

## 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 advanced instrumentation, method development, validation, and trace analysis across environmental, materials, and biologic systems. Demonstrated expertise in [high resolution mass spectrometry coupled with chromatography](#), [advanced 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)

#### 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, hyperspectral mapping, nanoindentation of nanoparticles and thin films, elastic modulus, Hamaker constant, Force modulation), X-ray diffraction analysis (XRD), Surface area analysis (BET-SAA), thermogravimetric analysis (TGA), Langmuir trough, Carbon capture with MOFs
- **Computational tools:** Python, PHREEQC | Method development, troubleshooting, optimization

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

#### EDUCATION

- **Postdoctoral Scholar** – UC San Diego, USA (2020 – 2023)
- **Ph.D. Chemistry** – New Mexico Tech, USA (2016 - 2020)
- **B.Sc. Chemistry with 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, e.g., Inter-molecular forces between nanomaterials, nanoindentation.

- Generated analytical datasets that **directly supported 3 grant renewals and new funding awards** and **3 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 CO<sub>2</sub> 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:**

- Essentials of Entrepreneurship, Innovation, and Design – UC San Diego Extension Studies (*In progress*, 2026)
- 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 (**16 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 TiO<sub>2</sub> 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 advising and chemistry consulting (2025 – Present)
- Co-Host, iScholar Dive podcast (2023 – Present)

##### **Community Engagement:**

- Language mentor, UCSD English in Action (EIA) (2021 – Present)