Major publications:

Darsh Shah, Vedang Patel, Abhishek Borkar and Prabhat Ranjan "Improved Speed IR Communication based Sensor Network for Tokamak In-Vessel Monitoring", 26th NATIONAL SYMPOSIUM ON PLASMA SCIENCE & TECHNOLOGY (PLASMA-2011), Patna (December 20-23, 2011)

Derek Lomas, Kishan Patel, Dheeraj Medikonda, Darsh Shah, Yash Soni, Anshul Pahwa, Dixie Ching "Play Exemplars from Playpower.org" at International Academic Conference on Meaningful play, October 21-23, 2010, Michigan State University, East Lansing, Michigan.

Patent:

Applied for patent at Patent and Trademark office, Mumbai for an invention titled "A Novel Standalone Printer Add-On Device and System". Application number: 2753/MUM/2011.

Honors, prizes, awards, and fellowships:

Was selected in the 'Living with Machines' track at the MIT Media Lab's Design and Innovation Workshop which was held in Pune from 24th - 29th January 2011.

Made a working prototype of a braille printer KEYS2DOTS. The idea behind this was that there are millions of visually impaired people in the world. A majority of them are literate and can read braille. On the side of spectrum, printing in braille is very costly and the printers are not easily available for the people who don't know braille. The keys2dots product targets this space. In our initial working prototype, we made a custom printer using FabLab machines which could print dots on a sheet of paper. The input is given via a qwerty keyboard, which is sent to arduino. The arduino converts the alphabet into the corresponding braille 6-dot pattern and then gives commands to the motor and relay to punch the holes in the paper. The video of the printer in action - http://www.youtube.com/watch?v=1qfjwbxTCKQ

Press Coverage: The Hindu Newspaper http://www.hindu.com/2011/01/29/stories/2011012958830200.htm - It is about the braille printer which we made during the workshop.

Again participated in the Sensor Mediated Environments' track at the MIT Media Lab's Design and Innovation Workshop which was held in Delhi from 26th - 30th March 2012. The instructors were Nanwei Gong and Nan Zhao.

At this workshop, we came up with an initial working prototype of smart, connected t-shirt called smarT. The t-shirt has a LED panel in front for displaying information on the shirt. The final idea is to read gestures using camera and display text on the LED panel. The camera is mounted on the shoulder or head of the wearer. One use for this product is that people can in real time read the sign language, convert it to text and display it in real time on screen. Also, the t-shirt is connected to internet and hence the display can be used for advertising. So, context-based/location aware advertisements would be on

the t-shirt as the person moves around. Moreover, custom messages can be displayed on the t-shirt as per the mood of the wearer like slogans, trolls, and other similar things.

A new type of flexible & wearable technology should be invented to take this product from prototype to commercial success.

Teaching and work experience:

I was a part-time teaching assistant in the Embedded Hardware Design course in my senior year. My responsibility included designing lab experiments, explanation of the topics and helping the students during the lab session.

From January 2012 to May 2012, I worked as a Game developer and designer intern at Playpower Lab Pvt. Ltd. It is a startup company which makes educations games for K-12 students. My work was to brainstorm and come up with new game designs with the team, then make an initial rapid prototype of the game and iterate again till the design of the game is fixed. After the concrete design and multiple iterations, I code the game using Actionscript3.0 and PureMVC framework. We made 3 games in 5 months. The first game was battleship number line game in which the ship came from back to front in random time and the player has to answer a maths question displayed on screen. The ship would then blast cannon for wrong answer or timeout. The second game was clock game in which time/clock reading skills were taught to the player. The time was displayed on the clock and the player had to guess the time or the play was asked to set a particular time and much more. The last game was MathFact in which the player had to answer simple maths addition, subtraction, division and multiplication questions. It has an fun and intuitive UI. This game is hosted at http://goo.gl/q6wSM.

Following the completion of my undergraduate degree, I joined Qualcomm, India as an Associate Engineer in June 2012. At Qualcomm, I am currently working on FastCV, a computer vision library by Qualcomm, making test APIs for FastCV and exploring ways to test these on different hardware platforms. Also, I am building an automation suite for testing using Perl. I write end-to-end apps in C++ for FastCV APIs. I use and test Vuforia Augmented Reality using camera booth and Matlab. I work on Valgrind to detect failing scenarios related to memory profiling in the video codecs as well as FastCV APIs and rectify them.

Research experience:

I did a research internship with PlayPower Foundation affiliated to Carnegie Mellon University during my sophomore year. The Playpower foundation is supported by MacArthur Grant and has won various awards. I worked under Derek Lomas, a Phd candidate at CMU and Prof. Mattew Kam. My task was to code for 8-bit 6502 microprocessor to make educational games for Nintendo Entertainment System (NES) platform. The 6502 processor, which ran at 1.79 MHz, and had 32KB ROM & 2KB of RAM, made it challenging. I wrote more than 5000 lines of code in assembly language with only 2 general purpose registers to work with. I used bank switching to fit the entire game into the limited space of 32KB. Also, displaying sprite using the picture processing unit and writing waveforms to produce sound was a difficult task. We made 3 games. A Hanuman quiz game in which Hanuman, an Indian mythological God

would fly in sky, collect points and ask basic question. This game aimed at increasing the general knowledge and math skills of the player. The second game was Hanuman Typing game in which the character moved and fought with monsters, when the text displayed on the screen was typed correctly by the player. The task was to type simple sentences in English with an aim to improve the usage of English in by the player. The last game was a malaria game in which the player will kill the mosquitoes. The narrative explained preventive methods and measures on how to avoid getting malaria. The games were field tested in Ahmedabad, Mumbai and Bengaluru. A paper was published on this effort. Also, the games were showcased in various conferences like "Game Developers Conference - 2011" (GDC-2011) and "Electronic Entertainment Expo -2010" (E3 -2010).

I was a research assistant in the Embedded Systems and Sensor Network Research Group at DA-IICT, where I did my summer research internship under Prof. Prabhat Ranjan on OpticalCENSE project. This project was sponsored by National Fusion Program, Board of Research in Fusion Science, India, where we were assigned the task of designing a wireless sensor network which would facilitate viewing of pre-fusion condition inside a Tokamak, before the nuclear fusion takes place. The traditional solutions like using Radio Frequency communication could not be used inside a conducting chamber due to multipath effects. We came up with an innovative solution of an infrared-communication based sensor network system. I made optimizations in design of the node and soldered a prototype that increased data transfer speed in the lab for testing. I used MCP2120 in the new version which increased the baud rate to 312.5 Kbaud. Once the prototype was working correctly and design finalized, I fabricated a custom PCB using OrCad and did alpha testing in the lab. We published the results in PLASMA-2011.

Other experience and volunteer work:

I did a one month rural internship at Hadoti Natural Society under the guidance of Professor Ganesh Devy and Mr. Rakesh Vyas in December 2009. We worked in rural areas of Kota district, visiting different villages and working on human - crocodile conflict and its amelioration measures. We taught the villagers on how to prevent attacks and the steps to be taken to avoid the conflicts. It was a very useful learning experience as we stayed in the village for a month and got to know more about the lives of people. We also helped them in their other activities pertaining to village work.

I am member of IEEE (Institute of Electrical and Electronics Engineers) and I am affiliated to IEEE Student Branch at DA-IICT since joining the university in 2008. I am involved in various activities conducted by the branch.

Positions held:

Secretary, IEEE Student Branch, DA-IICT since February, 2011

Roles include arranging meetings, taking notes during meetings, preparing documents like annual plan and report, working with other volunteers, major decision making, budgeting, event planning, etc.

Publicity Manager, IEEE Student Branch, DA-IICT from March, 2010 - February 2011

As a publicity manager, I and my team went to various colleges in the state for publicizing the events. A good publicity ensures success of an event as turnout is high.

Volunteer, IEEE Student Branch, DA-IICT from August 2008 - February 2010

I was involved in the organisation of Indicon 2010, a national conference which was organised at DA-IICT. I worked for 4 months under direct supervision of the faculty coordinator of the event and learnt a lot out of it.

Organized and coordinated a One day workshop on Matlab in DA-IICT in March 2010.

Coordinator of i.rubble event at IEEE ifest 2010 held at DA-IICT in September 2010.

Supervision of Summer School 2011 held in June 2011 at DA-IICT.

As I was in the core committee, I was involved in planning and executing all the events throughout the years. This work helped me to understand responsibility and imbibed the values of leadership in me.

I was appointed Team leader for many of academic courses in during past 3 years. So, this has helped me to learn leadership skills and gain a lot of knowledge on how to get things done completely and correctly.

I am a founding member of Ahmedabad Robotics Club, a hobby club where I used to teach children about electronics and robotics. We started this club in summer 2008 with 5 kids and now the intake has crossed 100. We have regular meetings on Saturdays and Sundays and children are taught from basic mechanics to electronics to motors and even soldering. Components are provided for children to make models and robots and competitions are organized for the same.

I have an active blog in which I write about my interactions with technology: http://blog.darshshah.org/

I play basketball sport and Tabla, a classical Indian music instrument.

Spirituality:

Have done a course called Youth Empowerment Seminar (YES+) of the Art of Living Foundation in 2010. I go for monthly meetings and seminars and follow up sessions which are done in campus. As a senior member, I and my other colleagues, organize and motivate others to come and join us for these sessions. Doing daily kriyas taught in course helps me in stress management and living life happily.

Link: http://www.artofliving.org/us-en/yes-plus

Skills:

Expertise Area: Electronics, Embedded System, Wireless Sensor Networks

Operating Systems used: Linux (Ubuntu/Fedora), Windows (WinXp and above)

Programming Language: C, C++, Java, Verilog, Embedded C, SQL, Assembly language for 6502, ActionScript 3.0, HTML/CSS, Basic Python, LabView graphical coding, NesC

Tools and Technologies: AVR Studio, WinAvr, Xilinx, Matlab, Logisim, Multisim, LabView, Oracle, FreeRtos, Spartan 3 FPGA, Eagle, Orcad, Adobe Flash, Network Simulator 2, TinyOS, Meshbean

Microcontrollers used: ATMEGA16/32, Basic Stamp2, Lego Mindstrom Nxt, Arduino, MSP430, ATMEGA 1281, Zigbit

Other skills: Soldering, PCB design and testing, using Fablab machines like Modela MDX-20, Laser Cutter, Shopbot