ELIZABETH PUMFORD, PHD

PRINCIPAL SCIENTIST | BIOENGINEER

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CAREER SUMMARY

Principal Scientist with 10+ years of experience in diagnostic and assay development, biomaterials, and translational R&D for human and veterinary applications. Proven leader in building compliant laboratories, directing interdisciplinary research, and advancing non-invasive diagnostic devices from concept through validation.

EDUCATION

PhD, Bioengineering | UCLA — *Emphasis: **Diagnostics** & **Wound Care***

MS, Biomedical Engineering | University of Utah — *Emphasis: Diagnostics & **Biomaterials***

BS, Biomedical Engineering | University of Utah — *Emphasis: **Biomaterials**; Minor: Chemistry*

SKILLS

CORE SKILLS	Initiative | Adaptability | Interdisciplinary Communication | Problem Solving
LEADERSHIP	Project Management (ASQ CSSGB) | Program Leadership | Cross-functional Collaboration | Stakeholder Engagement | Technical Writing | Scientific Communication
REGULATORY	Design Control | Risk Management | IRB Submissions | FDA & OSHA Compliance | ISO Documentation (10993)
SCIENTIFIC & TECHNICAL	Diagnostics & Assay Development | Point-of-Care Technologies | Biomaterials | Hydrogels | Microfluidics | Drug Delivery | Protein & Polymer Chemistry | Blood & Tissue Phantoms | Nanoparticles | Optics | FEM/COMSOL | Python | Experimental Design & Data Analysis

WORK EXPERIENCE

Principal Scientist, *In Vitro* Research | Octavian Solutions — 2024- Present

- Direct laboratory-based R&D for non-invasive optical diagnostics, driving *in vitro* programs from feasibility through validation; oversee experimental design, data analysis, and regulatory submissions to support clinical and commercial milestones
- Built and launched a fully operational research laboratory, including infrastructure planning, vendor selection, equipment procurement (>$200,000 capital spend), and SOP development
- Manage laboratory operations including budgeting (annual budget: $100,000), resource allocation, timelines, and training of scientists
- Developed and implemented company-wide OSHA- and FDA-aligned safety and compliance programs

Research Assistant | UCLA, *Department of Bioengineering* — 2019- 2024

- Led interdisciplinary research programs focused on hydrogel wound dressings with controlled drug delivery for human and veterinary applications
- Supported and consulted on large-animal (sheep) surgical studies, contributing to biocompatibility, safety and performance evaluation, and translational readiness
- Designed and developed a drug-releasing stent for black rhinoceros, participating in surgical implantation and validation in collaboration with Brookfield Zoo

- Engineered a low-cost, paper-based HIV-1 point-of-care diagnostic
- Designed and synthesized biodegradable, plant-based plastic alternatives, reducing net CO_2 emissions by ~60% compared to conventional plastic
- Managed laboratory operations and mentored 12+ undergraduate and intern researchers, resulting in 20+ publications and conference presentations.

Outreach Coordinator | SERVES—*East Los Angeles Community College* 2021- 2024
- Designed and managed federally funded outreach program to improve Veteran retention in STEM disciplines
- Developed 5-week internship curriculum and provided hands-on mentorship to 10 participants annually

Parasitology Intern | Zoetis, *Veterinary Medical R&D* Summer 2022
- Developed, optimized, and validated quantitative diagnostic assays within regulated R&D environment
- Generated reproducible assay performance data, with assay incorporated into drug-development pipeline to support internal decision-making

Course Facilitator | UCLA, *Course: "Targeted Drug Delivery"* 2020- 2022
- Facilitated graduate-level instruction on drug delivery systems, pharmacokinetics, and pharmacodynamics
- Applied mathematical modeling and differential equations to controlled drug release and system optimization
- Instructed students on literature analysis, grant writing, and FDA regulations (21 CFR Parts 210 and 211)

Research Assistant | University of Utah, *Department of Biomedical Engineering* 2016-2019
- Conducted and analyzed preclinical biocompatibility studies, in compliance with ISO 10993-4 standards, to quantify catheter and stent stenosis due to platelet activation
- Authored regulatory and quality documentation aligned with translational and clinical research needs
- Managed laboratory operations, trained new personnel, and contributed to successful grant proposals totaling $25,000 in funding

Ambassador | University of Utah, *College of Engineering* 2016-2018
- Supported departmental communication initiatives and cross-departmental collaboration efforts
- Independently established textbook share for equitable access to course resources

Research Assistant | University of Cambridge, *Department of Chemical Engineering* Summer 2016
- Collaborated on design and commercialization of a point-of-care diagnostic test for leptospirosis
- Supported protocol compliance, technology transfer, and inter-laboratory validation studies
- Technology advanced to commercial production

Outreach Instructor | SciTrek, *UC Santa Barbara* 2013-2014
- Designed and delivered hands-on science modules focused on soil retention and experimental design
- Supervised and mentored a team of 7 students conducting independent experiments

VOLUNTEER EXPERIENCE

Wildlife Husbandry Specialist | Loveland Living Planet Aquarium & WLC Sanctuary 2022 - Present
- Provide daily care, enrichment, and habitat maintenance for exotic species, including:
  - Leopards, porcupines, otters, sloths, penguins, foxes, tortoises, giraffes, groundhogs, ostriches, etc.
- Monitor animal behavior and health, reporting concerns to veterinary staff