

# Pranesh Santikellur

## PERSONAL INFORMATION

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## PROFILE

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**PH.D. SCHOLAR** Currently, I am pursuing a Doctor of Philosophy (Ph.D.) degree at the Department of Computer Science, Indian Institute of Technology, Kharagpur, under the supervision of Professor Rajat Subhra Chakraborty. **My research interests are in solving hardware security challenges using machine learning techniques.** Prior to joining IIT Kharagpur to pursue my PhD, I worked as an Embedded Linux Developer at Bengaluru, India for nearly 6 years.

## EDUCATION

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JULY 2017 - PRESENT	<i>Ph.D. Research Scholar, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur</i>
AUGUST 2006 - MAY 2010	<i>Bachelor of Engineering, Department of Computer Science , SDM College of Engineering and Technology, Dharwad</i> Percentage : 73.76
JULY 2004 - MARCH 2006	<i>Higher Secondary (+2), Karnataka State Board</i> Percentage : 83.6
JULY 2003 - MARCH 2004	<i>Class X, Karnataka State Board</i> Percentage : 86.88

## WORK EXPERIENCE

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SEP 2016 - APR 2020 *Senior Research Fellow (SRF).*  
I was part of a research project sponsored by Intel USA, entitled "Verification Challenges in Compression and Cryptographic Stacks in Quick-Assist Technology" and worked under the guidance of Dr. Rajat Subhra Chakraborty. This included analysis of data compression efficiency on QAT hardware.

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DEC 2012 - SEP 2016 *Firmware Engineer*  
I was part of firmware design team at *Horner Engineering Automation Group*, Bengaluru, India. My responsibilities were:

- Ported the PLC product code-base from Linux Target Image Builder (LTIB) to Yocto for the new product.
- Developed the touch driver and implemented 3-point calibration rule to it.
- Involved in board bringing up of PLC products with Linux as embedded OS.

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SEP 2010 - DEC 2012    *Design Engineer*

I was part of embedded software team at *Processor Systems Pvt Ltd*, Bengaluru, India. The project was to build the control card for medical application. The tool used for the project were Nios-II Embedded processor. My responsibilities were

- Build the interactive terminal between soft-core MCU unit present inside Nios-II and computer through serial communication. This was also mainly used to download the firmware to flash.

## PUBLICATIONS

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BOOK

**P. Santikellur** and R. S. Chakraborty, "Deep Learning for Computational Problems in Hardware Security: Modeling Attacks on Strong Physically Unclonable Function Circuits", Springer (forthcoming)

JOURNAL PAPERS

**P. Santikellur** and R.S Chakraborty, "Intrinsic Dimension: A Deep Learning Assisted Empirical Metric to Estimate the Robustness of Physically Unclonable Functions to Modeling Attacks" submitted to *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*.

S. Chattaopadhyay, **P. Santikellur**, R. S. Chakraborty, J. Mathew and M. Ottavi, "A Conditionally Chaotic Physically Unclonable Function Design Framework with High Reliability", accepted in *ACM Transactions on Design Automation of Electronic Systems*, Apr. 2021.

**P. Santikellur** and R. S. Chakraborty, "A Computationally Efficient Tensor Regression Network based Modeling Attack on XOR Arbiter PUF and its Variants" in *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 40, no. 6, pp. 1197-1206, June 2021, doi: 10.1109/TCAD.2020.3032624.

V. Govindan, R. S. Chakraborty, **P. Santikellur**, A.K Chandhary, "A Hardware Trojan Attack on FPGA based Cryptographic Key Generation: Impact and Detection", *Journal of Hardware and Systems Security* (Springer), vol. 2, no. 3, pp. 225-239, Sep. 2018.

#### BOOK CHAPTER

**P. Santikellur**, R. S. Chakraborty, and J. Mathew, "Hardware Security in the Context of Internet of Things: Challenges and Opportunities." *Internet of Things and Secure Smart Environments: Successes and Pitfalls*, p.299.

#### CONFERENCE PAPERS

**P. Santikellur**, R. Mukherjee and R.S. Chakraborty, "APUF-BNN: An Automated Framework for Efficient Combinational Logic Based Implementation of Arbiter PUF through Binarized Neural Network," accepted in *31st ACM Great Lakes Symposium on VLSI (GLSVLSI)*, Apr. 2021.

**P. Santikellur**, Lakshya, S. R. Prakash and R. S. Chakraborty, "A Computationally Efficient Tensor Regression Network based Modeling Attack on XOR Arbiter PUF", *IEEE Asian Hardware Oriented Security and Trust Symposium (AsianHOST)*, Xi'an, P.R. China, 2019.

V. S. Balijabudda, D. Thapar, **P. Santikellur**, R. S. Chakraborty and I. Chakrabarti, "Design of a Chaotic Oscillator based Model Building Attack Resistant Arbiter PUF", *IEEE Asian Hardware Oriented Security and Trust Symposium (AsianHOST)*, Xi'an, China, 2019.

U. Chatterjee, **P. Santikellur**, R. Sadhukhan, V. Govindan, D. Mukhopadhyay and R. S. Chakraborty, "United We Stand: A Threshold Signature Scheme for Identifying Outliers in PLCs (poster with 2 page short-paper)", Late Breaking Results (LBR) track of *IEEE/ACM Design Automation Conference (DAC)*, Las Vegas, Nevada, USA, 2019.

**P. Santikellur**, R. Mukherjee, and R. S. Chakraborty: Logic Synthesis of Arbiter PUF using Binarized Neural Networks (poster)", *International Conference on Security, Privacy and Applied Cryptographic Engineering (SPACE)*, Gandhinagar, India, 2019.

#### STUDENT PROJECT

**P. Santikellur**, T. Haque, M. Al-Zewairi and R. S. Chakraborty, "Optimized Multi-Layer Hierarchical Network Intrusion Detection System with Genetic Algorithms," *IEEE International Conference on new Trends in Computing Sciences (ICTCS)*, Amman, Jordan, 2019.

#### ACHIEVEMENTS

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- Intel AI Student Ambassador from IIT Kharagpur, India.
- Intel's one of the first Certified Instructors for oneAPI and DPC++ Essentials.
- Secured Second Prize in CSAW'17 Embedded Security Challenge held at IIT Kanpur, 2017.

#### INVITED TALKS

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- Invited for webinar at "cadforassurance.org" for the topic on our tool "Deep Feed Forward Neural Network Based PUF Attack Tool".
- Invited for talk at IEST, Shibpur on for the topic "Recent Advances in Machine Learning based Modeling Attacks on PUF".

- Invited for talk at IEEE TENCON 2019 for the topic "Physically Unclonable Functions: Design, Applications, Threats".

## TEACHING ASSISTANCE

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- Machine learning (CS60050)
- Computer Organisation and Architecture Laboratory (CS39001, CS31007)
- Programming and Data Structures Laboratory (CS11001)

## TECHNICAL SKILL

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- LANGUAGES: C, C++, MATLAB, PYTHON, VERILOG
- ML FRAMEWORKS: TENSORFLOW(+KERAS), H2O, SCIKIT-LEARN
- TOOLS: LTIB, YOCTO, LATEX, GDB

## PROFESSIONAL ACTIVITIES

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- Co-Chair of ISQED 2021 (Session Title: Application of AI/ML in Hardware Security)
- A member of TCHES 2021 artifact review committee.
- External Reviewer: TCHES, IEEE TCAD, IEEE TCAS, ACM CSUR, DSD, GLSVLSI, VDAT

## REFERENCES

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- **Prof. Rajat Subhra Chakraborty**  
Associate Professor,  
Dept of Computer Science and Engg, IIT Kharagpur, India.  
Email: rschakraborty@cse.iitkgp.ac.in
- **Varsha Chakraborty**  
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