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Shruti Marwaha

Education

2010 - 2015 **PhD in Systems Biology & Physiology**, *University of Cincinnati*, OH.

Thesis title *A Genomics and Mathematical Modeling approach to study Helicobacter pylori associated Gastritis and Gastric Cancer.*

Description The key research projects:

Drug Repurposing
- *Analyzed high-throughput genomics data* to identify key genes and pathways dysregulated in gastric cancer and gastric atrophy.
- Developed computational pipeline for gene-signature based drug repurposing.

Mathematical Modeling
- Developed an Ordinary Differential Equation (ODE) model of the host's immune response to *H. pylori*, with focus on crosstalk between cytokines and sonic hedgehog.
- The model helped to identify a negative feedback loop and potential oscillatory behavior of the system.

2005 - 2007 **Masters in Bioinformatics (PGDB)**, *Institute of Bioinformatics & Applied Biotechnology*, Bangalore, India.

Internship Project Developed an interaction network of Angiopoietin pathway in cancer by literature curation and mathematically modeled it using Ordinary Differential Equations.

2002 - 2005 **B.Sc (Hons) in Zoology**, *University of Delhi*, Delhi, India.

Experience

Nov 2007 - Mar 2010 **Associate Team Lead Scientist**, Cellworks Research India Ltd, India.

May 2007 - Oct 2007 **Associate Biomodeling Scientist**, Cellworks Research India Ltd, India.

Project Description
- Mathematically modeled molecular pathways that are perturbed in cancer to *identify potential drug targets.*
- The model predicted higher efficacy of mTORC1 inhibitor in PTEN and KRAS wild type system as compared to that in PTEN and KRAS mutant model, highlighting the importance of mTORC1-IRS1-AKT-ERK feedback loop.

Skills

Programming Languages R (and Bioconductor), Python, Perl, Matlab.

Genomics Data Analysis Microarray, RNA-seq, Variant Calling, DNA Methylation.

Databases SQL, MySQL, Cypher, Neo4j.

Operating Systems Mac, Linux, Windows.

Tools	Cytoscape, AWS, Git, Latex.
Biological Simulators	CellDesigner, Copasi, SBToolBox.
Mathematical Modeling Techniques	Ordinary Differential Equations, Flux Balance Analysis, Boolean Networks.

Relevant Courses

Advanced Statistics, Data Analysis, Machine Learning, Computational Systems Biology, Functional Genomics, Human Systems Physiology, Molecular Genetics and Cell Biology.

Publications

Peer Review Publication

Marwaha S, Schumacher MA, Zavros Y, Eghbalnia HR. ***Crosstalks between Cytokines and Sonic Hedgehog in Helicobacter pylori Infection: A Mathematical Model***, PLoS One. 2014 Nov 3, 9(11):e111338.

Oral Presentation

Shruti Marwaha, Michael A Schumacher, Yana Zavros, Hamid R Eghbalnia. *Feedbacks in sonic hedgehog circuits with cytokines in H. pylori mediated gastritis.* Ohio Physiological Society, October 6-7, 2011. Cincinnati, OH.

Key Poster Presentation

Shruti Marwaha, Hamid R Eghbalnia. ***Drug Repurposing for Gastric Cancer using Genomics Data.*** Southern California Systems Biology Conference, January 31, 2015. Irvine, CA.

Shruti Marwaha, Michael A Schumacher, Yana Zavros, Hamid R Eghbalnia. *Interactions between cytokines and sonic hedgehog in H. pylori mediated gastritis implicates a novel feedback circuit.* International Conference on Computational Cell Biology, August 14-16, 2013. Blacksburg, Virginia.

Shruti Marwaha, Michael A Schumacher, Yana Zavros, Hamid R Eghbalnia. *Feedbacks in sonic hedgehog circuits with cytokines in H. pylori mediated gastritis.* Experimental Biology, April 21-25, 2012. San Diego, CA.

Research Interests

Data Analysis, Biomarker and Drug Target Identification and Personalized Medicine.

Awards

2011 **Peter K Lauf Student Travel Award**, *for oral presentation on "Feedback in Sonic hedgehog circuits with cytokines in H. pylori mediated gastritis"*, at Ohio Physiological Society.

2010 - 2015 **University Graduate Scholarship**, *University of Cincinnati*.

Workshops & Conferences Attended

July 27 - 31, 2015 *Systems Biology of Disease*, Institute of Systems Biology, Seattle, WA

May 16 - 18, 2014 *Great Lakes Bioinformatics Conference*, Cincinnati Children's Hospital, OH

Professional Affiliations

2014 - 2015 Vice President for Physiology Student Organization, University of Cincinnati.

2012 - 2013 Secretary for Health Sciences Graduate Student Association, University of Cincinnati.