research articles (**15 first-authored**)
- 18 scientific presentations at major conferences and seminars (often as oral or featured speaker)
- Recent highlight: **Hettiarachchi, E.; Grassian V. H.; pH-dependent surface interactions and structural changes for DNA adsorbed on TiO₂ particle surfaces have implications for environmental DNA – Cell Reports Physical Science, 2025.**
- **Google Scholar:** <https://scholar.google.com/citations?user=OEf40NQAAAAJ&hl=en&oi=ao>

LEADERSHIP & PROFESSIONAL SERVICE

Professional Service:

- Peer-reviewer for MDPI, AGU, EGU, RSC, ACS, and Elsevier journals. (2018 – Present)
- Science and technical writing advisor for multiple clients (2020 – Present)
- Co-Host, iScholar Dive podcast (2023 – Present)

Community Engagement:

- Outdoor volunteer, San Diego Ranger Districts (2025 – Present)
- Language mentor, UCSD English in Action (EIA) (2021 – Present)