Sambhawa Priya

University of Minnesota, MCB 6-182, 420 Washington Avenue SE, Minneapolis, MN 55455
priya030@umn.edu, +1(484) 838-9024, https://sambhawapriya.netlify.app/

Education

Ph.D. in Bioinformatics and Computational Biology   August, 2016 – Present
University of Minnesota, Minneapolis, MN, USA
Adviser: Dr. Ran Blekhman

M.S. in Computer Science   May, 2016
Lehigh University, Bethlehem, PA, USA

B.E. in Computer Science   May, 2010
Manipal Institute of Technology, Karnataka, India

Professional Experience

• Research Assistant (*Machine learning-based integration to identify host gene-microbiome interactions in human diseases*)	Blekhman Lab, University of Minnesota, Minneapolis, MN, USA	August, 2016 – Present
• Graduate Research Intern (*Semantic Web-based system for mining genetic mutations in cancer clinical trials*)	Mayo Clinic, Rochester, MN, USA	June – August, 2014
• Research and Teaching Assistant (*Semantic Web-based reasoning*)	Lehigh University, Bethlehem, PA, USA	August, 2011 – Nov, 2015
• Undergraduate Research Intern (*Wireless Sensor Network*)	Carnegie Mellon University, Pittsburgh, PA, USA	June – August, 2009
• Undergraduate Research Intern (*Automatic Speech Recognition*)	University of Lodz, Poland	June – August, 2008

Honors and Awards

- Doctoral Dissertation Fellowship, University of Minnesota (approx. $50,000), August, 2019 – May, 2020.
- Best Poster award in 10th Annual Bioinformatics Research Symposium, University of Minnesota, 2018.
- Microbial and Plant Genomics Institute Travel award ($489), 2018
- Bioinformatics and Computational Biology Graduate Fellowship, University of Minnesota (approx. $50,000), August, 2016 – May, 2017.
- First prize in the 2012 Semantic Web Challenge (Billion Triples Challenge Track), 2012.
- NSF Travel Grant, International Semantic Web Conference ($1,200), 2012.
- Award for Academic Excellence in Computer Science, Manipal Institute of Technology, 2009.

Publications (google scholar link)

Under review

1. **Priya S**, Burns MB, Ward T, Mars RAT, Adamowicz B, Lock E, Kashyap PC, Knights D, Blekhman R. "Shared and disease-specific host gene-microbiome interactions across human diseases". (*under review*) https://www.biorxiv.org/content/10.1101/2021.03.29.437589v1

2. Bramble MS, Vashist N, Ko A, **Priya S**, Musasa C, Spencer D, Lipson A, Mamona P, Karume K, Nsibu J, Manya H, Uy MNA, Colwell B, Boivin M, Mayambu B, Okitundu D, Mumba-Ngoyi D, Blekhman R, Tshala-Katumbay D, Vilain E. "The Gut Microbiome in Konzo". (*under revision for Nature Communications*)

Published

1. Mars RAT, Yang Y, Ward T, Houtti M, **Priya S**, Lekatz HR, Tang X, Sun Z, Kalari KR, Korem T, Bhattarai Y, Zheng T, Bar N, Frost G, Johnson AJ, van Treuren W, Han S, Ordog T, Grover M, Sonnenburg J, D'Amato M, Camilleri M, Elinav E, Segal E, Blekhman R, Farrugia G, Swann J, Knights D, Kashyap PC. "Longitudinal multi-omics reveals subset-specific mechanisms underlying irritable bowel syndrome". *Cell, 182:6, 1460–1473*. 2020. https://doi.org/10.1016/j.cell.2020.08.007.

2. Dayama G*, **Priya S***, Niccum DE, Khoruts A, Blekhman R. "Interactions between the gut microbiome and host gene regulation in cystic fibrosis". *Genome Medicine, 12:12.* 2020. https://doi.org/10.1186/s13073-020-0710-2. (*these authors contributed equally).

3. **Priya S** and Blekhman R. "Population dynamics of the human gut microbiome: change is the only constant". *Genome Biology, 20:150.* 2019**.** https://doi.org/10.1186/s13059-019-1775-3.

4. Brooks AW, **Priya S**, Blekhman R, Bordenstein SR. "Gut Microbiota Diversity across Ethnicities in the United States". *PLoS Biology, 16(12): e2006842.* 2018. https://doi.org/10.1371/journal.pbio.2006842.

5. Burns MB, Montassier E, Abrahante J, **Priya S**, Niccum DE, Khoruts A, Starr TK, Knights K, Blekhman R. "Colorectal cancer mutational profiles correlate with defined microbial communities in the tumor microenvironment", *PLoS Genetics, 14(6): e1007376.* 2018**.** https://doi.org/10.1371/journal.pgen.1007376.

6. Hale VL, Jeraldo P, Chen J, Mundy M, Yao J, **Priya S**, Keeney G, Lyke K, Ridlon J, White BA, French AJ, Thibodeau S, Diener C, Resendis-Antonio O, Gransee J, Dutta T, Petterson XT, Blekhman R, Boardman L, Larson D, Nelson H, Chia N, "Distinct Microbes, Metabolites, and Ecologies Define the Microbiome in Deficient and Proficient Mismatch Repair Colorectal Cancers", *Genome Medicine,10(1).* 2018. https://doi.org/10.1186/s13073-018-0586-6.

7. Clark CR, Maile M, Blaney P, Hellweg SR, Strauss A, Durose W, **Priya S**, Habicht J, Burns MB, Blekhman R, Abrahante JE, Starr TK, "Transposon mutagenesis screen in mice identifies TM9SF2 as a novel colorectal cancer oncogene", *Scientific Reports 8(1).* 2018. https://doi.org/10.1038/s41598-018-33527-3.

8. Lynch J, Tang K, **Priya S**, Sands J, Sands M, Tang E, Mukherjee S, Knights D, Blekhman R. "HOMINID: A framework for identifying associations between host genetic variation and microbiome composition". *GigaScience. 6:12, pp. 1–7.* 2017**.** https://doi.org/10.1093/gigascience/gix107.

9. **Priya S**, Jiang G, Dasari S, Zimmermann MT, Wang C, Heflin J, Chute CG. "A Semantic Web-based system for mining genetic mutations in cancer clinical trials". *AMIA Summits on Translational Science Proceedings. pp.142 –146 (PMID:26306257).* 2015. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4525254/.

10. Zhang X, Song D, **Priya S**, Daniels Z, Reynolds K, Heflin J. "Exploring Linked Data with Contextual Tag Clouds". *Journal of Web Semantics: Science, Services and Agents on the World Wide Web. vol. 34, pp. 33-39.* 2014**.** https://doi.org/10.1016/j.websem.2013.12.004.

11. **Priya S**, Guo Y, Spear M, Heflin J. "Partitioning OWL Knowledge Bases for Parallel Reasoning". *In: Proc. of Eighth IEEE International Conference on Semantic Computing (ICSC 2014). Newport Beach, CA, pp. 108-115.* 2014. https://doi.org/10.1109/ICSC.2014.34.

12. Zhang S, Song D, **Priya S**, Heflin J. "Infrastructure for Efficient Exploration of Large Scale Linked Data via Contextual Tag Clouds". *In: Alani H. et al. (eds) The Semantic Web – ISWC 2013. ISWC 2013. Lecture Notes in Computer Science, vol 8218. Springer, Berlin, Heidelberg.* 2013**.** https://doi.org/10.1007/978-3-642-41335-3_43.

Research Presentations

- **(Talk)** "A machine learning framework reveals patterns of host gene-microbiome interactions across human diseases", Cold Spring Harbor Laboratory meeting on Biological Data Science, CSHL (virtual), November 2020.
- **(Poster)** "Shared and disease-specific host gene-microbiome interactions across human diseases", Cold Spring Harbor Laboratory meeting on Microbiome, CSHL (Virtual), October 2020.
- **(Poster)** "Common host gene-microbiome interactions across human diseases", Cold Spring Harbor Laboratory Meeting on Microbiome, Cold Spring Harbor, New York, July 2019.
- **(Talk)** "A Machine Learning Framework Reveals Common Molecular Interactions Between Gut Microbiome and Host Genes Across Human Disease States", 3rd Workshop on Statistical and Algorithmic Challenges in Microbiome Data Analysis, Simons Foundation, New York, April 2019.
- (**Invited Talk**) "Characterizing Host Gene-Microbiome Interactions in Human Diseases Using Machine Learning", Machine Learning Applications to Phenomics and Genomics, Fall Symposium, Microbial and Plant Genomics Institute, University of Minnesota, August 2018.
- (**Talk**) "Characterizing Host Gene-Microbiome Interactions in Human Diseases Using Machine Learning", 5th Midwest Population Genetics Meeting, University of Minnesota, August 2018.
- (**Poster**) "Interactions between the gut microbiome and host gene regulation shed light on the pathogenesis of colorectal cancer in cystic fibrosis patients", 7th Conference on Beneficial Microbes, Madison, Wisconsin, July 2018.
- (**Invited Talk**) "Interactions between the gut microbiome and host gene regulation shed light on the pathogenesis of colorectal cancer in cystic fibrosis patients", 10th Annual Bioinformatics Research Symposium, University of Minnesota Rochester, January 2018.
- (**Talk**) "A Semantic Web-based system for mining genetic mutations in cancer clinical trials", AMIA Joint Summits on Translational Science, San Francisco, March, 2015.

Teaching and Mentoring Experience

- Developed and taught a course module on "Introduction to Machine Learning using R" in BICB 8510 Computation and Biology (Spring 2020, Spring 2021, *UMN-Twin Cities* & *UMN-Rochester campuses*).
- Mentored graduate rotation students in *Blekhman Lab, UMN* (Fall 2018, Spring 2021)
- Teaching Assistant, *Lehigh University* (2013 – 2015).
    - Courses: *Design and Analysis of Algorithms*, *Introduction to Java*.
    - Managed classes with 50 – 140 undergraduate students.
    - Responsibilities: Conduct labs, grade homeworks and exams, design and deliver guest lectures, hold office hours, mentor students, maintain and write scripts for collection and processing of homeworks.

Science Outreach and Service

Outreach:
- Organized science outreach activity on the topic of Human Microbiome at farmer's market as part of Market Science outreach program. (June, 2019 and June, 2017)
- Coordinator of monthly lab reading and discussion on diversity, equity and inclusion.

Service:
- Organizing hands-on workshop on "Machine Learning on Microbiome data" at the 14th Great Lakes Bioinformatics (GLBIO) conference, May 10 – 13, 2021.
- Reviewer for Human Genetics, mSystems, Cell Host & Microbe (co-reviewer), Communications Biology – Nature, Scientific Data - Nature, PeerJ, IJCAI research track (2016), Biomedical Data Mining, Modeling, and Semantic Integration at ISWC (2015).
- Served in local organizing committee for International Semantic Web Conference (ISWC) 2015.

Professional and Technical Skills

- *Programming*: R, Java, Scala, C, C++
- *Scientific skills*: microbiome analysis (metagenomics, 16S, metabolomics, viromics), human genomic analysis (RNA-sequencing, whole genome sequencing), multi-omic integration, machine learning, parallel and distributed computing.