

## Shubhra Gupta

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<http://www.guptalab.org/shubhg/>

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### PROFESSIONAL SUMMARY

- Gained knowledge in interdisciplinary areas (mathematics, statistics, computer applications, molecular biology, bioinformatics and computational molecular biology).
- Excellent working experience of bioinformatics & statistical tools, statistical programming, data management and databases. Analysis and visualization of gene expression data using statistical approaches.
- Diverse experience in projects. Vast teaching experience from secondary to post secondary level.
- Dedication and drive as a hard-working individual.
- Superlative planning, organizational, excellent oral, written communication and team-building skills.
- Ability to manage multiple tasks in a pressured environment and meet deadlines.

### COMPUTER SKILLS

- **Programming Languages:** VBA, Perl, C, MySQL, Maple, Matlab and html
- **Query Languages:** MySQL, Relational Algebra, Tuple and Domain Relational Calculus
- **Others:** Latex, Microsoft Word, Microsoft Access, Microsoft Excel, Microsoft Power point
- **Operating Systems:** Windows 2000/XP, UNIX, Linux (Red Hat, Mandrake), Mac OSX
- **Web Server:** Xitami, Apache

### BIOINFORMATICS SKILLS

- **Sequence Alignment:** BLAST, FASTA, ClustalW, ClustalX
- **Statistical tool:** SAS, R; **Experimental design:** Design Expert
- **Query Database:** Entrez ; **Sequence Database:** GenBank
- **Microarray and Data mining tools:** Cluster, Gene Spring, Weka, TreeView
- **Gene expression analysis methods:** Filtering, Normalizing, Classifying and clustering genes (Euclidean distance, heuristic distance, SVM), visualization.
- **Phylogenetic Analysis:** Paup 4.0, PHYLIP, Tree Base, Tree View, Multidivtime, Mega
- **Models and Algorithms:** Genome sequencing algorithms: pair wise sequence, alignment, Edit distance, Scoring models, multiple sequence alignment; optimal global alignment, local alignment; local suffix alignment problem, gene annotation
- **Molecular Modeling:** Using Insight II and Chime created polypeptides and sugars, with optimizing the structures and compared them.

### EDUCATION

- **Professional M.S. in Computational Biosciences (Aug/2002 – Aug/2004), Arizona State University, AZ, USA, GPA: 3.8/4.0**
  - ♣ Learned Entrepreneurship in the biotechnology management, global Pharmaceutical, medical technological industries and also working of an organization.
  - ♣ Learned real life tomato growing using statistical approach.
  - ♣ Developed web based tool to optimize codon.
  - ♣ Handled large gene expression data.
- **Diploma in Computer Application (Aug/1996 –Feb/1997), Systems InfoTech Computer Education, India, Grade: A**
- **Bachelor of Education (Aug/1995 – June/1996), University of Kanpur, India, Methods of Teaching: Mathematics and Science**
- **Master of Science: Mathematics (Aug/1991 – June/1993), University of Kanpur, Kanpur, India, First Division (First position in the college)**  
**Courses:** Probability and Statistics, Mathematical Analysis, Topology and Complex Analysis, Differential Equation and Solid Geometry, Hydromechanics and Rigid Dynamics, Mechanics, Modern Algebra, Functional Analysis, Riemannian Geometry, Numerical Methods

- **Bachelor of Science: Physics, Mathematics and Chemistry (Aug/1988 – June/1991), University of Kanpur, Kanpur, India First Division**

#### WORK HISTORY

- **Research Assistant, Center for Evolutionary Functional Genomics, Arizona State University, AZ (Feb/04 - Aug/04)** (Title: Estimating the Divergence Time of Molecular Sequences using Bayesian Techniques)
  - ♣ Focused on the theoretical, computational, and practical aspects of the Bayesian methods to construct evolutionary timescales using molecular data and *multidivtime*.
  - ♣ Wrote a *perl* script to automate the use of *multidivtime* in the Linux environment.
- **Teacher: Mathematics, Virandra Swarup College, Kanpur, UP, (July/99 - April/00).**
- **Teacher: Science and Mathematics, Kanpur Vidyamandir, Kanpur, UP, (July/98 – May/99).**
- **Trainee Graduate Teacher: Mathematics, Jawahar Navodaya Vidyalaya Sarsaul (Ministry of Human Resource Development Government of India, Department of Education), UP, (Sep/97 – May/98).**
- **Teacher: Mathematics and Science, A.B.H.S.College, UP, (Aug/94 - May/95).**
  - ♣ Taught classes of approx 50 students, all of them passed with good rank. Some of them are in aboard for study or for work.
  - ♣ Organized cultural and physical extra curriculum activities like Music, painting & craft, Cleanness and Hygiene, Knitting, Wood work, Candle making, Gardening, Embroidery, Social work, Dancing, chat stall, sports, games.
- **Taught in Coaching's: 1. Indian Coaching Institute (ICI); 2. Mathur Coaching; 3.Tuitions at Home**  
**Subject: Mathematics and Science (Grade 9 to Grade 12 and BS, MS).**

#### AWARDS AND HONORS

- Selected for summer school at Mathematical Biosciences Institute at Ohio State University, Ohio.
- Selected to "The National Society of Collegiate Scholars (NSCS)" for outstanding achievement in Graduate program at Arizona State University, Ohio.
- Won institute aptitude test "SCHOLARSHIP-96".
- Test of English as a Foreign Language (TOEFL) qualified.

#### PUBLICATIONS AND CONFERENCES

- **Book:** A problem book on mathematics, for IIT- JEE (With M. K. Gupta) in progress. This book has about 350 original problems in mathematics for the joint entrance examination of Indian Institute of Technology.
- **Research Article:** "On Higher Order *K*-bonacci Matrices" submitted to *Ars. Comb. Journal*, 08/03.
- Attended joint mathematics meetings, January 7- 10, 2004, Phoenix Civic Plaza, Phoenix, Arizona.
- Attended quantum mind conference: Consciousness, Quantum Physics and the Brain, March 15-19, 2003, The University of Arizona, Tucson, Arizona.

#### ACTIVITIES

- Represented India through costume parade in the Event Asia 2001 (Christchurch, New Zealand) and took part in various cultural activities at Indian Social and Cultural Club, Christchurch, New Zealand.
- Worked as a volunteer at the Sir John McKenzie Memorial Children's Library, Christchurch, New Zealand.

#### PROFESSIONAL AFFILIATION

American Mathematical Society, 2003 & 2004

#### RESEARCH PROJECTS

- 1. Divergence Time of Molecular Sequences using Bayesian Techniques (Internship project):** <http://math.la.asu.edu/~cbs/stext/intern.htm#2003>
- 2. Micro array Data Analysis (Team Size: 2):** We downloaded breast cancer data, which was freely available on the web. Analyzed that data and then applied classification methods on that. Classification methods performed using MS-Access, MS-Excel and VBA.  
[http://www.guptalab.org/shubhg/pdf/Project\\_Report\\_CMB.pdf](http://www.guptalab.org/shubhg/pdf/Project_Report_CMB.pdf)
- 3. Clustering of micro array data:** I downloaded the freely available micro array data from the web. In order to decide which genes have significantly varying expression across conditions I applied filtering process on that data. C programming, T-test and web-based tool used to perform clustering.  
<http://www.guptalab.org/shubhg/pdf/finalreportdatamining.pdf>
- 4. Sales Database and Payroll System (Team Size: 5):** We developed a database that keeps track and calculate various sales and payroll issues for a rental company. This was a Microsoft solution, where the business logic was done using macros in MS-Access.  
<http://www.guptalab.org/shubhg/pdf/Group9Phase3Final.pdf>
- 5. Codon Optimization:** Codon optimization is a technique recently used by many researchers to improve the protein expression in living organism by increasing the translational efficiency of the gene of interest. Optimizing codon for gene of interest is one of the most efficient ways to increase the quantity of the gene-product for prolonged time. I developed a web based tool for that using C programming, CGI script and html.  
[http://www.guptalab.org/shubhg/pdf/shubhra\\_codon.pdf](http://www.guptalab.org/shubhg/pdf/shubhra_codon.pdf)
- 6. A Biomathematical Approach to HIV and AIDS (Team Size: 6):** A bio-mathematical approach for HIV infection was applied for an uninfected, infected and a mutating virus model using maple, matlab and Microsoft packages. <http://www.guptalab.org/shubhg/pdf/HIV.pdf>
- 7. Molecular Modeling (Team Size: 4):** We had designed de novo a simple, linear model of Vitamin-D binding protein derived macrophage activating factor (GcMAF), using software Insight II. <http://www.guptalab.org/shubhg/pdf/final.pdf>
- 8. Phylogenic Analysis (Team Size: 2):** We developed phylogenic trees using Maximum Likelihood, Maximum Parsimony, Neighbor Joining and Bootstrap Analysis with the help of Paup 4.0, Latex and tree view. [http://www.guptalab.org/shubhg/pdf/Proj\\_report\\_phylogenic.pdf](http://www.guptalab.org/shubhg/pdf/Proj_report_phylogenic.pdf)
- 9. Tomatoes Growing (Team Size: 2):** [http://www.guptalab.org/shubhg/pdf/final\\_report.pdf](http://www.guptalab.org/shubhg/pdf/final_report.pdf)
- 10. Reframing Organization:** [http://www.guptalab.org/shubhg/pdf/Reframing\\_organization.pdf](http://www.guptalab.org/shubhg/pdf/Reframing_organization.pdf)
- 11. Business Model Plan (Team Size: 4):** <http://www.guptalab.org/shubhg/hsa598.html>