Abraham Gabriel, PhD

R&D Scientist · Electrochemical Sensors · Microfabrication · Assay Development

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SUMMARY

Hands-on R&D scientist with 6+ years developing microfabricated electrochemical devices, functional surface interfaces and validated assays. Takes sensors from wafer-level fabrication through surface functionalisation and test-plan execution to validation against reference methods in real samples. Co-inventor on a published US patent application; 7 peer-reviewed papers.

CORE COMPETENCIES

Microfabrication: photolithography, magnetron sputtering, PECVD (SiN), RIE, wet etching, profilometry, microscopy, 48-cell wafer-level layouts, chip packaging, integrated Ag/AgCl references.
Surface & assay engineering: SAMs, thiol and EDC/NHS chemistry, antibody/enzyme/DNA immobilisation, chitosan and Nafion coatings, ion-selective membranes, immunoassays, ELISA comparison.
Test & validation: EIS, CV, chronoamperometry, potentiometry, DPV; calibration, LOD/LOQ, selectivity, interference, drift, stability, device-to-device variability, matrix effects.
Fluidics & integration: PDMS moulding, syringe-pump flow, epoxy framing, multichannel instrumentation (PalmSens MUX8, BioLogic SP-300).
Execution: structured troubleshooting, protocol standardisation, technical reports, IP documentation, mentoring, partner collaboration.

EXPERIENCE

Postdoctoral Researcher, Biosensor & Device Development Jan 2026 – present
ARO–Volcani Institute, Bioelectronics & Electrochemistry Laboratory, Israel

- Lead lactate and TMAO assay development for a multiplexed electrochemical chip for candidate urinary markers of cancer-immunotherapy response (project with Sheba Medical Center); define experimental priorities and mentor MSc, PhD and undergraduate researchers.
- Engineer enzyme, DNA and ion-selective interfaces on thin-film gold; iterate designs to improve signal quality, consistency and manufacturability.
- Run structured test programs and root-cause studies separating material, interface, process, instrument and sample-matrix effects.
- Contributed to adhesive screening and membrane-casting standardisation for a 48-cell ion-selective chip, supporting process repeatability.

PhD Researcher, Microfabricated Electrochemical Devices Mar 2019 – Sep 2025
Hebrew University of Jerusalem / ARO–Volcani Institute, Israel

- Designed and cleanroom-fabricated silicon-based microelectrode chips and multiplexed biochips on wafer-scale layouts.
- Developed two immunosensing methods on the same chip design: label-free EIS (LOD 3 ng/L, five-log range, under 10 min) and enzyme-assisted amperometry (LOD 0.066 µg/L, ~20 min).
- Evaluated both in treated-wastewater samples with Israel's National Water Company (Mekorot), in agreement with ELISA.
- Outputs: 3 first-author papers and a published US patent application (US 2025/0264433 A1).

EDUCATION

PhD, Soil and Water Sciences (electrochemical biosensors), Hebrew University of Jerusalem 2025
MSc, Environmental Quality Sciences, Hebrew University of Jerusalem 2019
BTech, Crop and Environmental Protection, LAUTECH, Nigeria (First Class Honours) 2015

SELECTED OUTPUTS

- 7 peer-reviewed papers, incl. *ACS ES&T Water* (2025), *J. Electrochem. Soc.* (2025), *Sens. Actuators B* (2021, 2023), *ACS Meas. Sci. Au* (2026). Full list at research.abrahamgabriel.com.
- Patent application PCT/IL2021/051409; US 2025/0264433 A1: integrated multi-method electrochemical biosensor.
- Oral talks at ECS meetings (2021, 2023); peer reviewer for three analytical journals.

Languages: English (C1), Yoruba (native). Nationality: Nigerian. References on request.