Pleasanton, CA
559.797.1269
aspatterson@gmail.com
adrianapattersonip.com
adrianaip
@aspatterson
adrianapip

Adriana Patterson Ip

Curriculum Vitae

Applied biochemist with interdisciplinary training in molecular biology, microbiology, and computational biology. Interests include nucleic acid-based molecular diagnostics, infectious disease, and digital health applications.

Education

2007-2012 **Ph.D., Biomolecular Science and Engineering with Biochemistry and Molecular Biology Emphasis**, *University of California, Santa Barbara*.
Advisor: Kevin Plaxco, Ph.D.

2006 **M.S., Microbiology and Immunology**, *Georgetown University*.
Advisor: John Casey, Ph.D.

2005 **B.S., Biology with Biotechnology Emphasis**, *George Mason University*.
Mentor: Carol Litchfield, Ph.D.

Professional/Research Experience

2014–present **Biotechnology Consultant**, *Dranalytics, Inc.*

- Founded a biotechnology consultancy offering data analysis services to early-phase startups developing point-of-care molecular diagnostics;
- Performed sequence analyses on large datasets using: *pandas*, Jupyter Notebook, Biopython, NCBI's suite of tools (Genome Workbench, sra-toolkit, etc.);
- Developed primer design workflows for conventional/isothermal amplifications, including helicase-dependent amplification and loop-mediated isothermal amplification.

2007–2012 **Doctoral Researcher**, *University of California, Santa Barbara*.

- Built an integrated microfluidic chip housing electrochemical biosensors and loop-mediated isothermal amplification that detects *Salmonella* in blood;
- Led a project with Novartis Diagnostics scientists and Planned Parenthood clinicians to design/build a quantitative biosensor that detects antibodies in HIV-infected human serum;

- Developed a biosensor based on DNA-triplex formation that can detect HIV.

2006–2007 **Research Associate**, *University of California, Santa Barbara.*

- Supported identification of breast cancer receptors from mammalian tissues using flow cytometry and surface plasmon resonance;
- Led instruction for the FACS Aria and BiaCore instruments at the Chemical Engineering Department's Flow Cytometry Core;
- Assisted graduate researchers with mammalian cell culture, Western blotting, cryostat usage, and molecular cloning.

2005–2006 **Graduate Researcher**, *Georgetown University.*

- Performed research related to the unique genome editing properties of the hepatitis delta virus.

2004–2005 **Laboratory Technician**, *George Mason University.*

- Assisted the development of laboratory exercises related to: lysozyme analysis, leukocyte differentials, Widal tests, Mono-Latex tests, particle agglutination with Treponema pallidum antibodies, Ouchterlony, radial immunodiffusion, Serum Protein Electrophoresis, Immunoelectrophoresis, ELISA, SDS-PAGE, and Western Blot Analysis;
- Prepared various buffers and media for student experiments.

2003–2005 **Undergraduate Researcher**, *George Mason University.*

- Analyzed halophilic bacteria from Shark Bay, Australia
- Assisted graduate researchers with Gram staining, thin layer chromatography, lipid extraction, and identification with Biolog chromogenic plates;
- Performed statistical and differential analyses using the Multi-Variate Statistical Package

Programming Experience

Languages Python

Miscellaneous Git/Github, Django, Linux Operating Systems, HTML, CSS

Publications and Talks

Peer-Reviewed Articles

A. Yang, K. Hsieh, **A. Patterson**, B. Ferguson, M. Eisenstein, K. Plaxco, H. Soh. "Accurate zygote-specific discrimination of single-nucleotide polymorphisms using microfluidic electrochemical DNA melting curves." Angewandte Chemie International Edition, Vol. 53 (12), pages 3163-7, (2014)

A. Patterson. K. Hsieh, H. Soh, K. Plaxco. "Electrochemical real-time nucleic acid amplification: towards point-of-care quantification of pathogens." Trends in Biotechnology, Vol. 31 (12), pages 704-12, (2013)

A. Patterson, B. Ferguson, H. Soh, K. Plaxco. "Microfluidic and chip-based detection and intraspecies strain discrimination of Salmonella serovars derived from whole blood of septic mice." Applied and Environmental Microbiology, Vol. 79 (7), pages 2302-11, (2013)

K. Hsieh*, **A. Patterson***, B.S. Ferguson, K. Plaxco, H. Soh. "Rapid, sensitive, and quantitative detection of pathogenic DNA at the point of care through microfluidic electrochemical quantitative loop-mediated isothermal amplification." Angewandte Chemie International Edition, Vol. 51 (20), pages 4896-900, (2012) *Co-first authored study

R. White, H. Kellewaard, W. Hsieh, **A. Patterson**, J. Kasehagen, T. Uzawa, K. Cash, H. Soh, K. Plaxco. "Wash-free, electrochemical platform for the quantitative multiplexed detection of specific antibodies." Analytical Chemistry, Vol. 84 (2), pages 1098-103, 2012.

X. Zuo, F. Xia, A. Patterson, H. Soh, Y. Xiao, K. Plaxco. "Two-Step telomerase detection by using exonuclease III-aided target recycling." ChemBioChem, Vol. 12 (18). Pages 2745-7, (2011)

A. Patterson, F. Caprio, A. Vallee-Belisle, D. Moscone, K. Plaxco, G. Palleschi, F. Ricci. "Using triplex-forming oligonucleotide probes for the reagentless, electrochemical detection of double-stranded DNA." Analytical Chemistry, Vol. 82 (21), pages 9109-15, (2010)

F. Xia, R. White, X. Zuo, **A. Patterson**, Y. Xiao, D. Kang, X. Gong, K. Plaxco, and A. Heeger. "An electrochemical supersandwich assay for sensitive and selective DNA detection in complex matrices." Journal of the American Chemical Society, Vol. 132 (41), pages 14346-8, 2010.

Doctoral Dissertation

June 2012. Electrochemical Detection of Infection. University of California, Santa Barbara, Santa Barbara, CA

Conference Talks

Electrochemical Detection of Infection. Novartis Diagnostics and Vaccines Annual Conference, Sonoma, CA. August 2011.

Posters

Rapid, On-chip Electrochemical Detection of Salmonella. University of California Bioengineering Symposium, Santa Barbara, CA. June 2011.

Rapid, On-chip Electrochemical Detection of Salmonella. American Society for Microbiology, Biodefense and Emerging Pathogens, Washington, DC. February 2011.

Rapid, On-chip Electrochemical Detection of Salmonella. American Society for Microbiology, Biodefense and Emerging Pathogens, Washington, DC. February 2011.

Electrochemical Detection of Pathogen DNA. Gordon Research Conference - Electrochemistry, Ventura, CA. January 2010.

Better Living Through Biosensors. Bioengineering Insights, Santa Barbara, CA. January 2009.

Awards and Honors

2011 University of California Graduate Opportunity Fellowship

2011 American Society for Microbiology Student Fellow Travel Grant Recipient

2010 University of California Graduate Opportunity Fellowship

2010 University of California Science and Engineering Grant

Outreach and Teaching

2011 Research Experience for Teachers (RET), University of California, Santa Barbara

2011 Graduate Research Lab Tours, University of California, Santa Barbara

2009 Graduate Teaching Assistant - CHEM125L:Lab Techniques in Biochemistry, University of California, Santa Barbara

2007-2008 Private Tutor, Santa Barbara Tutoring, Biology, Environmental Science, Geometry

2007 Graduate Teaching Assistant - MCDB1AL:Biology Laboratory, University of California, Santa Barbara

2007 Undergraduate Teaching Assistant - BIOL452:Immunology, George Mason University