

# SHRUTI HIRAY

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CONTACT INFORMATION	Department of Electrical Engineering Indian Institute of Technology Bombay Citizenship status: Indian	Phone: +91-9167851903 Email: <a href="mailto:shruti_hiray@iitb.ac.in">shruti_hiray@iitb.ac.in</a> Homepage: <a href="http://shrutihiray.github.io">shrutihiray.github.io</a>
EDUCATION	<b>Indian Institute of Technology Bombay</b> , India <i>July 2014 - Present</i> Dual Degree (Bachelor + Master of Technology), <a href="#">Department of Electrical Engineering</a> Master's Specialization: <a href="#">Communications &amp; Signal Processing</a> Minor degree in <a href="#">Computer Science</a> CGPA: 8.54/10	
RESEARCH PROJECTS & INTERNSHIPS	<b>Lightning Network Simulator - Dual Degree Thesis</b> <i>Report</i> Guide: <a href="#">Prof. Saravanan Vijayakumaran</a> <i>Spring 2017 - Present</i> <ul style="list-style-type: none"><li>Studied scalability of <b>Bitcoin blockchain</b> with Lightning Network.</li><li>Implementing a simulator for multihop payment routing in <a href="#">Haskell</a> and <b>Python</b>.</li><li>Achieved <b>98%</b> reachability in the 2000 node network with 4 beacons using <b>Flare</b>.</li></ul> <b>Multisource and Multipath Content Transfer</b> <i>Report</i> Guides: <a href="#">Prof. D. Manjunath</a> & <a href="#">Prof. Nikhil Karamchandani</a> <i>Autumn 2018</i> <ul style="list-style-type: none"><li><b>Parallel download</b> through Cellular and WiFi from multiple sources.</li><li>Implemented browser plugin using <b>Javascript &amp; Google Native Client</b>.</li><li>Implemented <b>Java Cloud Server</b> on <b>AWS with Apache</b> and <b>C++ Server</b> on <b>OpenWrt</b> Operating system installed on WiFi access points.</li><li>Parts of file downloaded from cache in WiFi access points reduces network congestion considerably and increases throughput.</li></ul> <b>Summer Risk Analyst</b> at <i>American Express</i> <i>Summer 2017</i> <ul style="list-style-type: none"><li>Built <b>dynamic pricing engine</b> for Membership Rewards using <b>Gradient Boost</b> in <b>SQL &amp; Hadoop</b>.</li><li>Used customer analytics data to personalize the offers to customers.</li><li>Achieved <b>80%</b> accuracy of prediction of expected points redeemed by customer.</li><li>Received <b>pre-placement offer</b> for remarkable work in the internship.</li></ul> <b>Android Application Developer</b> at <i>Carsense</i> <i>Summer 2016</i> <ul style="list-style-type: none"><li>Developed APIs for data sync with hardware device via <b>BLE communication</b>.</li><li>Analyzed user activity with <b>CleverTap</b> and crashes with <b>Crashlytics</b>.</li><li>Developed <b>JUnit</b> Test Cases using <b>Espresso Test Framework</b> to test the app features on various mobile devices present in <b>Google Cloud Testing Lab</b>.</li></ul>	
TEACHING ASSISTANTSHIP	EE720: Number Theory & Cryptography EE308: Communication Systems	<a href="#">Prof. Saravanan Vijayakumaran</a> <a href="#">Prof. S. N. Merchant</a>
RESEARCH INTERESTS	My research interest lies in <b>Blockchain &amp; Cryptocurrency Technologies, Cryptography, Security</b> .	

KEY ACADEMIC PROJECTS	<b>Algorand Simulator</b> <span style="float: right;"><i>Spring 2019</i></span> <ul style="list-style-type: none"> <li>Discrete event simulator of Algorand using <b>Gossip, Cryptographic sortition</b>.</li> <li>Tested for <b>Fail-Stop</b> adversary, <b>Byzantine</b> adversary.</li> </ul>
	<b>Optimal Relay Node Placement</b> <span style="float: right;"><i>Spring 2018</i></span> <ul style="list-style-type: none"> <li>Implemented relay node placement in <b>LTE-A Cellular Systems</b></li> <li>Jointly optimized for downlink and uplink for <b>coverage extension</b>.</li> </ul>
	<b>Speech Watermarking</b> <span style="float: right;"><i>Autumn 2017</i></span> <ul style="list-style-type: none"> <li>Developed watermark extraction algorithm for proving ownership, tampering.</li> <li>Implemented using <b>Autoregressive model &amp; Psychoacoustic model</b>.</li> </ul>
	<b>Automatic Speech Recognition system</b> <span style="float: right;"><i>Autumn 2017</i></span> <ul style="list-style-type: none"> <li>Classified speech signals of spoken numerical digits using labelled data.</li> <li>Used <b>Cepstrum, K-means clustering, Dynamic time warping</b>.</li> </ul>
	<b>Microprocessor Design</b> <span style="float: right;"><i>Autumn 2016</i></span> <ul style="list-style-type: none"> <li>Designed a 16 bit - 8 register <b>RISC</b> computer system of 14 instructions.</li> <li>A 6 staged pipeline processor with <b>hazard mitigation</b> using data-forwarding.</li> </ul>
	<b>Capturing Displaying Analog Signals using VHDL</b> <span style="float: right;"><i>Spring 2016</i></span> <ul style="list-style-type: none"> <li>Developed a VHDL program to store &amp; display analog signals using the <b>Krypton CPLD development board</b>.</li> <li>Implemented <b>Control Path &amp; Data Path</b> for each sub-part of the system.</li> </ul>
RELATED COURSEWORK	<b>Computer Science:</b> Blockchain Technology, Number Theory & Cryptography, Network Security, Data Structures & Algorithm, Computer Networks, Discrete Structures, Operating Systems, Machine Learning, Computer Graphics
	<b>Electrical:</b> Microprocessors, Error Correcting Codes, Speech Processing, Wireless Communications, Advanced Communication Networks, Advanced Signal Processing
	<b>Others:</b> Probability, Data Analysis, Economics.
TECHNICAL SKILLS	<b>Programming Languages:</b> C/C++, VHDL, Python, Java, Assembly Language, SQL, Ruby, NodeJS, Haskell <b>Development Tools:</b> Ruby on Rails, PRAAT, MATLAB, Scilab, L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub> , Github, ngSpice, Arduino, Android Studio, AutoCAD
POSITIONS OF RESPONSIBILITY	<b>Technical Councilor</b> of <i>Hostel 10, IIT Bombay</i> <span style="float: right;"><i>2016-2017</i></span> Organized <b>telescope, microscope</b> handling workshops, virtual reality session. Spread awareness of <b>Women In Tech</b> , managed technical general championships.
	<b>Institute Convener</b> of <i>Robotics Club, IIT Bombay</i> <span style="float: right;"><i>2015-2016</i></span> Organized inter-hostel robotics events, industrial visits and guest lectures. Mentored technical activities, played a key role in creating <b>robotics community</b> .
EXTRA CURRICULAR ACTIVITIES	<ul style="list-style-type: none"> <li>Completed a basic certified course in <b>Spanish</b> language.</li> <li>Performed Maharashtra Folk dance in <b>Institute Classical &amp; Folk Arts Night</b>.</li> <li>Secured 2<sup>nd</sup> position in <b>Freshiezza Group Dance</b> Competition.</li> <li>Completed a course in <b>Lawn Tennis</b> under <b>National Sports Organization</b>.</li> <li>Secured <b>Bronze</b> medal in Institute <b>Carom</b> General Championship.</li> </ul>