Gainesville, FL
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Natya Hans

Computational Biologist

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SUMMARY

Computational biologist with eight years of experience in exploratory, hypothesis and data driven science with key expertise in:

• Developing tools to integrate Genomics and functional traits into statistical framework.
• Designing and executing scientific analyses for Genomics, Transcriptomics and Metabolomics.
• Organizing scientific events and symposiums at university, regional and national level.
• Communicating effectively with colleagues from different fields including molecular biologists, statisticians, and computer scientists using analytic reports and presentations at lab meetings along with talk invitations at national conferences.

SKILLS

Programming: R (ggplot2, tidyverse, dylyr, tibble, flexdashboards, RShiny), Perl (OOP and bioperl), Python, C++, Linux programming, Bash, AWK

Tools: Git, GitHub, LaTeX, MarkDown, MySQL, Google Analytics, JMP, Geneious

Computing: High performance computing (Slurm, PBS, SGE), Cloud computing-GCP

Omics: RNA-Seq, DNA-seq, Whole Genome and Whole Exome sequencing, alignment algorithms (Bowtie, BWA, BLAST, MAFFT, CLUSTAL), Microarray and gene expression (DeSeq2,EdgeR), Phylogenomics software (RAxML, ASTRAL, MrBayes, BEAST, BuCKY), SAMtools, BEDtools

Statistics: Regression, k-means and hierarchical clustering, machine learning, data cleaning, normalization, feature selection, and dimensionality reduction (PCA, SVM, MDS), mathematical optimization, stochastic modeling, multivariate statistics and hypothesis testing

EDUCATION

Ph.D. Evolutionary Computational Biology, University of Florida — May 2022

M.Tech. Computational & Systems Biology, Jawaharlal Nehru University — Aug 2013

B.Tech. Biotechnology, Kurukshetra University — Aug 2010

RESEARCH EXPERIENCE

Graduate Research Assistant, University of Florida — Jun 2014 – May 2022

Supervised by Dr. Gordon Burleigh, Department of Biology

Investigated statistical aspects of molecular evolution and genomics of biodiversity

- Demonstrated application of the statistical technique, data cloning to phylogenetic models using R. Invited to present at Evolution conference 2019 at Providence,RI. Manuscript in review at Systematic Biology journal.
- Developed a new statistical software, using Hidden Markov models linking rates of molecular evolution with hidden functional traits in C++.
- Collaborated with avian biologists and developed a Perl pipeline for automating the avian tree of life using genomic databases. Designed the data integration pipeline and presented results during lab meetings and at UF Genetics Institute symposium.
- Contributed to a multi-lab collaborative project by developing a Perl and Bash scripting pipeline for evaluating the evolutionary relationships between flagellate plants, part of NSF GoFlag grant using transcriptomics data.

Junior Research Fellow, Jawaharlal Nehru University — Aug 2011 – Jul 2013

Supervised by Dr. Andrew Lynn, Center for Computational Biology and Bioinformatics

Evaluated Data Mining algorithms for Chemiinformatics using R programming language

- Improved predictive models using different algorithms such as support-vector machines, random forest, and naives bayes.
- Determined structure activity relationship (cheminformatics) for lead prediction against *Mycobacterium tuberculosis*.
- Contributed to Open Source Drug Development and presented results at the International Conference on Biomolecular Forms.

Research Assistant Jul 2009 – Jun 2010

Supervised by Dr G. Lakshmi Kumari, Applied Biotech Department, Ambala, India

- Prepared immunogens for polyclonal antibody production against thyroid (T3 and T4)
- Purified conjugates(T3-BSA,T4-BSA) using dialysis and chromatography(ion exchange,
- Quantified conjugate affinity using ELISA assay.
- Tracked mammalian cell cultures for monoclonal antibody production.

Internship Jun 2009 – Jul 2009

Atlas Pharmaceuticals, Haridwar, India

- Tested dissolution rates of different drugs in different pH and temperatures.
- Learned the drug manufacturing process and CGMP regulations.
- Learned the Quality control steps in manufacturing, processing, and packing of a drug product according to FDA safety standards.

Internship Jul 2008 – Aug 2008

Ranbaxy, Gurgaon, India

- Prepared biological samples for several bio-analytical instruments, including HPLC, LCMS, GCMS.
- Executed cloning of the gene of interest (GeneX- trade secret) by using a protocol that included techniques such as amplification using PCR, restriction digestion of gene and vector DNA, ligation and then transformation, screening of transformed host strains, inducing gene expression with IPTG using *E. coli* as expression host, lysing cells using freeze-thaw method and sonication and isolating and purifying the protein using SDS PAGE, Western Blotting and FPLC.

Project Assistant Apr 2011 – Jul 2011

ICGEB, New Delhi, India

- Worked on zebrafish animal models and evaluated the regulatory roles of the different miRNAs in hematopoiesis.
- Performed micro-injections of the embryos with miRNA tagged with GFP and RFP.
- Performed in situ-hybridization experiments on zebrafish embryos (wild and those that were injected with miRNA) using the probes (Gata1, mpx and l-plastin).
- Investigated the live embryo through imaging using Fluorescent microscope and bright field microscope.

TEACHING EXPERIENCE

Graduate Teaching Assistant, University of Florida 2014 – 2022

- Instructed seven biology lab courses, both in person and online using Zoom and Canvas LMS.
- Instructed Genetics course for four semesters to undergraduate class of 300 students each semester.
- Coached 20 graduate students on science outreach, non academic science careers, reproducibility and open source data model.
- Invited to deliver four guest lectures on genomics, proteomics and biotechnology, evolutionary biology and quantitative genetics, molecular cloning, bacterial and viral recombination and replication to 300 undergraduate students.
- Trained 60 undergraduate students bioinformatics skills on using NCBI databases such as Genbank, Structure, dbSNP, KEGG.

FIRST AUTHOR PUBLICATIONS

Hans, N; Ponciano J M, Burleigh J G. Evaluating the structural identifiability of diversification models using Data Cloning. (Status: In Review Systematic Biology)

Hans, N; Burleigh J G. Linking rates of sequence evolution with hidden traits. (Status: Manuscript in Prep)

INVITED TALKS

Hans, N; Ponciano J M, Burleigh J G. Spotlight Session: Bright side of Phylogenetics: Evaluating the identifiability of diversification model. Evolution Meeting, Providence, RI. Jun, 2019

Hans, N; Ponciano J M, Burleigh J G. Towards diagnosing identifiability of evolutionary models. Second annual Biodiversity symposium, Gainesville, FL. May, 2019

POSTERS

Hans, N; Ponciano J M, Burleigh J G. Characterizing the performance of species diversification models. Evolution Meeting, Portland, OR. Jul, 2017

Hans, N; Kimball R., Braun E.L., and Burleigh J.G. Building Avian Tree of Life using Supermatrix. Florida Genetics Symposium. Gainesville, FL. Nov, 2014

Hans, N; Yendrek C., Ainsworth L., Brown P., Leakey A.D.B., Dalsing B., Rios L., Sorgini C., Barrios-Perez E. , Erice G , Shim S, Leisne C, McIntyre LM. The impact of ozone growth and development in Zea mays. Florida Genetics Symposium. Gainesville, FL. Nov, 2013

Hans, N; Bharti D., and Lynn A.M. Quantitative Structure Activity Relationships (QSAR) for targets against *Mycobacterium tuberculosis* using data-mining techniques. International Conference on Biomolecular forms and functions. Bangalore, India. Jan, 2013

Hans, N; Mittal P, and GL Kumari. Production of Monoclonal antibodies against α and β subunits of hCG. National Conference on Medical Biotechnology, Rohtak, India. Rohtak, India. Apr, 2010

COMMUNITY ENGAGEMENT

Symposia organizer, Evolution Meeting, Cleveland Ohio — Jun 2022

- Symposium Title: " Making decisions about data and analyses in systematic biology"
- Co-organizing with Alex Hernandez and Chloe Nash

Organization Team, Southeast Regional SACNAS Meeting — Feb 2020

Organization Team, Society of Systematic Biology Standalone Meeting, Gainesville, FL — Jan 2020

Coding Facilitator, Girls Who code, Gainesville — 2019 – 2020

Vice President, Biology Graduate Student Association — 2020 – 2021

Public Relations and Fundraising Rep, Biology Graduate Student Association — 2019 – 2020

IT rep, Biology Graduate Student Association — 2018 – 2019

Science Fair Judge, Alachua County Public Schools — 2015 – 2019

AWARDS

Teaching Assistantship from Department of Biology, UF — 2014 – 2022

Biodiversity Summer Fellowship ($4,000) from Biodiversity Institute, UF — 2018

Travel award ($300) from National Science Policy Network — 2018

Travel award ($600) from NSF for Macroevolution course at Oregon State University, Corvallis — 2017

Travel award ($500) from Society of Study Evolution for Evolution conference at Portland — 2017

Genetics and Genomics Graduate Student Research Fellowship ($25,000) — 2013 – 2014

University Grant Commission, India research fellowship ($5,600) — 2011 – 2013

Jawaharlal Nehru University Research Student Fellowship ($1,500) — 2011 – 2013