# ANKU <u>ADHIKARI</u>

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## OBJECTIVE

Research on secure data management and attack prediction analytics for IoT-enabled manufacturing environments

## EDUCATION

**Ph.D. in Computer Science** — Aug 2016 - Present

University of Illinois at Urbana-Champaign, United States

- Certificate in Foundations of Teaching, Center for Innovation in Teaching & Learning at Illinois

**M.S. in Electrical & Computer Engineering** — Jan 2013 - Dec 2015

University of Illinois at Urbana-Champaign, United States

- M.S. Thesis – VID-ECG : Remote attack vulnerabilities of ECG-based biometric authentication

**B.Eng. in Electrical & Electronics Engineering (Communication)** — Aug 2003 - Sept 2007

Kathmandu University, Nepal *(Among top 10 in cohort, equivalent to High Honor)*

- Undergraduate Thesis –The Study and Design of Mobile Ad Hoc Networks

## EXPERIENCE

**Graduate Research Assistant** — Aug 2016 - Present

**University of Illinois at Urbana-Champaign** — Illinois, USA

- Researched on data security and privacy problems in manufacturing environments (factory floor, supply chains, manufacturing federations, remote data analytics)
- Built systems to evaluate secure data sharing methods using IoT- blockchain technology for Industry 4.0
- Identified mechanisms that can be built into IoT sensors to secure data generated during product lifecycle(digital threads)
- Published in IEEE BigDataSecurity 2016, IEEE PerCom 2019

**Research Assistant** — Sept 2019 - Nov 2019

**Advanced Digital Sciences Center (ADSC), Collaboration with A⋆STAR** — Singapore

- Collaborated with manufacturing technology research centers(ARTC and I2R) in Singapore for analyzing security vulnerabilities in hyperpersonalized product manufacturing environments
- Researched run-time attack detection methods using IoT data from sensors on factory floors
- Proposed a verification method to detect attacks and anomalies during production process

**Graduate Intern (PhD) - Security and Privacy Research Group** — May 2017 - Aug 2017

**Intel Labs, Intel Corporation** — Oregon, USA

- Researched on security architectures for autonomous vehicles, focusing on sensor data
- Built a simulation testbed comprising of an in-vehicular network (VMs, mininet) and autonomous car (Unity)
- Demostrated real-time attacks using a test-bed and vulnerabilities of various security architectures
- Proposed and implemented an isolation-based architecture for improved security within performance constraint as a mitigation

**Research Affiliate, AUIP Scholar Attachment** — Jan 2016 - July 2016

**Advanced Digital Sciences Center (ADSC)** — Singapore

- Researched on side channel vulnerabilities in manufacturing environments
- Performed security attacks to demonstrate audio and electromagnetic field side-channel vulnerabilities
- Reconstructed designs and obtained process information from a 3D printer and CNC mill using smart phones
- Published in ACM CCS 2016

**Software Engineer - Smart Grid Group** — Sept 2012 - Dec 2012

**Advanced Digital Sciences Center (ADSC)** — Singapore

- Researched on reliable cognitive radio for smart grid networks
- Designed a basic system model for an efficient, reliable and adaptive security protocol for Cognitive Radio based future Smart Grid networks.

**Research Engineer - Institute for Infocomm Research** — Mar 2008 - June 2012

**Agency for Science, Technology and Research, (A⋆STAR)** — Singapore

- 60GHz Chipset Development A⋆STAR Flagship Project : Developed a prototype for an IEEE-compliant chipset for next generation millimeter-wave based WPANs
- Robust Mesh Enabled WiMedia Network Project : Developed a generic and standalone IP connectivity solution based on WiMedia Link Layer

## SKILLS

**Expert :** Python(NumPy, Scikit-Learn, SciPy, Matplotlib, Pandas, Jupyter Notebook, Statsmodels), MATLAB, Linux (Ubuntu, Fedora, CentOS, Raspian), svn, Git
**Intermediate/Basic :** C, HTML, CSS, R, MySQL, Unity, Raspberry Pi, Arduino, Ruby on Rails

## PUBLICATIONS & TECHNICAL DISCLOSURES

- A. Adhikari, M. Winslett, *A Hybrid Architecture for Secure Management of Manufacturing Data in Industry 4.0*, 2019 IEEE International Conference on Pervasive Computing and Communication Workshops (PerCom Workshops), Kyoto, Japan, 2019, pp. 973-978.
- A. Hojjati, A. Adhikari, K. Struckmann, E. J. Chou, T. Nguyen, K. Madan, M. Winslett, C. Gunter, W. P. King, *Leave Your Phone at the Door: Side Channels that Reveal Factory Floor Secrets*, In Proceedings of the 2016 ACM SIGSAC Conference on Computer and Communications Security (CCS '16). ACM, New York, NY, USA, 2016, pp. 883-894.
- A. Adhikari, A. Hojjati, J. Shen, J. T. Hsu, W. P. King and M. Winslett, *Trust Issues for Big Data about High-Value Manufactured Parts*, 2016 IEEE 2nd International Conference on Big Data Security on Cloud (BigDataSecurity), IEEE International Conference on High Performance and Smart Computing (HPSC), and IEEE International Conference on Intelligent Data and Security (IDS), New York, NY, USA, 2016, pp. 24-29.
- A. Adhikari, (2015), *Video-analysis Inference Automated ECG (VID-ECG): Improving Video-based Heart Rate Detection and Exposing Security Risks of ECG-based Biometric Authentication* (Master's thesis). University of Illinois at Urbana-Champaign, IL, USA.
- R. J. Jayabal, S.Y. Law, A. Adhikari, B. Jin, J. Chen, I²R Disclosure 2010109, *A Hardware Rate Adaptation Implementation and Control Interface for Very High Speed Wireless Communications,* 2011.
- A. Adhikari, *ICT Programmes for Decentralization and Development,* ITU Telecom ICT Book for the Youth Forum, pp.351-352, Dec 2006.

## OTHER R&D PROJECTS

**Security Issues in Networked Wireless Pacemakers**     Aug 2014 - Dec 2014
- Survey on vulnerabilities of wireless pacemakers and security mechanisms to improve safety and privacy

**CoBuy: Share the Deal and Save Your Money**     Jan 2014 - Aug 2014
**iOS prototype demonstrated in the Computer Science department open-house sessions in May 2014**
- Proposed the concept of social-networking plus e-commerce website to support group bulk purchases
- Designed and implemented a mobile application prototype to support it

## HONORS & ACHIEVEMENTS

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| **Teachers Ranked as Excellent by Their Students (top 30% across campus),** UIUC | 2020 |
| **A⋆STAR Graduate Scholarship,** Agency for Science, Technology and Research, Singapore | 2013 - Present |
| **Sponsorship,** Grace Hopper Conference - CS@Illinois | 2016 & 2019 |
| **Sponsorship,** Qualcomm EmpowHERment Summit | 2015 |
| **Scholarship,** Computing Research Association - Women (CRA-W) Grad Cohort Workshop | 2015 |
| **I²R Good Team Player Award,** Institute for Infocomm Research (I²R) | 2009, 2011 & 2012 |
| **ITU Telecom Fellowship,** ITU Youth Forum *(Only 1 female selected nationally)* | 2006 |
| **President,** Society of Electrical and Electronics Engineers (SEEE) *(1st female student president)* | 2006 |

## PROFESSIONAL AFFILIATIONS

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| ITU Telecom - Alumni Youth Fellow | IEEE - Student Member |
| A*STAR Graduate Academy Singapore - Scholar | Systers - Member |
| Advanced Digital Sciences Center - Research Affiliate | Women in Electrical and Computer Engineering, UIUC |
| Society of Women Engineers (SWE) - C2C Member | Women in Computer Science, UIUC |
| Nepal Engineering Council - Member | |