

# Anish Mangal

## Education

2004 – 2008; Bachelor of Electronics and Communication Engineering  
**Netaji Subhas Institute of Technology (NSIT); Delhi University**  
Graduated First Class with Distinction (Highest Possible Honors)  
GPA – 78.90%

## Publication(s)

A. Mangal, D. Jindal, G. P. Srivastava. **Verifying Low-Power Implementation in SoCs Containing Multiple Power Domains**. *Prior-art Database; IPCOM000198312D, Aug – 2010*

## Talks

A. Mangal, A. Sarwal. **Sugar: the sweet constructionist learning environment**. *In PyCon India 2010, Bangalore; Sep – 2010*

A. Mangal. **Python in the hardware world: MyHDL**. *In PyCon India 2010, Bangalore; Sep – 2010*

## Research Experience

**Volunteer Contributor to Sugarlabs and One Laptop Per Child**  
*Jun 2010 – Present*

- **Pippy activity maintainer**  
Developed new features and fixed bugs and merged out of stream changes.
- **Contributor to Dextrose**  
Designed and developed new features (such as a 'resource usage indicator', an activity 'microformat updater'). Also contributed patches to fix bugs.
- **Contributor to Record activity**  
Fixed the UI of Record, which is a core Sugar activity. The UI was broken on the latest versions of the Sugar code-base.
- **Contributor to sugar-core**  
Fixed some core environment bugs.
- **Developer of XoScope**  
This is an under development activity that allows kids to attach a mini-telescope to the xo laptop camera and take images of the Moon. It involves using the v4l2 api to modify camera settings such as exposure, auto-gain control, contrast, brightness. Also, it is required to capture RAW Bayer data from the camera so that no information is lost in compression. I am the sole developer of this activity.

## Undergraduate researcher at Electronics and Communication Division, NSIT, Delhi University

- **Shaft Encoder**  
Designed an innovative low cost, low component count shaft encoder based on a miniature stepper motor. Won **Distinctive Excellence** at **Circuit Cellar AVR Design Contest 2006** sponsored by Atmel.
- **Ultrasonic Distance Ranger**  
Designed a distance measurement tool based on ultrasonic transducers. This involved determining the impedance characteristics of the ultrasonic transducers, to allow them to be interfaced to the analog to digital conversion and sampling circuits.
- **Microstepping Motor Controller**  
Developed a microstepping motor controller that drastically reduces the number of IO pins used, allowing the whole project to be centered around a tiny 8 pin AVR microcontroller.
- **Big Message Display Board**  
This involved reverse engineering an existing interface and display driver board and connecting it to an embedded system and a GSM modem. The end user could modify the data to be displayed by multiple boards spread over various locations, (for example, multiple traffic intersections) by simply accessing an application on his computer.

## Working Experience

### Design Engineer at Freescale Semiconductor

*Jul 2008 – Sep 2010*

- **System performance analysis**  
The objective of this activity was to ascertain whether a particular bus-arbiter was capable of handling the bandwidth requirements inside the P1022 Multicore System-on-Chip (SoC). It involved studying the system bus architecture and the bus arbitration scheme in detail and simulating various load and traffic conditions to determine the required performance metrics.
- **Verification of SoC specific IP Block, Common On-chip Processor (COP)**  
It involved the complete verification cycle of the COP block including RTL and Gate Level verification. The COP block in P1022 contained the Power Management, Reset, Clocking and Debug sub-blocks. Developed new testbench components (such as monitors) as a part of this activity.
- **Developed a methodology for low power verification of designs containing multiple power domains**  
The P1022 multicore SoC features advanced low power modes such as Deep-Sleep, wherein a portion of the design is powered OFF. Verifying this feature required the development of a flow to automatically generate checkers by obtaining information from the design. This work was later published as a **defensive publication**.
- **Silicon bringup and validation**  
Worked with the P1022 silicon validation team in the debug and bringup of the SoC. It involved many hands-on debug sessions on various boards developed specifically for the P1022 SoC. I also assisted the PLL characterization team in their analysis of various PLL's (System, Core, DDR) in the design.
- **P1022 Rev 1.1 activities**  
P1022 implemented an advanced ultra deep-sleep mode resulting in drastic power savings. I was involved with the conception, design and simulation of corner cases of this advanced deep-sleep mode. Got recognition from the organization in the form of a financial reward. Apart from this, carried out the RTL and gate level verification of many IP blocks in the design.

## Technical Consultant at Paraguay Educa

Nov 2010 – Apr 2011 (Tentative)

- It will involve providing technical insight and support to the OLPC deployment in Paraguay.

## Awards and achievements

### Distinctive Excellence, Atmel AVR Design Contest 2006 for Shaft Encoder

Awarded **1st** position in 'Original hardware' at Innovision 2006, NSIT

Awarded **1st** position in 'AVR Challenge' at Innovision 2006-07, NSIT

Awarded **1st** position in '8085 Programming' at gates2k7, GTBIT

Awarded **2nd** position in 'Pre-defined Hardware' at Innovision 2006, NSIT

Awarded **merit scholarship** at NSIT amounting to **full tuition fee waiver**

**34<sup>th</sup>** Rank in **CEE – 2004** (out of ~65000 applicants), the annual entrance examination for admission to undergraduate programs in the **University of Delhi**

## Skill Set

### Languages

✱Verilog, ✱SystemVerilog, ✱Python, ✱LaTeX, ✱C, ✱C++, ✱Perl, ✱scheme, ✱assembly, ✱bash, ✱tclsh

### Libraries

✱GTK+, ✱MyHDL, ✱GStreamer, ✱glibc, ✱avr-glibc, ✱Sugar API

### Developer Tools

✱GIT, ✱SVN, ✱Design sync, ✱Make, ✱Trac, ✱GTKWave, ✱gnuplot, ✱vim, ✱AVR-related

### CAD tools

✱VCS, ✱Cadence LP, ✱DVE, ✱OrCAD, ✱Eagle(PCB), ✱Novas Debussy, ✱Xilinx ISE

| Legend: ✱ **Expert**, ✱ **Proficient**, \* **Familiar**

## Extracurricular

### Sugarlabs FOSS community building

*Mentoring a group of students from various colleges to get involved in the Sugarlabs FOSS project.*

### Embedded systems workshops

*Conducted two Atmel AVR microcontroller based embedded systems workshops attended by over 200 people.*

### Amateur astronomy and Amateur Telescope Making (ATM)

*Hand-figured an eight inch (diameter) f/7.4 parabolic mirror and built a Dobsonian telescope*

### Unconventional webcam (Lucky imaging) and DSLR Astrophotography

### Co-founder of Innovation for Social Change

*A non profit organization committed to the betterment of society through innovation*

### Photography