

Fakir Sharif Hossain

154/C, Fouzdhary, Cumilla-3500, Bangladesh

Mobile: +8801742288981

dr.hossain@baiust.edu.bd

EDUCATION

- 2015 – 2018 Graduate School of Information Science, Nara Institute of Science and Technology (NAIST), Japan
PhD in Hardware security (**VLSI Design & Test**)
Thesis title: Hardware Trojan detection in power side-channel analysis
Supervisors: Prof. Michiko Inoue (NAIST, JP), Prof. Alex Oriololu (UCSD, USA)
- 2008 – 2012 Institute of ICT, Bangladesh University of Engineering and Technology (BUET)
M.Sc. in Information and Communication Technology (ICT)
Thesis title: Design of a Low Power Advanced Encryption Standard Processor
- 2008 – 2008 Institute of Information Technology, University of Dhaka (DU), Bangladesh
PGDIT - Post graduate diploma in Information Technology (IT)
Project title: Mobile device and web based remote controller on data repository
- 2003 – 2007 Department of Electrical and Electronic Engineering, Ahsanullah University of Science and Technology (AUST), Bangladesh
B.Sc. (Hons) in Electrical and Electronic Engineering (EEE)
-

TEACHING AND RESEARCH CAREER SUMMARY

- Sep, 2019 – Present **Associate Professor** in the Dept. of Electrical and Electronic Engineering (EEE) Bangladesh Army International University of Science and Technology (BAIUST)
- Sep, 2018 – Aug, 2019 **Assistant Professor** in the Dept. of Electrical and Electronic Engineering (EEE) Bangladesh Army International University of Science and Technology (BAIUST)
- Jan, 2014 – Sep, 2018 **Assistant Professor** in the Dept. of Electrical and Electronic Engineering (EEE) International Islamic University Chittagong (IIUC), Bangladesh
- April 2015 – 2018 **PhD studentship**, Nara Institute of Science & Technology (NAIST), Japan
I have been studying on VLSI security, especially on a topic of Hardware Trojan Detection. Hardware Trojan is one of the emerging threats arisen from complicated design and manufacturing flows of semiconductor products including several outsourcing phases. I have proposed several new ideas and methods to give effective and efficient solutions to detect Hardware Trojans that maliciously embedded in VLSIs. I have developed methods in power based side-channel analysis to achieve two major challenges in hardware security: (1) Detection sensitivity for tiny Trojans in the context of process variations and (2) Golden reference or Golden IC free detection.
- 2015 – 2018 **Research Assistant**, Dependable System Lab, NAIST, Advisor: Prof Michiko Inoue

2009 – 2014	Lecturer in Electrical and Electronic Engineering (EEE) International Islamic University Chittagong (IIUC), Bangladesh
2011-2012	Employer: Hyundai Engineering Co., Ltd. (Korea based multinational company) Position held: (part time) Consultant (Electrical Infrastructure)

PRIZES AND AWARDS

2015 – March 2018	Nara Institute of Science and Technology (NAIST) Presidential Scholarship Grant for Doctoral Research, valued at ¥1800000 Japanese Yen per year for 03 years.
2015 – March 2018	Research assistant (RA) Grants from NAIST, valued at ¥22000 per month.
Feb 2018	IEEE Asian Test Symposium Doctoral Thesis Award.
Nov 2017	IEEE Kansai Section Student Research Encouragement Award, valued at ¥30000.
Nov 2016	The Excellent Paper Award for System and LSI Design Engineering Research Group for “A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection” in DA Symposium Japan 2016.
Nov 2016	The excellent student presentation award of Special Interest Group on System LSI Design Methodology (SIG SLDM) of Information Processing Society in Japan (IPSI) for the presented paper “A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection” in Design Gaia 2016.
Nov 2016	Best Poster presentation award for the presented paper “A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection” in Design Gaia 2016 workshop, IEICE, Japan. Awarded certificate and ¥10000.
Nov 2015	Best presentation award for the Young Researcher category for the presented paper “A Scan-chain Based Circuit Partitioning Technique for Detecting Tiny Hardware Trojans in IC” in Design Gaia 2015 workshop, IEICE, Japan. Awarded certificate and ¥5000.
Dec 2015	Best Poster presentation award for the presented paper “A Scan Segmentation Technique to Detect HT in IC” in IEEE international conference of WEICON-15, Dhaka, Bangladesh. Awarded certificate.

PUBLICATIONS

Journals (08):

- Jan 2017 **FS. Hossain**, T. Yoneda, and M. Inoue, "An effective and sensitive scan segmentation technique for detecting hardware Trojan," *IEICE Transactions on Information and Systems*, vol. E100-D, no. 1, 2017.
- Oct 2015 **FS. Hossain**, ML. Ali, "A Novel Byte-Substitution Architecture for the AES Cryptosystem," *PloS one Journal, Public Library of Science*, Vol. 10, no. 10, 2015.
- Oct 2015 MRC. Beson, SA. Aljunid, MR. Awal, M. Jusoh, MN. Sakib and **FS. Hossain**, "Design and implementation of vehicle mounted wind turbine (VMWT)," *ARPN Journal of Engineering and Applied Sciences*, Vol. 10, no. 19, 2015.
- June 2013 **Fakir Sharif Hossain**, Md. S. Alam, Md. M. A. Joardar, "Mobile Device and Web Based Remote Controller on Data Repository," *International Journal of Information Engineering, SEIPUB*, Vol. 2, no. 2, 2013.
- June 2013 M. Shafiul Alam, Md. Abdur Razzak, Md. Nazrul Islam, **Fakir Sharif Hossain**, "Stability Enhancement of East West Interconnected System Using Static VAR Compensator (SVC)," *International Journal of Engineering Research & Technology (IJERT)*, Vol. 2, no. 6, 2013.
- May 2013 **Fakir Sharif Hossain**, A. Newaz, KM. Grihan, "Biometric Authentication Scheme for ATM Banking System Using Energy Efficient AES Processor," *International journal of Information and Computer Science (IJICS)*, Vol. 2, no. 4, 2013.
- Jan 2013 **Fakir Sharif Hossain**, "Design a High Speed AES Crypto Processor ASIC", LAP-LAMBERT Academic Publishing company, ISBN: 978-3-659-31890-0, Germany.
- Nov 2011 L. Ali, A. Ishak, **Fakir Sharif Hossain**, N. Roy, "Design of an ultra-high speed AES processor for next generation IT security," *International Journal of Computers and Electrical Engineering, Elsevier*. Vol. 37, no. 6, 2011.

International Conferences (10):

- Oct 2018 **Fakir Sharif Hossain**, Michihiro Shintani, Michiko Inoue and Alex Orailoglu " Variation-Aware Hardware Trojan Detection through Power Side-channel" In proceeding 2018 IEEE *International Test Conference (ITC)*, Arizona, USA, pp. 1-10, Oct 2018.
- Oct 2018 **Fakir Sharif Hossain**, Mohammed Abdul Kader, Tomokazu Yoneda " EqSA: A Golden-IC Free Equal Power Self- Authentication for Hardware Trojan Detection" In *International Conference on Innovations in Science, Engineering and Technology (ICISSET)*, IEEE, Chittagong, Bangladesh, pp.86-91, Oct 2018.
- Oct 2018 Md. Ismael Hossain, **Fakir Sharif Hossain**, " Low-Frequency Inter-Area Mode Detection in Power System using Continuous Wavelet Transform" In *International Conference on Innovations in Science, Engineering and Technology (ICISSET)*, IEEE, Chittagong, Bangladesh, pp.299-304, Oct 2018.

- Oct 2018 M.A. Kader, Md.Zakaria Islam, Jobair Al Rafi, Muhammad Rasedul Islam, **Fakir Sharif Hossain**, "Line Following Autonomous Office Assistant Robot with PID Algorithm" In *International Conference on Innovations in Science, Engineering and Technology (ICISSET)*, IEEE, Chittagong, BD, pp.109-114, Oct 2018.
- Nov 2017 **Fakir Sharif Hossain**, Tomokazu Yoneda, Michihiro Shintani, Michiko Inoue, and Alex Orailoglu, "Intra-die-variation-aware side channel analysis for hardware Trojan detection," In 2017 IEEE Asian Test Symposium (ATS), Taipei, Taiwan, pages 52-57, Nov. 2017.
- May 2017 **Fakir Sharif Hossain**, Tomokazu Yoneda, Michiko Inoue, and Alex Orailoglu, "Detecting hardware Trojans without a Golden IC through clock-tree defined circuit partitions," In 2017 IEEE European Test Symposium (ETS), Limassol, Cyprus, pages 1-6, May 2017.
- Dec 2015 **Fakir Sharif Hossain**, T. Yoneda, and M. Inoue, "An effective scan segmentation approach to detect hardware Trojans in Integrated circuits," IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), Dhaka, BD, pp. 78-81, 2015.
- May 2011 **Fakir Sharif Hossain**, M. Ali, MA. Syed, "Design of a very low power and High Throughput AES Processor," Computer and Information Technology (ICCIT), 2011 14th IEEE International Conference on Topic(s): Communication, Networking & Broadcasting, Dhaka, BD, pp. 339-343, 2011.
- Mar 2011 MA. Syed, MM. Ali, **Fakir Sharif Hossain**, SA. Haque, AH. Siddique, "Prospect of a Pico Hydro Power Plant Based on Irrigation Pump in Perspective of Rural Areas in Bangladesh," Electric Power and Energy Conversion System (EPECS), 2011 2nd IEEE International Conference on Topic(s): Power, Energy & Industry Applications, Sharjah, UAE, pp. 1-6, 2011.
- Dec 2010 **Fakir Sharif Hossain**, M. Ali, N. Roy, "Design and analysis of a high performance AES processor," Electrical and Computer Engineering (ICECE), IEEE International Conference on Communication, Networking & Broadcasting ; Computing & Processing (Hardware/Software), Dhaka, BD, pp. 562 – 565, 2010.

Technical Reports (03):

- March 2018 **Fakir Sharif Hossain**, Tomokazu Yoneda, Michihiro Shintani, Michiko Inoue, and Alex Orailoglu. A Golden-Free Hardware Trojan Detection Technique Considering Intra-Die Variation. *IEICE Tech. Rep.*, Tokyo, Japan, vol. 117, no. 444, DC2017-84, pages 43-48, Feb. 2018.
- Nov 2016 **Fakir Sharif Hossain**, T. Yoneda, M. Inoue and A. Orailoglu, "A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection" in

- Design Gaia workshop, IEICE technical report, Osaka, Japan, vol. 116, no. 331, pp. 135-140, 2016.
- Nov 2015 **Fakir Sharif Hossain**, T. Yoneda, and M. Inoue, "Scan Segmentation Approach to Magnify Detection Sensitivity for Tiny Hardware Trojan" in Design Gaia workshop, IEICE Technical report, Nagasaki, Japan, vol. 115, no. 338, pp. 1-6, 2016.

SUPERVISED UNDERGRADUATE STUDENT PROJECTS

- Sep 2013 Design and implementation of a remote control cargo lift.
- June 2013 Design and implementation Portable Direct digital synthesizer (DDS) function generator.
- June 2013 Design and implementation password based door control using microcontroller.
- June 2013 Design and implementation of a portable digital oscilloscope.
- Nov 2012 Design and implementation of solar thermal electricity generation by concentrated solar power (CSP) Technology.
- June 2012 Wireless status monitoring of an industry
- June 2012 Design and implementation of priority based electrical load regulation of a small factory.
- June 2012 Design and implementation of a smart home.
- June 2012 Design and implementation of energy saver to mitigate power crisis of Bangladesh.
- June 2011 Development of an algorithm for power system fault analysis using bus impedance matrix method.
- June 2011 Design and Implementation of a vehicle mounted wind turbine (VMWT).
- April 2011 Implementation of Advanced Encryption Standard with MATLAB code.
- April 2011 Design and analysis of electrical power system stability.
- Mar 2008 Website design for an online real estate service.

TRAINING PROGRAMS

- June 2019 Completed Certified Workshop on "Hand-on Orientation on Outcome Based Education (OBE)" held on 18 June 2019, organized by Institute of Engineers (IEB), BAETE, BD.
- Mar 2013 Completed Workshop on "Advanced Embedded System Design & Development" held from 08-09 March 2013, organized by Institute of Information and

- Communication Technology, Bangladesh University of Engineering and Technology (BUET).
- Jan 2013 Completed training course on "Embedded System Design & Development" held from 17-22 January 2013, organized by Institute of Information and Communication Technology, Bangladesh University of Engineering and Technology (BUET) under the supervision of University Grand Commission (UGC), Bangladesh.
-

RESEARCH ACTIVITY

- Feb 2019 **Instructor, Professional Training on IC Designing and Verification Using FPGA**
Two days long training in the Dept. of EEE, BAIUST, Bangladesh.
- Nov 2018 Keynote Speaker, **Hardware Security and Emerging security topics**
Dept. of EEE, BAIUST, Bangladesh.
- Jan 2017 **Supervised internship student at Dependable System Lab, NAIST**
Three weeks training on CAD tool to implement ASIC design.
- Nov 2016 **Talk given at the workshop on Dependable Computing under the Institute of Electronics, Information and Communication Engineers (IEICE), Japan, at Ritsumeikan University, Osaka Ibaraki Campus, Japan**
Title: A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection.
- Nov 2016 **Poster presented at the workshop on Dependable Computing, ICECE, Japan**
Title: A Golden-IC Free Clock Tree Driven Authentication Approach for Hardware Trojan Detection.
- Dec 2015 **Academic visit to Institute of Information and Communication Technology (IICT), BUET, Bangladesh**
Two weeks invited academic visit.
- Dec 2015 **Talk given at IICT, BUET, Bangladesh**
Title: How to detect hardware Trojans in ICs: Testing of ICs.
- Dec 2015 **Poster presented at the International IEEE Conference on ECE, BUET, BD**
Title: An effective scan segmentation approach to detect hardware Trojans in Integrated circuits.
- Nov 2015 **Talk given at the workshop on Dependable Computing under the Inst. of Electronics, Information and Communication Engg. (IEICE), Nagasaki, Japan**
Title: Scan Segmentation Approach to Magnify Detection Sensitivity for Tiny Hardware Trojan.

TECHNICAL SKILLS

Programming Language C/C++, Ruby, R, Verilog HDL
Framework MATLAB
Tool CAD Tools: Design Compiler, IC Compiler, VCS, TetraMax (ASIC design: design synthesis, layout, and power analysis)
-A good experience in SoC and VLSI design, layout and IP block implementation
-Skills in establishing regression testing flows and verification plan development
-Sound knowledge of analog circuit design and I/O circuit design
-High aptitude for analog and digital design and verification

REFEREES

Prof. Michiko Inoue, Ph.D.

Dependable System Laboratory
Graduate School of Information Science
Nara Institute of Science and Technology (NAIST)
Ikoma Nara, 630-0192, Japan
Tel:+81-743-72-5220, Fax:+81-743-72-5229
e-mail: kounoe@is.naist.jp

Prof. Alex Orailoglu, Ph.D.

University of California, San Diego, USA
Department of Computer Science and Engineering
La Jolla, CA 92093-0114
Tel: (858) 534-0914, Fax: (858) 534-7029
e-mail: alex@cs.ucsd.edu

Prof. Md. Altaf-Ul-Amin, Ph.D.

Computation System Biology Laboratory
Graduate School of Information Science
Nara Institute of Science and Technology (NAIST), Japan
Tel:+81-743-72-5952, Fax: +81-743-72-5329
e-mail: amin-m@is.naist.jp

Prof. Md. Liakot Ali, Ph.D.

Institute of Information and Communication Technology
Bangladesh University of Engineering and Technology (BUET), Dhaka, 1000, Bangladesh
Room 609, ECE Building
Tel: +880-2-55167100/6516 & 6238
e-mail: liakot@iict.buet.ac.bd