Ashir A. Borah

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PhD candidate at UCSF and the Arc Institute. I build CRISPR-based screening systems and AI-enabled research tooling at the intersection of functional genomics, virology, and computational biology — pairing experimental and computational methods to study gene regulation, host–virus biology, and disease.

Experience

Arc Institute — PhD Researcher (joint with UCSF) Jun 2023 – Present
Functional genomics, virology, and AI-enabled scientific tooling *Palo Alto, CA*

- Design CRISPR-based screening systems and Perturb-seq workflows for gene regulation, host–virus biology, and disease mechanisms.
- Build LLM-based research agents, multi-agent workflows, and APIs for literature synthesis, hypothesis generation, and experimental planning.
- Mentor UCSF PhD rotation students (BMI & Tetrad programs); led UCSF R Bootcamp 2022–2024 — trained 250+ postdocs, clinicians, and students.

Broad Institute of MIT and Harvard — Computational Associate I & II Jul 2019 – Apr 2022
Cancer Dependency Map (DepMap), Cancer Data Science *Cambridge, MA*

- Validated cancer therapeutic targets from genome-scale CRISPR knockout screens; led GI-cancer target discovery.
- Contributed to open-source ML platform modeling knockout dependency profiles across >100,000 genomic features.
- Co-authored publications in *Nature*, *Cell*, *Cancer Discovery*, *Cell Systems*, and *Genome Biology*; received Spot Award ×2 for going above and beyond.

Education

University of California, San Francisco Sep 2022 – Present
Ph.D. Candidate, Biological and Medical Informatics — Advisors: Luke Gilbert (Arc), Brian Hie (Stanford/Arc) *San Francisco, CA*
M.S., Biological and Medical Informatics awarded Jun 2024 en route to Ph.D. (advisor: Luke Gilbert).

Dickinson College Aug 2015 – May 2019
B.S. Mathematics & Computer Science — Magna Cum Laude, Phi Beta Kappa — GPA 3.89/4.00 *Carlisle, PA*

Selected Publications

Borck P.C., . . . , **A.A. Borah**, *et al.* **SKI complex loss renders 9p21.3-deleted or MSI-H cancers dependent on PELO.** *Nature* (2025). doi:10.1038/s41586-024-08509-3

Goudy L., Ha A., **A.A. Borah**, *et al.* **Integrated epigenetic and genetic programming of primary human T cells.** *Nature Biotechnology* (2025). doi:10.1038/s41587-025-02856-w

Khoroshkin M., . . . , **A.A. Borah**, *et al.* **A systematic search for RNA structural switches across the human transcriptome.** *Nature Methods* (2024). doi:10.1038/s41592-024-02335-1

Raghavan S., . . . , **A.A. Borah**, *et al.* **Microenvironment drives cell state, plasticity, and drug response in pancreatic cancer.** *Cell* (2021). doi:10.1016/j.cell.2021.11.017

van Wietmarschen N., . . . , **A.A. Borah**, *et al.* **Repeat expansions confer WRN dependence in microsatellite-unstable cancers.** *Nature* (2020). doi:10.1038/s41586-020-2769-8

Full list (13 peer-reviewed + 1 preprint + 8 conference abstracts): Google Scholar.

Skills

Functional genomics: CRISPR screens (knockout / interference / activation), Perturb-seq, scRNA-seq, viral vector design, mammalian cell culture, cloning.

Single-cell & ML: Scanpy, Seurat, Cell Ranger, scVI, rapids-singlecell (GPU), MAGeCK, PyTorch, JAX. Foundation models for DNA / RNA / protein.

AI tooling: LLM agents, multi-agent workflows, retrieval-augmented systems, LangChain, DSPy, scientific APIs, prompt engineering.

Programming: Python, R. — **Languages:** English (native), Hindi (professional), Assamese (conversational).

Selected Honors

Spot Award (×2), Broad Institute (2020, 2021) — Phi Beta Kappa (2019) — Best Poster, Dickinson Science Symposium (2019) — Richard Howland Memorial Scholarship — sole CS recipient (2018) — Torchbearer Award, Bhumi — 6 of 8,000 volunteers (2015).