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Shruti Marwaha

Skills

Programming Languages	R (& Bioconductor), Python, SQL, Perl.
Genomics Data Analysis	RNA-seq, Microarray. Familiar with Variant Calling, DNA Methylation.
Machine Learning	Caret (R), Scikit-learn (Python).
Tools	Amazon Web Services (AWS), Git, Cytoscape.
Operating Systems	Linux, Mac, Windows.

Education

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

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

Description Key research projects:

Drug Repurposing
- *Analyzed high-throughput gene expression data* to identify key genes and pathways dysregulated in gastric cancer and gastric atrophy.
- Developed computational pipeline on AWS for RNAseq analysis and 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 novel feedback loop and potential oscillatory behavior of the system.

2005 - 2007 **Masters in Bioinformatics (Post Graduate Diploma)**, *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

Oct 2015 - Dec 2015 **Research Associate**, *Cincinnati Children's Hospital Medical Center*, OH.

Project Title Drug Repurposing for Head and Neck Squamous Cell Carcinoma.

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

Project Description
- Developed Ordinary Differential Equation models of molecular pathways that are perturbed in cancer to *identify potential drug targets*.
- Case-study example: 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.
- Managed and mentored a team of 7 members.

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

Project Description
- Mathematically modeled mTOR-HIF, glycolysis and TCA pathways to simulate tumor metabolism.

Data Science Projects

April 2016 - May 2016 **Kaggle Challenge**, *San Francisco Crime Classification*.

Project Description
- Developed a machine learning model to predict the category of a crime that occurred in past 12 years in San Francisco.
- Built a multiclass classifier from ~880,000 samples to classify the crime into one of the 39 possible categories.
- `https://github.com/ShrutiMarwaha/KaggleSFCrime/`

Feb 2016 - Mar 2016 **Chronic Kidney Disease Prediction**.

Project Description
- Developed a predictive model from clinical features to identify patients at the risk of Chronic Kidney Disease using Support Vector Machine.
- Implemented the model as a web application `https://shruti-marwaha.shinyapps.io/KidneyDiseasePredictor/`

Relevant Courses

Machine Learning, Advanced Statistics, Data Analysis, Computational Systems Biology, Functional Genomics, 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.

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.

Oral Presentation

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

Awards

2011 **Peter K Lauf Award**, *for presentation on "Feedback in Sonic hedgehog circuit 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.