Kaylyn K. Leung, PhD

Electrochemical Biosensor Scientist and Engineer

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Scientist and engineer with a PhD in chemistry and over a decade of experience developing electrochemical aptamer-based biosensors, from DNA surface chemistry and sensor design through in vivo and pre-clinical validation. Self-taught in programming and data architecture; I build the data pipelines and analysis tools that turn raw electrochemical signals into reliable, decision-ready results.

Expertise and skills

Sensors	Electrochemical aptamer-based (E-AB) sensors, electrochemistry including square-wave voltammetry and impedance spectroscopy, DNA self-assembled monolayers on gold, fluorescence microscopy
Pre-clinical	Rodent studies under GLP, human safety trials, in vivo sensor validation
Data	Python (pandas, NumPy, Matplotlib), MATLAB, statistics, data pipeline and data model design

Employment

2025 to present — **Senior Electrochemical Engineer**, stealth-stage wearable biosensor startup, San Diego, CA

- Lead project planning for the team: set priorities, timelines and experiment plans
- Design and maintain the team-wide data architecture and pipelines; data from 100+ sensors processed in minutes
- Mentor junior teammates in sensor testing and data analysis
- Optimize and characterize electrochemical sensors, and translate lab prototypes into device-ready designs

2023 to 2025 — **Senior R&D Scientist**, Nutromics Inc., San Diego, CA

- Spearheaded development of a novel analyte-detection assay
- Supported pre-clinical validation studies under GLP, including rodent studies, and human safety trials
- Audited data workflows to ensure reliability and efficiency of data processing

2019 to 2022 — **Postdoctoral Researcher**, Center for Bioengineering, University of California, Santa Barbara

- Built data-analysis tools that cut processing time from hours to minutes, focusing on accuracy and compliance
- Identified the mechanisms of E-AB sensor signal drift and reduced in vivo drift using xenonucleic acids
- Optimized sensor geometry for constrained in vivo placements
- Led pre-clinical validation of biosensors, including rodent studies
- Supervised students, including an undergraduate who published a first-author paper

Education

2013 to 2019 — **PhD, Chemistry**, University of British Columbia, Vancouver, Canada

2009 to 2013 — **BSc, Honours Chemistry**, University of British Columbia, Vancouver, Canada

Patents

Published 2026 **Sensor Having an Extended Dynamic Range**
European Patent Application EP 4 812 765 A1, published September 30, 2026. U.S. and Chinese applications filed.
The Regents of the University of California and Nutromics. Inventors: Batchelor, Hodges, Gerson, Leung, Kippin, Plaxco

Published 2026 **Improved Methods of Interrogating an Electrochemical Sensor**
U.S. Patent Application filed April 8, 2024, published August 13, 2026 (priority to U.S. 63/496,257, filed April 14, 2023).
The Regents of the University of California. Inventors: Roehrich, Leung, Plaxco, Sepunaru, Gerson, Kippin, Kolkman, Emmons

Published 2026 **Electrochemical Temperature Measurement Using Redox-Active Polymers**
International Patent Application WO 2026/076489 A1, published April 16, 2026 (priority to U.S. 63/705,358, filed October 9, 2024).
The Regents of the University of California and Nutromics. Inventors: Gerson, Leung, Plaxco, Kippin, Hodges, Batchelor

Filed 2024 **Electrochemical Sensor Having Reduced Signal Loss**
International (PCT) Patent Application filed 2024 (priority to U.S. 63/506,560, filed June 6, 2023).
The Regents of the University of California. Inventors: Leung, Gerson, Emmons, Plaxco, Kippin

Pending **Improved Sensor Interrogation Method**
International (PCT) Patent Application pending.
The Regents of the University of California and Nutromics. Inventors: Verrinder, Gerson, Leung, Kippin, Plaxco, Hodges, Goncales

Selected publications

7 first-author and 8 co-authored papers; full list at kaylynleung.com/science

Leung, K. K.; Gerson, J.; Emmons, N.; Heemstra, J. M.; Kippin, T. E.; Plaxco, K. W. The use of xenonucleic acids significantly reduces the in vivo drift of electrochemical aptamer-based sensors. *Angewandte Chemie*, 2024, 63 (21), e202316678.

Leung, K. K.; Gerson, J.; Emmons, N.; Roehrich, B.; Verrinder, E.; Fetter, L.; Kippin, T. E.; Plaxco, K. W. A tight squeeze: geometric effects on the performance of three-electrode electrochemical aptamer-based sensors in constrained, in vivo placements. *Analyst*, 2023, 148, 1562–1569.

Leung, K. K.; Downs, A. M.; Ortega, G.; Kurnik, M.; Plaxco, K. W. Elucidating the mechanisms underlying the signal drift of electrochemical aptamer-based sensors in whole blood. *ACS Sensors*, 2021, 6, 3340–3347.

Leung, K. K.; Yu, H.-Z.; Bizzotto, D. Electrodepositing DNA self-assembled monolayers on Au: detailing the influence of electrical potential perturbation and surface crystallography. *ACS Sensors*, 2019, 4 (2), 513–520.

Leung, K. K.; Gaxiola, A. D.; Yu, H.-Z.; Bizzotto, D. Tailoring the DNA SAM surface density on different surface crystallographic features using potential assisted thiol exchange. *Electrochimica Acta*, 2018, 261, 188–197.

Selected scholarships and awards

2020 to 2021 Otis Williams Postdoctoral Fellowship in Bioengineering

2014 Dr. F. J. Nicolson Scholarship

2010 to 2013 UBC Dean's Honour List