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Summary

B.Tech, Ind. Biotechnology; Expected date of graduation: June 2006.
Have worked on wet lab (Basic Molecular Biology, Microbiology, Immunology Techniques) and computational biology (Algorithms & Programming, Sequence Analysis, Network Reconstruction, Model Building & Simulation) projects.
Experienced in teaching; Regularly delivered class-room seminars.
Thorough, open-minded; Committed to finding innovative solutions to challenging problems.

Work Experience

– (Jan'06-Present) Characterizing the TIM-barrel fold. Dr. Nagasuma Chandra, Bioinformatics Centre, Indian Institute of Science, Bangalore.
– (Sep-Dec'05) Reconstructing the cMyc network; wish to fit it into a dynamical model for simulation of cell behaviour. Dr. Gautam Pennathur, Centre for Biotechnology, Anna University, Chennai.
– (July'05-Present) Analyzing the proteome to understand protein sequence/structure correlation with gene sequences to gain insights into molecular evolution; to be applied for gene prediction. Dr. Gautam Pennathur, Centre for Biotechnology, Anna University, Chennai.
– (May-Jun'05) Modeled the segment polarity network in Drosophila using discrete state dynamics to find steady-states. Dr. Sitabhra Sinha, Institute for Mathematical Sciences, Chennai.
– (Dec'04-March'05) Characterized various signals & base content biases of the eukaryotic gene, and predicted genes using minimal constraints; have found putative genes in the *H. sapiens* genome. Dr. Gautam Pennathur, Centre for Biotechnology, Anna University, Chennai.
– (May-Jun'04) Initiated efforts to identification of the causative organism of a skeleton-muscular syndrome in shrimps of southern India. . Involved design and standardization of novel experiments & observation cycles. Mr. Ramdas, Padlab Biotech, Chennai
– (Jul-Dec'03) Assisted a graduate student working on Canine Distemper Virus; learnt the basic microbiology and molecular biology laboratory techniques. Dr. RB Narayanan, Centre for Biotechnology, Anna University, Chennai.

Education and Training

– B.Tech in Industrial Biotechnology (Expected date of graduation: June 2006), Centre for Biotechnology, A.C. College of Technology, Anna University; CGPA: 8.4 (upon 10; aggregate of 6 semesters);
– AISSCE (March 2002), DAV Boys Sr. Sec. School, Examination Authority: CBSE; 89.00%
– AISSE (March 2000), National Public School, Examination Authority: CBSE; 86.00%

Languages known: National – English, Tamil, Hindi; International – Japanese

Skills

– C, Perl; basic proficiency in Matlab, bio-ware like Pajek, Cell Designer, BioSuite; tools like BLAST, Clustal; MS & Open/Star office; Comfortable in Linux/Unix & Windows environments.
– Basic molecular, microbiological, immunological, analytical laboratory techniques.
– Leadership, organization, creative design & presentation.

Relevant Coursework

All basic Math & Engineering courses, Molecular Biology, Cell Biology, Biochemistry, Immunology, Bio-organic Chemistry, Genetics, Metabolic Engineering, Biological Spectroscopy, Chromatographic Separations, Molecular Pathogenesis, Protein Engineering, Bioinformatics, Genomics and Proteomics, Genetic Engineering, Cancer Biology, Biophysics, Analytical Techniques in Biotechnology, Math courses on Special functions & z-transforms, courses in Chemical & Biochemical Engineering. Laboratory courses in Molecular & Cell Biology, Microbiology, Genetic Engineering, Immunology, Biochemistry, Bio-organic Chemistry, Instrumental methods of analysis, Bioprocess & Downstream Processing.

Awards and Achievements

– Subject topper – mathematics – in AISSE 2000.
– Distinction in "The University of New South Wales – International competition for schools" (Mathematics and Science).
– 1st place, essay -The Indian National Trust for Arts and Cultural Heritage – "The Heritage of Chennai" competition.
– Conceived questions/concept, organized & been the quiz master for inter-collegiate, inter-school (general & technical) Quizzes.
– Part of content development team for www.classontheweb.com
– Organized, served in the scientific committee, & designed the poster and brochure for Biotechcellence '05 – a National Level Symposium.

Articles & Reviews

– Cancer – *Pretty Evolvable, But Not Quite There…Yet*! (Proceedings of Biotechcellence '05 – a National Level Symposium).
– Unpublished: Human Telomerase and its Regulation
The Genetic Code
Human Immunodeficiency Virus and AIDS

References

1. Dr. R. B. Narayanan, Director, Centre for Biotechnology, Anna University, Chennai, India. rbn@annauniv.edu
2. Dr. P. Gautam, Professor, Centre for Biotechnology, Anna University, Chennai, India. gpennathur@annauniv.com
3. Dr. Nagasuma Chandra, Asst. Professor, Bioinformatics Centre, Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore, India. nchandra@physics.iisc.ernet.in
4. Dr. Geetha Muthukumaran, Asst. Professor, Centre for Biotechnology, Anna University, Chennai, India. geethamk@annaniv.com

Research Experience – Annex

Centre for Biotechnology, Anna University, Chennai **Jul – Dec'03**
Immunology laboratory, Dr. Narayanan RB
Assisted a PhD student working on Canine Distemper Virus. In course, learnt the basic molecular, microbiology and chromatographic techniques hands-on.

Padlab Biotech, Chennai **May – Jun'04**
Identification of the causative organism of a skeleto-muscular syndrome in shrimps (Paenus Monodon) of southern India
It was important because shrimps are one of India's major exports and the lethal syndrome, with an unknown cause, was causing enormous damages to shrimp aquaculture here. Mr. Ramraj from the company, and I conceived a connection between this syndrome and a similar disease primarily affecting western hemisphere shrimps. My work ranged from collection of samples of affected shrimps from various parts of south India, standardization and use of DNA extraction from the tissue of interest and RT-PCR experiments (including choice of DNA segment to be amplified and primer design). Done against normal tissues and those with various other infections as controls, my initial trials gave positive results. Designed further observation cycles and transmission studies.

Centre for Biotechnology, Anna University, Chennai **Dec'04 – Mar'05**
Computational Biology Laboratory, Dr. Gautam Pennathur
Gene prediction in Eukaryotes
Learnt Perl and C programming languages, and the use of numerous bioinformatics tools and databases. In-depth characterization of the various signals of the eukaryotic gene was made. Worked with a colleague of mine through the project. Using the HS3P and EID databases I came up with the splice-site dataset, created probability transition matrices for the signals and then used them to iteratively refine the data. Exon and intron length profiles and stop-codon distribution within these were also analyzed by me. Many putative genes have been found in the *H. sapiens* genome using these minimal-constraints. All algorithms were developed and scripted by us.

Institute of Mathematical Sciences, Chennai, Dr. Sitabhra Sinha **May – Jun'05**
Modeling the segment polarity network in *Drosophila*
This was a summer project carried out to gain some experience in network dynamics. Worked independently to identify steady-state conditions by numerically solving the existent set of differential equations using first principles. A sheet of interacting cells were considered. While the parameters where unknown, they were randomly generated, plugged into the equations and solved. The number of such trials that mapped onto the wild-type patterns gave a glimpse of the robustness of the network. Understood modeling formalizations and slowly began to appreciate the subtleties therein. Used C codes to run the simulation.

Centre for Biotechnology, Anna University, Chennai **Jul'05 – Present**
Computational Biology Laboratory, Dr. Gautam Pennathur
What makes these strings of amino acids proteins?
To answer how genes have evolved to their present state, I believe, it is important to consider the correlations between DNA sequences and the protein structures/sequences, a degeneracy funnel.

While the idea was conceived by me, the procedure came to shape over a discussion with my colleague. Both work together now. We began to explore the proteome for universal structure and sequence properties. I have extensively studied protein super-secondary and secondary structures. Used Perl scripts for the purpose. We are gaining new insights into protein architecture. Correlating this knowledge to gene sequences remains to be done.

Centre for Biotechnology, Anna University, Chennai **Sep – Dec'05**
Computational Biology Laboratory, Dr. Gautam Pennathur
The cMyc signaling network – Reconstruction and modeling
Deregulated signaling is found in many diseases. My primary interest is cancer where multiple, not single, errors culminate in inordinate division of cells. My colleague and I have taken up the reconstruction and modeling of the cMyc signaling network (The oncogene *cMyc* is frequently associated with human malignancies and plays a critical role in regulating cell proliferation, growth, apoptosis, and differentiation). We have worked to an initial network that should be extended. We then wish fit the signaling interactions into a dynamic model for analysis. The network is also to be analyzed to identify topological features. The work is being carried forward by my colleague.

Indian Institute of Science, Bangalore **Jan'06 – Present**
Bioinformatics Centre, Super Computing Education & Research Centre, Dr. Nagasuma Chandra
Characterization of the TIM-barrel fold
Working on this (structural biology) for my undergraduate thesis. The work involves analyzing protein structural scaffolds for characteristic inter-residue interactions. Would also explore various methods of modeling while studying the altered systems. I'm keen on learning various tools and software, like MATLAB, thoroughly and expanding my ability in mathematics and computer programming.