

Aman Kumar

Indian Institute of Technology Madras

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Objective	Graduate studies in the field of biological sciences	
Research Interests	Molecular Biology, Biochemistry, Molecular Basis to Diseases, Synthetic Biology and Systems Biology	
Education	Indian Institute of Technology Madras Candidate for Bachelor & Master of Technology degree in Biotechnology Major GPA: 8.90/10 (3.69/4) Overall GPA: 8.36/10 (3.55/4)¹ Relevant courses: Cell Biology, Molecular Biology, Systems Biology, Genetic Engineering, Biochemistry, Molecular Basis to Diseases	Chennai, India Aug 2010-July 2015
	Patna Central School Class XII Secured 91% in final exams (ranked 1 st out of 94 students)	Patna, India May 2009
	Patna Central School Class X Secured 87.2% in final exams	Patna, India May 2007
Scholastic Achievements	<ul style="list-style-type: none">• One of the top 4% (>10,000 applicants internationally) students selected by MITACS for summer internship 2014 in Canada• Gold medalist at the worldwide (204 teams) synthetic biology competition iGEM held annually at MIT, USA (2013)• One of the top 10% (>10,000 applicants nationally) students selected for summer fellowship 2012 by Indian Academy of Sciences• Recipient of INR 200,000 research grant from Industrial Consultancy & Sponsored Research (ICSR) at IIT Madras for the iGEM project (2013)• One of the six nominated by my Institute for the TF LEaRN scholarship for exchange programme at the Nanyang Technological University, Singapore (2012)• Among top 0.8% (~500,000 candidates) to be admitted into the prestigious Indian Institute of Technology (IIT) (2010)	
Conference Poster²	Kumar Aman et al. “ <i>Combating Shiga Toxin – A synthetic biology approach</i> ”, International Genetically Engineered Machine (iGEM) competition, Chinese University of Hong Kong, Hong Kong	4 th -6 th Oct 2013
Unpublished Paper³	Kumar A., Raman K. (2014). “ <i>Boolean Modelling of Catecholamine synthesis and degradation pathways</i> ” Indian Institute of Technology Madras.	
Research Experience	Dr. Fraser Lab, Department of Biological Sciences <i>Summer Intern – MITACS Scholar</i> Investigating the biological and catalytic roles of human ATP Citrate Lyase (hACLY) <ul style="list-style-type: none">• Imbalance in activity of hACLY activity leads to several diseases like Type 2 Diabetes, Tumor cell growth, Hypocitraturia, Obesity etc• Purified the hACLY protein using chromatographic techniques like Gel filtration, Anion Exchange.• Performed coupled-enzyme assays for elucidating activity of protein• Structural analysis of the purified protein will help in determining the function and catalytic site of the enzyme• Supervisor: Dr. Marie Fraser, Department of Biological Sciences, University of Calgary	University of Calgary May’14-Aug’14
	Cardiovascular Genetics Lab, Department of Biotechnology <i>Research Associate (Master’s Thesis)</i> Studying the interactions of Chromogranin A with Heat Shock Proteins (HSP70) to elucidate its plausible role in cancer and cardiovascular diseases <ul style="list-style-type: none">• Engineered the Chromogranin A gene into GST-tagged vector and optimized its purification strategy• Observed the co-localization of Chromogranin and HSP70 using confocal microscopy• Performed co-immunoprecipitation for <i>in vivo</i> interaction studies• Supervisor: Dr. Nitish R Mahapatra, Department of Biotechnology, IIT Madras	IIT Madras Jan’14-Present

¹ Conversion of 10 scale to 4 scale as described by <http://tinyurl.com/gpaconversion>

² Poster can be viewed at <http://tinyurl.com/iGEM-poster>

³ The link for the paper can be found at <http://tinyurl.com/Boolean-modeling>

International Genetically Engineered Machine (iGEM)*Core Member – Awarded Gold Medal***CUHK, Hong Kong**

Mar'13-Oct'13

Combating the effect of deadly Shiga-toxin (AB₅) and inhibiting biofilm formation⁴

- Engineered a novel 9 amino acid anti-Shiga peptide for its extracellular secretion and toxin inhibition
- Detected the presence of the anti-toxin peptide in spent media using reverse HPLC
- Supervisors: Dr. Nitish R Mahapatra, Dr. Karthik Raman, IIT Madras

Dr. V. Nagaraja, Department of Microbiology and Cell Biology*Summer Internship - IAS Scholar***IISc Bangalore**

May'12-Jul'12

Investigating the function of DNA modification protein “Mom” (from Bacteriophage Mu) using site-directed mutagenesis

- Identified the active residues of the protein and introduced mutation using Inverse PCR
- Engineered the mutant PCR product into pET-28a vector and purified using Ni-NTA column
- Supervisor: Dr. V. Nagaraja, Indian Institute of Science Bangalore, India

Course Projects**Boolean Modelling of Catecholamine synthesis and degradation pathways**

Supervisor: Dr. Karthik Raman

Jan.'14-May'14

- **Qualitative dynamics** for the biological pathway (**25 reactions**) was studied using Boolean modelling and predicted the **steady state** of the Catecholamine network using **Python**

A study on the Kinetic modeling for polyhydroxybutyrate (PHB) production by *Hydrogenophaga pseudoflava*

Supervisor: Prof. K B Ramachandran

Apr.'14-May'14

- **Extracted** reported data using Plot Digitizer and validated the reproducibility of results using **MATLAB**
- **Improvisation** on the existing model was tested for increasing PHB production

Testing the purity of water from various sources inside campus of IIT Madras

Oct.'13-Nov.'13

- **Collected** water from various sources of campus including hostel tap water, residential zone water, drinking water and lake water
- **Compared** the level of impurity present using filtration method and suggested ways to improve the purity of water

Wikipedia page on a set of genes collectively called *gab operon*

Aug.'13-Sept.'13

- **Co-authored** a **Wikipedia page**, considered best among 18 and awarded **14/10**, 40% more for coherent presentation and early submission

pH based hydrogels with embedded sensor for control of Type I Diabetes

Jan.'12-May'12

- Studied the **controlled release rate** of Insulin in response to glucose from spherical hydrogels using mathematical formulations

Workshop**Microarray Data Analysis and Data Mining**, Bionivid Technology, Bangalore, India

Supervisor: Mr. Mahadevan Vasudevan, Director-Research & Training

20th – 24th May'13

- Raw data (**for >3000 genes**) extracted is subjected for normalization using Genespring, a cutting edge microarray tool
- **Performed** quality control to screen for differentially expressed genes using Box Whisker Plot, Principal Component Analysis (PCA), Correlation co-efficient and clustering
- Significant biology and **model building** was performed to find the key regulators of the network

Technical Skills

- Languages: Proficient in C with elementary knowledge of JAVA, Python
- Professional softwares: MATLAB, PyMol, AutoDock, AutoCAD

Volunteer Activities

- Currently **Mentoring** a Centre For Innovation (CFI) project, for detecting water pollution using Biosensors
 - ❖ Assisted sophomores to build up ideas for developing biosensor using bio-luminescence method
 - ❖ Incorporated synthetic biology approach for engineering bacteria and measuring the contaminants using the change in Biochemical Oxygen Demand (BOD) value
 - ❖ Devised plan to develop an Android app with image processor for commercialisation purposes
- **Teaching Assistant** for the Life Sciences course (Aug. '14 – Nov. '14)
- Awarded **Best Human Practices** (Asia-Pacific) for raising awareness drive for safe meat processing throughout India through our novel initiative “**Code Red**” at Chinese University of Hong Kong (2013)
- Formulated questionnaire and conducted an event “**BIODOCKS**” at IIT Madras Biotechnology Departmental fest about protein docking studies (2012)
- **Taught underprivileged children** (> 300 students), from 5 different schools, basic Mathematics & Science as a team member of National Service Scheme (NSS) (2010)

⁴ Details about the iGEM project can be found at http://2013.igem.org/Team:IIT_Madras