

# Katherine Amberg-Johnson | Molecular and Cellular Biologist | Data Scientist

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## EDUCATION

### Stanford University

Ph.D. in Microbiology and Immunology  
August 2018

### University of California, Berkeley

B.S. in Microbial Biology, with honors  
May 2013

## RESEARCH EXPERIENCE

### Inzen Therapeutics

Scientist

September 2018- present  
New York, NY

- Assay Development:
  - Developed complex cell-culture systems to screen for cell stressors that induce liver cells to secrete molecules that regulate **inflammation, fibrosis, and compensatory proliferation**.
  - Optimized a cell-culture system to model the pathological inflammation of **Non-Alcoholic Steatohepatitis (NASH)** livers.
- Target Identification and Validation:
  - Employed **chemical biology tools** to uncover underlying molecular signaling that leads to the release of pro-inflammatory cytokines in a cell-culture model of NASH.
  - **Identified the specific pro-inflammatory mediator** required for monocyte activation in a cell-culture model of NASH by leveraging RNA sequencing data to identify candidate factors and validating candidates using specific inhibitors and antibody neutralization.
  - Performed **siRNA screens** to discover novel mediators of lung fibrosis.
  - Generated stable knockout cell lines using **CRISPR/Cas9 genome editing** to validate candidate drug targets in cancer mouse models.
- Computational Analysis:
  - Developed **four distinct analysis pipelines** using Python to elect candidate active molecules by integrating proteomics datasets with biochemical activity data.
  - Evaluated the accuracy of our computational analysis pipelines using **statistical resampling methods** (bootstrapping).
- External *In Vivo* Collaborations:
  - Led a collaboration with a contract research organization (CRO) to study mouse serum proteins released in various **mouse models of acute liver failure**.
  - Led a collaboration with a CRO to study the growth of tumor cells with knockouts in candidate drug targets in a **mouse model of B-cell lymphoma**.
- Extracurricular:
  - Helped team transition to an **electronic notebook platform** for documenting experiments and sample tracking.
  - Led a committee to organize **team events, community outreach, and journal club**.

### Stanford University, Advisor: Ellen Yeh

Bio-X Fellow Ph.D. Student, Departments of Microbiology & Biochemistry

Sept 2013-August 2018

Palo Alto, CA

- Chemical and Cell Biology:
  - Pioneered a **phenotypic drug-screening pipeline** involving FACs-based conditional dose-dependent drug assays, qPCR, and microscopy to identify and characterize novel antimalarial compounds targeting apicoplast biogenesis.
  - Optimized a **fluorescence drug-screening assay** involving an automated microplate-reader to quantify dose-dependent cell-death kinetics in *T. gondii*.

- Utilized **CRISPR/Cas9 genome editing** to validate drug targets in *P. falciparum* and *T. gondii*.
- Computational Analysis:
  - Analyzed **whole-genome sequencing data** using Python to identify anti-parasitic drug targets from multiple independently selected resistant *T. gondii* strains.
  - Developed a Python-based platform for **automatic queries** of the parasite online databases.
- Collaborations:
  - Coordinated collaboration with enzymologists at MIT to establish **high-throughput *in vitro* drug assays** for inhibition of enzymatic activity.
  - Pioneered and optimized **live video microscopy** experiments of *T. gondii* to study defects in division in collaboration with *T. gondii* geneticists.
- Leadership and Teaching:
  - Directly **mentored three 1<sup>st</sup> year Ph.D. students and one undergraduate researcher** on diverse projects including synthetic biology, super-resolution microscopy, protein immunoprecipitation, and gene expression profiling.
  - Provided both **instrument training and technical support for 70+ flow cytometry users**. Aided users with experimental design and data analysis.
  - Taught ***Techniques in Biotechnology*** and ***Innate Immunology*** to graduate students.

## Insight Data Science

Fellow

January 2018-April 2018

New York City, NY

Summary: [www.kambergjohnson.com/projects/beach-water-contamination](http://www.kambergjohnson.com/projects/beach-water-contamination)

- Developed *Contamination in Paradise*—a **python-based model** to predict bacterial contamination in Hawaiian beach water that could lessen the workload of the Hawaii Department of Health by 1/3<sup>rd</sup>.
- Implemented a boosted decision tree **machine-learning algorithm** including features engineered from time-series weather data to predict contamination events from severely imbalanced historical contamination data.
- Communicated a **dashboard visualization** of time series bacterial contamination using Tableau.
- **Identified possible subtypes** of contamination events for further analysis.

University of California, Berkeley, Advisor: David Wemmer

July 2010-May 2013

Undergraduate Researcher

Berkeley, CA

- Performed **NMR spectroscopy** and **optical tweezers** experiments to understand the structure and function of the bacterial transcriptional regulatory factor,  $\sigma^{54}$ .

## SKILLS

**Programming Languages:** Python, SQL

**Tools:** Pandas, Scikit-Learn, Matplotlib, BeautifulSoup, Illustrator, PyMOL, GraphPad Prism, Tableau

**Wet Lab:** Mammalian cell culture-cell lines and primary cells, ELISA, antibody neutralization, siRNA screening, Lentivirus transfections, Drug screening/characterization, SAR analysis, Western blotting, SDS-PAGE, Electroporation transfection, microplate-based assays, FACs cell sorting and analysis, Microscopy-live and fix immunofluorescence, CRISPR/Cas9 genome editing-knockouts and knock-ins, Molecular cloning—digest and recombination, PCR, qPCR, dPCR, Protein expression and purification

## PUBLICATIONS

- Tang, Y., Meister, T.R., Walczak, M., Pulkoski-Gross, M., Hari, S.B., Sauer, R.T., **Amberg-Johnson, K.**, Yeh, E. A mutagenesis screen for essential plastid biogenesis genes in human malaria parasites. *Plos Biol.* (2019)

- **Amberg-Johnson, K.** Yeh, E. Host cell metabolism contributes to delayed-death kinetics of apicoplast inhibitors in *Toxoplasma gondii*. *Antimicrobial Agents and Chemotherapy*. (2018).
- Foe, IT., Onguka, O., **Amberg-Johnson, K.**, Garner, R., Amara, N., Beatty, W., Yeh, E., Bogyo, M. The *Toxoplasma gondii* Active Serine Hydrolase 4 regulates parasite division and intravacuolar parasite architecture. *mSphere*. (2018).
- **Amberg-Johnson, K.**, Hari, S.B., Ganesan, S.M., Lorenzi, H.A., Sauer, R.T., Niles, J.C., Yeh, E. Small molecule inhibition of apicomplexan FtsH1 disrupts plastid biogenesis in human pathogens. *eLife*. (2017).

## AWARDS AND HONORS

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2019	Inzen Values Award for Passion
2018	Insight Data Science Fellowship
2016-2019	Bio-X Stanford Interdisciplinary Graduate Fellowship (Stanford University)
2016	Two-Photon and Super-Resolution Microscopy Pilot Grant (Stanford University)
2015, 2016	Biosciences Office of Graduate Education Travel Grant (Stanford University)
2013-2016	Cellular and Molecular Biology Training Grant (Stanford University)
2012	Amgen Scholars Program (UC Berkeley)
2012-2013	Barry Goldwater Scholarship (UC Berkeley)
2011	Science Undergraduate Laboratory Internship (LBNL)
2009-2010	Leadership Award (UC Berkeley)

## PRESENTATIONS

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2018	Stanford University Thesis Presentation (Oral Presentation, Stanford)
2017	Toxo-14 Meeting (Oral Presentation, Portugal)
2017	Bay Area Microbial Pathogenesis (Oral Presentation, UCSF)
2016	Biochemistry Postdoc Seminar (Oral Presentation, Stanford)
2016	Microbiology and Immunology Retreat Seminar (Oral Presentation, Stanford)
2015, 2016	Molecular Parasitology Meeting (Poster Presentation, Woods Hole)
2015	Bay Area Meeting on Organelle Biology (Oral Presentation, UCSF)
2013	Undergraduate Honors Thesis Research Symposium. (Oral Presentation, UC Berkeley)
2012	Amgen Symposium (Oral Presentation, UC Berkeley)

## EXTRACURRICULAR

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<b>American Museum of Natural History</b>	May 2019-present
<i>Discovery Room Volunteer</i>	New York, NY
<ul style="list-style-type: none"> <li>• Facilitate <b>hands-on-science learning</b> for children of all ages. Activities include scavenger hunts for animal specimen, assembling a life-size cast skeleton of a Triassic crocodile, exploring microbial diversity through microscopy of pond scum, and tracking real-time earthquakes with a digital seismographic display.</li> </ul>	
<b>Hume Center for Writing and Speaking</b>	January 2017-August 2018
<i>Oral Communications Tutor</i>	Palo Alto, CA
<ul style="list-style-type: none"> <li>• Fostered <b>supportive communication</b> through one-on-one mentoring to students at all stages of the oral presentation process (presenting a diversity of subjects including math, liberal arts, and science).</li> </ul>	