Ashir Borah

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EDUCATION

Dickinson College, Carlisle, PA
Bachelor of Science, Mathematics and Computer Science, *Magna Cum Laude,* Phi Beta Kappa
GPA: 3.89/4.00, Major GPA: 3.90/4.00
Senior Research: *Computational Analysis of Phorbol 12-myristate 13-acetate (PMA) perturbation on Human Leukemia*

RESEARCH EXPERIENCE

Computational Associate II, Broad Institute of MIT and Harvard 2021 - Present
Computational Associate I, Broad Institute of MIT and Harvard 2019 - 2021
Cancer Data Science, Dependency Map Project, Cancer Program
Advisor: James McFarland

- Lead the computational effort to validate therapeutic genetic targets and find their biomarkers
- Develop innovative strategies for discovering new targets from genome-scale screens
- Contributed to an open-source machine learning platform that models genetic knockout dependency profiles from more than 100,000 genomic features
- Modeled the latent variables from genome-scale CRISPR-Cas9 screens to discover a new Integrator interaction
- Assisted in analyzing the use of RNAi and CRISPR screens as complementary data modalities

This work has resulted in two publications: one in *Nature* and one in *Cell*, and two manuscripts are in revision: *Cell Systems* and *Cancer Discovery*.

Computational Research Assistant, Dickinson College 2018 - 2019
Biochemistry and Molecular Biology
Advisor: Michael Roberts
Topic: *Computational Analysis of Phorbol 12-myristate 13-acetate (PMA) perturbation on Human Leukemia*

- Processed genomic data CRISPR knockout and overexpression experiments on HL-60 Leukemia cancer cell lines
- Found differentially expressed genes from a compound perturbation that induced differentiation
- Awarded The Best Poster award in All College Science Symposium

Presented our findings at the 2020 American Association for Cancer Research conference (AACR), and several students have followed up on the other targets in the subsequent years.

HONORS & AWARDS

- Spot Award (2), Broad Institute: Awarded for going above and beyond 2020, 2021
- Phi Beta Kappa Honor Society 2019
- *Best Poster* Award, All College Science Symposium 2019
- Biology Department Summer Research Grant; Dickinson College 2018
- Dana Research Assistantship 2018
- Pi Mu Epsilon: Mathematics National Honor Society 2018
- Upsilon Pi Epsilon: Computer Science National Honor Society 2018
- The Richard Howland Memorial Scholarship: Awarded to one student for excellence in Computer Science 2018
- Jane Hill Prize in Computer Science: Awarded to one first-year who excels in computer science 2016

PUBLICATIONS

Accepted

Raghavan, S., Winter, P.S., Navia, A.W., Williams, H.L., DenAdel, A., Kalekar, R.L., Galvez-Reyes, J., Lowder, K.E., Mulugeta, N., Raghavan, M.S., **Borah, A.A.**, Kapner, K.S., ..., Wolpin, B.M., Hahn, W.C., Aguirre A.J., Shalek, A.K. **The tumor microenvironment drives transcriptional phenotypes and their plasticity in metastatic pancreatic cancer.** Accepted in principle at *Cell* (2021).

van Wietmarschen, N., Sridharan, S., Nathan, W.J., Tubbs, A., Chan, E.M., Callen,E., Wu, W., Belinky, F.,Tripathi, V., Wong, N., Foster, K., …, **Borah, A.A.**,..., Bass, A.J., Nussenzweig, A. **Repeat expansions confer WRN dependence in microsatellite-unstable cancers**. *Nature* 586, 292–298 (2020).

Under Revision

Pan, J., Kwon, J.J., Talamas, J.A., **Borah, A.A.**, Vazquez, F., Boehm, J.S., Tsherniak, A., Zitnik, M., McFarland, J.M., Hahn, W.C. **Sparse dictionary learning recovers pleiotropy from human cell fitness screens.** *Cell Systems*, under revision.

Cervia, L.D., Shibue, T., Gaeta, B., **Borah, A.A.**, Leung, L., Li, N., Dumont, N., Gonzalez, A., Bick, N., Kazachkoava, M., Dempster, J., …, McFarland, J.M., Vazquez, F., Hahn, W.C. **A ubiquitination cascade regulates the integrated stress response and epithelial cancer survival.** *Cancer Discovery*, under revision.

TEACHING AND VOLUNTEER EXPERIENCE

Course Creator and Teaching Assistant, Cancer Program R BootCamp 2019, 2021
Broad Institute of MIT and Harvard

- Designed and implemented a curriculum to teach postdocs and graduate students the basics of R
- More than 100 participants have completed the program
- Received an award (Spot Award) for going beyond duties and expectations and voluntarily developing this course

Co-chair, CodeRATS 2020 - 2021
Broad Institute of MIT and Harvard

- Co-led a group aimed to foster a sense of community among the early computational researchers
- Held weekly office hours to help with code questions and help others to start with coding
- Facilitated periodic workshops to teach new skills and techniques

Teaching Assistant, Mathematics and Computer Science 2016 - 2019
Dickinson College

- Facilitated lab classes helping students debug, grade homework, and answer questions
- Courses: Introduction to Programming I, Introduction to Programming II, Data Structures

Volunteering Coordinator (North India) June 2014 - July 2015
Bhumi, New Delhi, India

- Designed and implemented the after-school mathematics and science curriculum
- Managed more than 100 volunteers and their engagement projects, contributing 2700 hours during a single year
- Became one of 6 recipients of the ‘Torchbearer Award’ from a field of 8000 volunteers