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education

Ph. D.	**Chemical and Biological Engineering**	**Colorado State University,** Ft. Collins, CO *August 2010 – August 2016*
PSM	**Molecular and Cell Biology** *(Applied Biotechnology)*	**Oregon State University,** Corvallis, OR *November 2010*
B. Tech.	**Biotechnology**	**SASTRA University,** Thanjavur, India *May 2008*

research experience

University of California (Postdoctoral researcher, Nov 2016 – till date):

- Identification of organism-specific housekeeping genes using high-throughput data and their evolutionary impact.
- Design of algorithms and identification of benchmarks to generate high confidence context-specific models.
- Analysis and integration of omics data into metabolic models - *C. elegans*, *H. sapiens*, and *M. musculus*.
- Multi-network analysis of CHO cells.
- Designing recombinant protein production/secretion strategies in CHO cells.
- Reconstructing genome-scale model of *C. elegans* in collaboration with GENiE and WormJam group of researchers.
- Design of minimal media for *C. elegans* and its gut microbiota.
- Analysis of high throughput fat screening dataset of *C. elegans* mutants.

Colorado State University (Ph. D. research, 2010 – 2016):

- Studied environmental effects on epistatic interactions in metabolic networks to conclude that the path of evolutionary adaptation may be dependent on the organism's environmental history.
- Prepared the largest (to-date) genome-scale metabolic reconstruction of *Synechocystis sp.* PCC6803.
- Generated a metabolic dynamic model of *Synechocystis sp.* PCC6803 grown under autotrophic conditions.
  Techniques & Software: Metabolic Network Reconstruction, Flux Balance Analysis (FBA), Network Analysis, Network Visualization, Deterministic Modeling (Kinetic), Pathway Tools (API), COBRA Toolbox, MATLAB, Python, EFMTool, VoNDA, Extreme Pathways (ExPA).
- Constructed *Synechocystis sp.* PCC6803 single gene deletion mutants which have potential for higher free fatty acid production.
  Techniques: Media preparation, cell culture, primer design, plasmid construction, PCR, Gel Electrophoresis, & Synechocystis sp. PCC6803 transformation,

Oregon State University (Master's research):

- **Chaplen/Murthy Lab (2009 – 2010):** Studied algal metabolic network (*C. reinhardtii*) under different nutrient uptake rates and biomass composition to conclude that actual biomass composition of the algae may be changing during growth.
  Techniques & Software: *FBA, Dynamic FBA, and Deterministic Modelling (Kinetic), MATLAB, and GAMS.*
- **Fowler Lab (2009):**
  - Focused on determining differences in the genetic make-up of an individual maize plant and discovering transposon insertion sites.
    Techniques: *PCR, TAIL-PCR, Gel Electrophoresis, and setting up plant crosses in the field.*
  - Studied effects of proteins Sec8 and Exo70A on root growth in Arabidopsis.
    Techniques: *Media preparation, preparing seed culture, strain selection, root length and growth analysis.*

Biotech Park, Lucknow, India (2007): Studied biofuel production in *J. curcas* and *P. pinnata.*
Techniques: *Solvent extraction using Soxhlet Apparatus and Rotor Vaporization.*

peer reviewed publications

Joshi CJ et al.; What are housekeeping genes? ***(on bioRxiv) submitted to Proceedings of National Academy of Sciences, 2020.***

Richelle A et al.; What does your cell really do? Model-based assessment of mammalian cells metabolic functionalities using omics data. ***(on bioRxiv) submitted to Molecular Systems Biology, 2020.***

la Cour Karottki KJ et al; A metabolic CRISPR-Cas9 screen in Chinese hamster ovary cells identifies glutamine-sensitive genes. ***(on bioRxiv) submitted to Molecular Systems Biology, 2020.***

Armingol E et al.; Inferring the spatial code of cell-cell interactions and communication across a whole animal body. ***(on bioRxiv) submitted to Nature Communications, 2020.***

Joshi CJ et al.; StanDep: capturing transcriptomic variability improves context-specific metabolic models. ***PLoS Computational Biology, 2020.***

Saba J et al.; Dietary serine enhances chemotherapeutic toxicity in *C. elegans* through altering microbiota metabolism. ***Nature Communications, 2020*.**

Richelle A, Joshi CJ, and Lewis NE; Assessing key decisions for transcriptomic data integration in biochemical networks. ***PLoS Computational Biology,* 2019.**

Witting MA et al.; Modeling meets Metabolomics – The WormJam consensus model as basis for metabolic studies in the model organism *Caenorhabditis elegans.* ***Frontiers in Molecular Biosciences,* 2018.**

Hastings J et al.; WormJam: A consensus *C. elegans* metabolic reconstruction and metabolomics community and workshop series. ***Worm,* 2017.**

Joshi CJ, Peebles CAM, and Prasad A; Modeling and analysis of bioproduct formation in *Synechocystis sp.* PCC6803 using a new genome-scale metabolic network reconstruction. ***Algal Research*, 2017.**

Joshi CJ and Prasad A; Epistatic interactions among metabolic genes depend upon environmental conditions. ***Molecular BioSystems*, 2014**.

book chapter

Cyrielle C, Joshi CJ, Lewis NE, Laetitia M, Andersen MR; Adaptation of generic metabolic models to specific cell lines for improved modelling of biopharmaceutical production and prediction of processes. **accepted in Wiley-Blackwell Biotechnology Series.**

teaching experience

tutor (teaching, & keeping students on track in their coursework)	**Academics for Student Athletes** *Oregon State University* *September 2008 – January 2010*	Biology, Physics, Chemistry, Mathematics, Finance, and Accounting
teaching assistant (office hours, lab sessions, & lectures)	**Chem. & Biol. Engineering** *Colorado State University* *January 2011 – May 2015*	Kinetics of Biomolecular & Cellular Systems, Chemical & Biological Engineering Lab I & II, Momentum Transfer & Mechanical Separations, Biological Physics

oral presentations

Biomedical Engineering Society (BMES; October 14 – October 16, 2020) – *Joshi CJ, and Lewis NE;* Are housekeeping genes essential?

Q-Bio Summer School (Q-bio; July 8 – July 21, 2015) – *Joshi CJ, Peebles CAM, and Prasad A;* Modeling metabolic reconstruction of Synechocystis sp. PCC6803.

American Chemical Society (ACS; March 22 – March 26, 2015) – *Joshi CJ, Peebles CAM, and Prasad A;* A genome-scale metabolic reconstruction of *Synechocystis sp.* PCC6803 taking into account molecular mechanisms under photoautotrophic conditions.

Bio Physical Society (BPS; February 2 – February 6, 2013) - *Joshi CJ and Prasad A;* Comparative Analysis of Metabolic Robustness: *E. coli* and *Synechocystis sp.* PCC6803.

American Institute of Chemical Engineers (AIChE; October 28 – November 2, 2012) - *Joshi CJ and Prasad A;* Comparison of Network Structures that Confer Resilience Against Genetic Perturbations in Microbial Metabolism.

Colorado Center for Biorefining and Biofuels Semi-Annual Meeting (C2B2; August 25/26, 2011) - *Joshi CJ and Prasad A;* Fluxomics for Rational Design of a H2-producing Cyanobacterial System via Synthetic Biology.

posters

COnstraint Based Reconstruction Analysis Conference (COBRA Conference; October 13 – October 18, 2018) - *Joshi CJ and Prasad A;* Fine tuning thresholds to facilitate integration of transcriptomics data.

Metabolic Pathway Analysis (MPA; July 23 – July 28, 2017) – *Joshi CJ, Opdam S, Richelle A, and Lewis NE;* Generating tissue-specific metabolic models.

CSU Ventures Innovation Symposium (CSU Venture 2014; April 25, 2015) - *Joshi CJ and Prasad A;* Epistatic interactions among metabolic genes depend upon environmental conditions.

Cell and Molecular Biology Poster Symposium (CMB/MCIN/BMB/MIP; February 27, 2015) – *Joshi CJ, Peebles CAM, and Prasad A;* A genome-scale metabolic network reconstruction of *Synechocystis sp.* PCC6803.

COnstraint Based Reconstruction Analysis Conference (COBRA Conference; May 20 – May 23, 2014) - *Joshi CJ and Prasad A;* Epistatic Interactions Depend on Environmental Effects: an FBA Study.

COnstraint Based Reconstruction Analysis Conference (COBRA Conference; May 20 – May 23, 2014) - *Joshi CJ and Prasad A;* Structure and Role of Enzyme-Reaction Association in Microbial Metabolism.

American Society for Agricultural and Biological Engineers (ASABE; June 20 – June 23, 2010) - *Joshi CJ, Chaplen FWR, and Murthy GS;* Modeling Lipid and Carbohydrate accumulation in Green Algae, using Constraint Based Modeling.

community outreach

Engineering Fair Volunteers/Judges at the Carbon Valley Academy, Frederick, CO (April 24, 2015) – Talked about my research, interacted with students about their engineering projects, and helped setting up the project exhibit area.

Science Fair Volunteers/Judges at the Prairie Junior-Senior High School, New Raymer, CO (March 30, 2015) – Talked about my research, interacted with students about their science projects, and helped setting up the project exhibit area.

awards and grants

Cell and Molecular Biology Student Collaborative Interdisciplinary Research Grant, Colorado State University (Zimont A and Joshi CJ, *December 2015*).

Clean Energy Supercluster Seed Grant, Colorado State University (April 2012 – May 2013).

PSM Laurels Scholarship, Oregon State University *(January 2010 – April 2010)*.

Supplementary Laurels Scholarship, Oregon State University *(January 2009 – April 2009)*.