



Ujjwal Kumar  
Electrical Engineering  
Indian Institute of Technology, Bombay  
Specialization: Communication & Signal Processing

05002041  
Dual Degree (B.Tech+M.Tech.)  
Male  
DOB: 20/11/1986

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2009	8.71
Intermediate/+2	CBSE	St. Michael's High School, Patna	2004	82.40
Matriculation	CBSE	Loyola High School, Patna	2002	93.20

#### SCHOLASTIC ACHIEVEMENTS

- Ranked 5<sup>th</sup> in my specialization and 9<sup>th</sup> amongst 45 students in EE Dual Degree batch (2009)
- Department rank 1 out of 84 students after 1<sup>st</sup> year and hence awarded a **branch change** (2006)
- Fellowship recipient from Tata Teleservices IITB Centre of Excellence in Telecommunications (2009)
- Council for Scientific and Industrial Research (CSIR) "Leadership in Science" awardee (2003)

#### OLYMPIADS

- Represented state of Bihar in Indian National Mathematics Olympiad (INMO) (2003)
- Secured 3<sup>rd</sup> rank in state in Regional Mathematics Olympiad (RMO) (2002)
- Secured 33<sup>rd</sup> rank in National Science Olympiad from amongst 25000 students (2002)
- Received **merit certificate** in National Mathematics Olympiad, awarded to **top 1% students** (2001)

#### INTERNSHIPS

##### E.P.F.L. (Swiss Federal Institute of Technology), Switzerland

May-July '08

"Algorithm Development for Computational Systems Biology"

- Designed an **object-oriented toolbox** in MATLAB (partially in C++ using MEX), for dynamical analysis of bio-molecular reaction networks
- Implemented analysis and simulation algorithms for various **deterministic and stochastic models** of reaction networks, leading to important results in an **award winning publication**
- Felicitated by lab for timely attainment of goals and pleasant and efficient conduct

##### TCS Innovation Labs, Mumbai

Dec '07

"Real-time Speaker Identification"

- Benchmarked various **identification methods** and suggested use of MFCC's for speech modeling and 2nd order Gaussian Likelihood Measures for identification
- Developed an optimized **C++ program** to achieve at least **10-fold improvement in processing time**

#### KEY ACADEMIC PROJECTS

##### Joint Data Compression and Security, Dual Degree Project

Jan '09-present

- Carried out an **exhaustive survey** and presented a seminar on existing schemes based on **arithmetic coding** and **wavelet sub-band decomposition**
- Classified the various existing methods in an unified way based on standard parameters
- Quantified the possibility of **adding information** to zero-tree based compression techniques
- Currently working on quantifying additional choice presented by **hybrid wavelet transforms**

##### Image Super Resolution, Undergraduate Research Opportunity (UROP), IIT Bombay

Jan-May '07

- Explored the possibility of using **Papoulis-Gerchberg** method for image super resolution and method of **Total Variations** for de-noising
- Implemented it on MATLAB and also did a **comparative study** of various existing techniques

##### Digital Cards Game, Digital Circuits Course Project

Mar-Apr '07

- Successfully completed the given problem of simulating a two player card game on bread boards, using sequential and combinational **logic circuits** over **digital devices**
- Further improved the design to increase user-friendliness and reduce the circuit dimensions

## Dispersion for Graded Index Fiber, *Fiber Optic Communications Course Project*

Mar '08

- Calculated **dispersion** for a general graded index fiber, which follows  **$\mu$ -law variation** in refractive index along the radial direction
- Used MATLAB GUI to **demonstrate** ray-movement and dispersion values dynamically

## New Routing Protocol on Network Simulator-2, *Summer Project*

May-June '07

- Worked on implementation of a new routing protocol on NS-2 using **C++**, after studying various existing **Link-state routing protocols** such as **OSPF**.

## TECHNICAL SKILLS

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- **Languages:** C++, PHP, HTML, 8085/8051 assembly language
- **Packages:** MATLAB, MS Office, LATEX, Eagle Layout Editor, Keil, Network Simulator-2
- **Operating Systems:** Windows, Linux

## INITIATIVE

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**Conceptualized, organized** and systematically **executed** an Inter School Quiz Competition (**Brain of Patna**) working with a team of seven IIT students

- Planned a shoe string budget of **Rs. 1.5 lacs** with sponsorship from corporate houses & clubs of Patna
- Successfully convinced **25 leading schools** of the city attracting a participation of at least **10000 students**
- Garnered **media attention** through **23 articles** in national dailies and coverage from local channels
- The event has **grown** into an **annual state level** affair and has been **appreciated** by the **Governor**

## POSITIONS OF RESPONSIBILITY

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### Institute Cultural Web Nominee, *IIT Bombay*

Dec '07-Apr '08

- Created and maintained the institute cultural website and initiated an open discussion forum
- **Introduced** and **implemented** the idea of making separate websites for various cultural clubs
- Promoted the website as a reliable and centralized information source of in-campus cultural events

### Senior Student Mentor, *Department of Electrical Engineering, IIT Bombay*

Aug '07-present

- Part of a 20 member team **selected by faculty**, on the basis of academic performance and sincerity
- Assisted in identifying underperforming students and acting as a liaison between students and faculty
- **Responsible** for guiding **25 students** in managing their academic and extra-curricular workload

### Teaching Assistant, *Probability and Random Processes*

Aug '09-present

- Assisting the faculty in a course for **80** students by **conducting tutorials** and grading answer-scripts
- Conducting sessions outside the classroom for students who are facing difficulties in the course

## EXTRA-CURRICULAR ACTIVITIES

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### WEB

- Worked with **latest web related technologies** viz. AJAX, JAVASCRIPT, HTML, CSS and PHP and **Content Management System** such as JOOMLA
- **Voluntarily** developed websites for **Institute Counseling Services** and the campus newsletter **Insight**
- Used **web server** package XAMPP which includes HTTP server and MYSQL Database

### MISCELLANEOUS

- Conducted state-level **counseling** and **training workshop** for engineering aspirants (2004, 2005)
- Member of hostel **hockey** team: Won **bronze** in General Championship, IIT Bombay (2007)
- Member of **silver** winning team in hostel **football** league. (2008)
- Attended **French classes** at EPFL and cleared the beginner level with highest marks (2008)
- Won **1<sup>st</sup>** prize in district **inter-school science quiz** (2002)