

Priyanka Baloni, Ph.D.

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EDUCATION

2017 Ph.D., Molecular Biophysics Unit, Indian Institute of Science (IISc), India
2009 M.Sc., Microbiology, MS University of Baroda, India
2007 B.Sc., Zoology (Hons), MS University of Baroda, India

RESEARCH EXPERIENCE

2022-present Assistant Professor, School of Health Sciences, Purdue University
2020-2022 Senior Research Scientist, Hood-Price lab, Institute for Systems Biology, Seattle
2019-2020 Research Scientist, Hood-Price lab, Institute for Systems Biology, Seattle
2016-2019 Postdoctoral Fellow, Hood-Price lab, Institute for Systems Biology, Seattle
2012-2015 Senior Research Fellow, Indian Institute of Science, India (funded by CSIR)
2010-2012 Junior Research Fellow, Indian Institute of Science, India (funded by CSIR)

HONORS & ACTIVITIES

Honors

2020 *Laxmi Baxi* award at 67th Annual Scientific Meeting of Society for Reproductive Investigation for translational work in pregnancy field
2018 *ISB Innovator Award 2018* – project titled “Model driven discovery of central ligand-receptor pairs that maintain the drug resistance of a tumor cell ecosystem community”
2012-2015 *Council of Scientific and Industrial Research (CSIR)* – Senior Research Fellowship, Scholarship for selected students in India to pursue research
2010-2012 *Council of Scientific and Industrial Research (CSIR)* – Junior Research Fellowship, Scholarship for selected students in India to pursue research
2007-2009 UGC Post-Graduate Merit Scholarship, Award from UGC for University Rank Holder

Committee leadership & board members

2021 Organizing member and speaker at 2021 ISB Virtual Microbiome Series
2020 Organizing member and session chair of ISB Virtual Microbiome Events
2018-present Member of the Alzheimer’s Disease Metabolomics Consortium
2016-2019 Postdoc Advisory Board, ISB

Editorial Boards

2022	Topical Advisory Panel for <i>Metabolites</i>
2022	Guest Editor, <i>Metabolites</i>
2021-present	Academic Editor, <i>PLoS Global Public Health</i>
2021-present	Associate Editor, <i>Frontiers in Genetics</i>
2018-present	Editorial member in <i>Frontiers in Physiology</i> , <i>Frontiers in Neuroscience</i> , <i>Frontiers in Applied Mathematics and Statistics</i> , <i>Frontiers in Bioinformatics</i> , <i>Frontiers in Genetics</i>
2019-present	Reviewer Board member for <i>MDPI Metabolites journal</i>

Mentoring & outreach activities

2019-2022	Interacted and given lectures to community college students in Washington state, and principals and teachers of high schools in and around Seattle. Participated as a STEM professional for scientific discussions with high school and undergraduate students.
2018	<i>Science Teaching Experiences for Postdocs (STEP)</i> : Taught “Personalized medicine and Wellness: Separating Hype from Reality” course to Undergraduate students (Biology majors) at University of Washington, Seattle, USA. Designed the curriculum and taught the course.
2018	Organized and taught the COBRA hands-on course to research groups at Duke University
2017-present	Mentored undergraduate and high school summer interns at ISB, Seattle. ISB’s Internship program promotes underrepresented students to participate and get mentored by scientists. I have mentored female students and students from diverse ethnic groups.
2016-2019	Member of the ISB Postdoc Advisory Board. Organized outreach events for postdoc and career development programs
2014-2016	Mentored undergraduate students at IISc, Bangalore, India. I mentored 3 female and male students during my Ph.D.
2014	Taught “Metabolic reconstruction and Flux Balance Analysis” to undergraduate students at Indian Academy Degree College, Bangalore, India

PUBLICATIONS

Peer-reviewed articles (sorted by most recent)

1. **Baloni, P.**, Arnold, M., Buitrago, L., Nho, K., Moreno, H., Huynh, K., ... & Kaddurah-Daouk, R. (2022). Multi-omic analyses characterize the ceramide/sphingomyelin pathway as a therapeutic target in Alzheimer’s Disease. *Communications Biology*, 5(1), 1-13.
2. Sebastiani, P., Song, Z., Ellis, D., Tian, Q., Schwaiger-Haber, M., Stancliffe, E., ... & Perls, T. T. (2022). A metabolomic signature of the APOE2 allele. *GeroScience*, 1-12.
3. Ng, R. H., Lee, J. W., **Baloni, P.**, Diener, C., Heath, J. R., & Su, Y. (2022). Constraint-Based Reconstruction and Analyses of Metabolic Models: Open-Source Python Tools and Applications to Cancer. *Frontiers in Oncology*, 3016.

4. Su, Y., Yuan, D., Chen, D. G., Ng, R. H., Wang, K., Choi, J., ... & Heath, J. R. (2022). Multiple Early Factors Anticipate Post-Acute COVID-19 Sequelae. *Cell*.
5. Lee, J. W., Su, Y., **Baloni, P.**, Chen, D., Pavlovitch-Bedzyk, A. J., Yuan, D., Duvvuri, V., Ng, R.H., Choi, J., Xie, J., Zhang, R., Murray, K., Kornilov, S., Smith, B., Magis, A.T., Hoon, D.S.B., Hadlock, J., Goldman, J.D., Price, N.D., Gottardo, R., Davis, M.M., Hood, L., Greenberg, P.D., Heath, J. R. (2021). Integrated analysis of plasma and single immune cells uncovers metabolic changes in individuals with COVID-19. *Nature Biotechnology*, 1-11.
6. **Baloni, P.**, Funk, C. C., Readhead, B., & Price, N. D. (2021). Systems modeling of metabolic dysregulation in neurodegenerative diseases. *Current opinion in pharmacology*, 60, 59-65.
7. McFarland, K. N., Ceballos, C., Rosario, A., Ladd, T., Moore, B., Golde, G., Xue, W., Allen, M., Ertekin-Taner, N., Funk, C.C., Robinson, M., **Baloni, P.**, Rappaport, N., Chakrabarty, P., Golde, T. E. (2021). Microglia show differential transcriptomic response to A β peptide aggregates ex vivo and in vivo. *Life Science Alliance*, 4(7).
8. Zimmer, A., Korem, Y., Rappaport, N., Wilmanski, T., **Baloni, P.**, Jade, K., Robinson, M., Magis, A.T., Lovejoy, J., Gibbons, S.M., Hood, L., * and Price, N.D.,* (2021) The geometry of clinical labs and wellness states from deeply phenotyped humans. *Nature Communications*
9. Varma, V. R., Wang, Y., An, Y., Varma, S., Bilgel, M., Doshi, J., Legido-Quigley, C., Delgado, J.C., Oommen, A.M., Roberts, J.A., Wong, D.F., Davatzikos, C., Resnik, S.M., Troncoso, J.C., Pletnikova, O., O'Brien, R., Hak, E., Baak, B.N., Pfeiffer, R., **Baloni, P.**, Mohmoudiandehkordi, S., Nho, K., Kaddurah-Daouk, R., Bennett, D.A., Gadalla, S.M., Thambisetty, M. (2021). Bile acid synthesis, modulation, and dementia: A metabolomic, transcriptomic, and pharmacoepidemiologic study. *PLoS Medicine*.
10. Banerjee, U., **Baloni, P.**, Singh, A. and Chandra, N. (2021) Immune Subtyping in Latent Tuberculosis. *Frontiers in Immunology*
11. **Baloni, P.**, Dinalankara, W., Earls, J.C., Knijnenburg, T.A., Geman, D., Marchionni, L., Price, N.D. (2021) Identifying Personalized Metabolic Signatures in Breast Cancer. *Metabolites*.
12. **Baloni, P.**, Funk, C. C., Yan, J., Yurkovich, J. T., Kueider-Paisley, A., Nho, K., ... & Saykin, A. J., Kaddurah-Daouk, R., Price, N.D. (2020). Metabolic Network Analysis Reveals Altered Bile Acid Synthesis and Cholesterol Metabolism in Alzheimer's Disease. *Cell Reports Medicine*.
13. Su, Y., Chen, D., Lausted, C., Yuan, D., Choi, J., Dai, D., Voillet, V., Scherler, K., Troisch, P., Duvvuri, V.R., **Baloni, P.**, ... & Heath, J.R. (2020). Multiomic Immunophenotyping of COVID-19 Patients Reveals Early Infection Trajectories. *Cell*.
11. Jabbari, N., Kenerson, H., Lausted, C.G., Yan, X., Meng, C., Sullivan, K., **Baloni, P.**, Bergey, D., Pillarisetty, V.G., Hood, L., Yeung, R.S., Tian Q. (2020). Chemotherapies modulate tumor immune microenvironment of human metastatic colorectal carcinoma. *Cell Reports Medicine*.
12. **Baloni, P.**, Sangar, V., Yurkovich, J.T., Robinson M., Taylor, S., Karbowski, C.M., Hamadeh, H., He, Y.D., & Price, N.D. (2019) Genome-scale metabolic model of the rat liver predicts effects of diet restriction. *Scientific Reports*, 9(1), 9807.

13. Paquette, A., **Baloni, P.**, Holloman, A., Nigam, S., Bammler, T., Mao, Q., & Price, N. D. (2018). Temporal Transcriptomic Analysis of Metabolic Genes in Maternal Organs and Placenta During Murine Pregnancy. *Biology of Reproduction*.
14. Mishra, S., Shukla, P., Bhaskar, A., Anand, K., **Baloni, P.**, Jha, R. K., Mohan, A., Rajmani, RS., Nagaraja, V., Chandra, N., & Singh, A. (2017). Efficacy of β -lactam/ β -lactamase inhibitor combination is linked to WhiB4-mediated changes in redox physiology of *Mycobacterium tuberculosis*. *eLife*, 6, e25624.
15. Sambarey, A., Devaprasad, A., **Baloni, P.**, Mishra, M., Mohan, A., Tyagi, P., Singh, A., Akshata, JS., Sultana, R., Buggi, S., & Chandra, N. (2017). Meta-analysis of host response networks identifies a common core in tuberculosis. *NPJ systems biology and applications*, 3(1), 4.
16. Padiadpu, J*, **Baloni, P***, Anand, K*, Munshi, M., Thakur, C., Mohan, A., Singh, A., & Chandra, N. (2016). Identifying and tackling emergent vulnerability in Drug-Resistant mycobacteria. *ACS infectious diseases*, 2(9), 592-607.
17. Gupta, K. R., **Baloni, P.**, Indi, S. S., & Chatterji, D. (2016). Regulation of growth, cell shape, cell division and gene expression by second messengers (p) ppGpp and c-di-GMP in *Mycobacterium smegmatis*. *Journal of bacteriology*, JB-00126.
18. **Baloni, P.**, & Chandra, N. (2015). Architectural plan of transcriptional regulation in *Mycobacterium tuberculosis*. *Trends in microbiology*, 23(3), 123-125.
19. **Baloni, P***, Padiadpu, J*, Singh, A., Gupta, K. R., & Chandra, N. (2014). Identifying feasible metabolic routes in *Mycobacterium smegmatis* and possible alterations under diverse nutrient conditions. *BMC microbiology*, 14(1), 276.
20. Mohan, A., Padiadpu, J., **Baloni, P.**, & Chandra, N. (2015). Complete genome sequences of a *Mycobacterium smegmatis* laboratory strain (MC2 155) and isoniazid-resistant (4XR1/R2) mutant strains. *Genome Announc.*, 3(1), e01520-14.
21. Ghosh, S., **Baloni, P.**, Vishveshwara, S., & Chandra, N. (2014). Weighting schemes in metabolic graphs for identifying biochemical routes. *Systems and synthetic biology*, 8(1), 47-57.
22. Ghosh, S*, **Baloni, P***, Mukherjee, S., Anand, P., & Chandra, N. (2013). A multi-level multi-scale approach to study essential genes in *Mycobacterium tuberculosis*. *BMC systems biology*, 7(1), 132.

* Equal contribution

Submitted

1. Diener, C., Dai, C. L., Wilmanski, T., **Baloni, P.**, Smith, B., Rappaport, N., ... & Gibbons, S. M. (2022). Genome-microbiome interplay provides insight into the determinants of the human blood metabolome. *Accepted in Nature Metabolism* (2022)

2. Hwang, Y.M., Roper, R., Piekos, S., Enquobahrie, D., Hebert, M., Paquette, A., **Baloni, P.**, Price, N., Hood, L., Hadlock, J. Association of risk of preterm birth with selective serotonin reuptake inhibitor use: a retrospective cohort study. *Submitted* (2022)

Preprints

1. Watanabe, K., Wilmanski, T., **Baloni, P.**, Robinson, M., Garcia, G. G., Hoopmann, M. R., ... & Rappaport, N. (2022). Systems-level patterns in biological processes are changed under longevity interventions and across biological age. *medRxiv*.
2. Roach, J. C., Edens, L., Markewych, D. R., Rapozo, M. K., Hara, J., Glusman, G., ... & Hood, L. (2022). A multimodal intervention for Alzheimer's disease results in multifaceted systemic effects reflected in blood and ameliorates functional and cognitive outcomes. *medRxiv*.
3. Paquette, A. G., Ahuna, K., Hwang, Y. M., Pearl, J., Liao, H., Shannon, P., ... & Price, N. (2022). A Genome Scale Transcriptional Regulatory Model of the Human Placenta. *bioRxiv*.
4. Diener, C., Dai, C. L., Wilmanski, T., **Baloni, P.**, Smith, B., Rappaport, N., ... & Gibbons, S. M. (2022). Genome-microbiome interplay provides insight into the determinants of the human blood metabolome. *bioRxiv*.
5. **Baloni, P.**, Arnold, M., Moreno, H., Nho, K., Buitrago, L., Huynh, K., ... & Kaddurah-Daouk, R. (2021). Multi-Omic Analyses Characterize the Ceramide/Sphingomyelin Pathway as a Therapeutic Target in Alzheimer's Disease. *medRxiv*.
6. Su, Y., Yuan, D., Chen, D.G., Wang, K., Choi, J., Dai, C.L., Hong, S., Zhang, R., Xie, J., Li, S., Scherler, K., ..., **Baloni, P.**, Duvvuri, V., ... Heath, JR. (2021) Heterogeneous immunological recovery trajectories revealed in post-acute COVID-19. *medRxiv*.
7. McFarland, K.N., Ceballos, C., Rosario, A., Ladd, T.B., Moore, B.D., Golde, G., Wang, X., Allen, M., Ertekin-Taner, N., Funk, C.C., Robinson, M., **Baloni, P.**, Rappaport, N., Chakrabarty, P., Golde, T. (2021). Microglia show differential transcriptomic response to A β peptide aggregates ex vivo and in vivo. *bioRxiv*.
8. Su, Y., Chen, D., Lausted, C., Yuan, D., Choi, J., Dai, C., Voillet, V., Scherler, K., Troisch, P., Duvvuri, V. and **Baloni, P.**, ... & Heath, JR (2020). Multiomic immunophenotyping of COVID-19 patients reveals early infection trajectories. *SSRN*
9. **Baloni, P.**, Funk, C.C., Yan, J., Yurkovich, J.T., Kueider-Paisley, A., Nho, K., Heinken, A., Jia, W., Mahmoudiandehkordi, S., Louie, G. and Saykin, A.J., ., Kaddurah-Daouk, R., Price, ND (2020). Metabolic Network Analysis Reveals Altered Bile Acid Synthesis and Cholesterol Metabolism in Alzheimer's Disease. *SSRN*
10. **Baloni, P.**, Funk, C. C., Yan, J., Yurkovich, J. T., Kueider-Paisley, A., Nho, K., ... & Nathan D. Price. (2019). Identifying differences in bile acid pathways for cholesterol clearance in Alzheimer's disease using metabolic networks of human brain regions. *bioRxiv*, 782987.

Book chapters

1. Kaushik, S., **Baloni, P.**, Midha, CK. (2019) Text Mining Resources for Bioinformatics. *Encyclopedia of Bioinformatics and Computational Biology*

2. **Baloni, P.**, Ghosh, S., & Chandra, N. (2015). Systems approaches to study infectious diseases. In *Systems and Synthetic Biology* (pp. 151-172). Springer, Dordrecht

GRANTS

Current

NIH 1R01DK133468-01 Gibbons (PI) 07/2022 - 06/2027
CyberGut: towards personalized human-microbiome metabolic modeling for precision health and nutrition
Role: co-Investigator

This proposal aims to directly test a host microbiome-diet metabolic model for rapidly and accurately predicting personalized responses to diet in a newly recruited human observational cohort.

NIH/NIA U01AG061359 (Kaddurah-Daouk, Duke University) 09/30/18 –08/31/23
Metabolic Signatures for Disease Sub-Classification and Target Prioritization in AMP AD
Role: co-Investigator

The major goal of this project is to significantly advance our ability to study the complex mechanistic underpinnings of Alzheimer's disease using integrated multi-omic network models

NIH/NIA RF1AG059093 (Kaddurah-Daouk, Duke University) 08/01/18-03/31/23
Metabolic Networks and Pathways Predictive of Sex Differences in AD Risk and Responsiveness to Treatment
Role: co-Investigator

I will overlook our effort in using genome-scale metabolic and transcriptional regulatory networks of the brain to identify sex- and APOE-specific metabolic changes underlying AD, linking metabolomics and genetics in a network context.

Completed grants

NIH R01 HD091527 (Helen Jones, UF) 03/10/17–02/28/22
Harnessing “omics”: A Systems Biology approach to discovery of biological pathways in placental development and parturition
Role: MPI

We will seek to identify key genes and pathways associated with placental maturity that are quantifiable in maternal serum, and urine, as well as to create a transcriptional regulatory network in the placenta using Transcriptional Regulatory Network Analysis (TRENA), which has been developed by the Price lab as part of the NIH Accelerating Medicines Program and a Big Data to Knowledge Center.

NIH RO1 04/05/16–03/31/21
Hardwiring Mechanism into Predicting Cancer Phenotypes by Computational Learning
We aim to significantly advance our ability to study the complex mechanistic underpinnings of disease using integrated multi-omic network models. Role: co-I

NIH R01AG057452 (Kaddurah-Daouk) 09/01/17–08/31/20
Metabolic Network Analysis of Biochemical Trajectories in Alzheimer's Disease

Priyanka Baloni - CV

Role: Research Scientist

DOE DE-SC0018420 (Delucia)

12/01/17–11/30/19

Center for Advanced Bioenergy and Bioproducts Innovation (CABBI)

Role: Research Scientist

PRESENTATIONS

Invited talks (as a presenting author)

- *Invited talk, NIA-AA symposium: Enabling Precision Medicine for AD Through Open Science*, July 2022
- *Invited talk, Clinical Trials on Alzheimer's Disease (CTAD), Metabolomics a Biochemical Roadmap for Drug Discovery in Alzheimer's Disease*, November 2021
- *Invited talk, Metabolomics Association of North America (MANA), Multiomic analyses of sphingolipid pathway identifies potential drugs for Alzheimer's disease*, October 2021
- *Invited talk, AAIC Alzheimer's Association International Conference on Transcriptomics, metabolomics, lipidomics, metabolic flux and mGWAS analyses of sphingolipid pathway highlights novel drugs for Alzheimer's disease*, July 2021
- *Invited talk, The Significance of Microbial Metabolomics in Human Health and Disease symposium, New York Academy of Sciences on Role of bile acids in Alzheimer's disease*, November 2020
- *Invited talk, Webinar hosted by Research Center for Cellular Genomics, Shree Balaji Medical College and Hospital on Role of bile acids in Alzheimer's disease: an insight into importance of the gut-brain axis*, November 2020
- *Invited talk, Recent Advances in Drug Discovery and Pharmaceutical Sciences webinar series on Role of bile acids as metabolic markers in Alzheimer's disease*, October 2020
- *Invited talk, Placental-Interface Virtual Seminar series on Identifying metabolite signatures in placental development using iHumanPlacenta metabolic network*, June 2020
- *Invited talk, AMP-AD Face-to-Face meeting (2019), Bethesda, USA on Integrative Metabolomics to enable a precision medicine approach for the study of Alzheimer's disease and its subtypes*, July 2019
- *Invited talk, Gordon Research Conference on Metabolomics and Human Health (2019), Ventura, CA USA on Profiling bile acids to understand their metabolic role in Alzheimer's disease*, February 2019
- *Invited talk, 5th Conference on Constraint-Based Reconstruction and Analysis (COBRA 2018), Seattle, WA, USA on Understanding the role of bile acids in Alzheimer's disease*, October 2018

Poster

- *AAIC Alzheimer's Association International Conference (2021)* Role of acylcarnitines in Alzheimer's disease, July 2021
- *7th Conference on Constraint-Based Reconstruction and Analysis (COBRA 2021)*, Identifying metabolic signatures associated with preterm birth using iHumanPlacenta metabolic network integrated with transcriptomics and longitudinal metabolomics data, March 2021
- *Gordon Research Conference on Metabolomics and Human Health (2019), Ventura, CA USA*: Profiling bile acids to understand their metabolic role in Alzheimer's disease, February 2019
- *Metabolomics 2018, Seattle, USA*: Systems approaches to understanding altered metabolic landscapes in Alzheimer's disease, June 2018
- *Keystone Symposia Maternal-Fetal Crosstalk: Harmony vs. Conflict, Washington DC, USA*: Temporal transcriptomic changes in metabolic genes during pregnancy in maternal organs and placenta, October 2017
- *Cell Symposia - Technology, Biology, Data Science at Berkeley, USA*: Metabolic rerouting in drug resistant mycobacteria identified by integrating phenotypic microarrays, transcriptome and metabolic networks, October 2016
- *Gordon Research Conference on Tuberculosis Drug Discovery and Development, Spain*: Targeting the silent killer: Studying host response and identifying targets for latent tuberculosis infection, July 2015