

# Swadhin Pradhan

DOCTORAL CANDIDATE · COMPUTER SCIENCE

3491 Lake Austin Blvd., Apt. A, Austin, Texas - 78703, USA

☎ (+1) 737-222-8807 | ✉ swadhin@utexas.edu | 🌐 <https://cs.utexas.edu/~swadhin/> | 📷 swadhin | 📧 swadhin\_pradhan | 🎓 swadhin

## Education

### The University of Texas at Austin

Austin, Texas, USA

PH.D. IN COMPUTER SCIENCE

2014 - Present

- Research Interests: RFID, Wearable Computing, Mobile Systems, Wireless Networks
- Advisor: Lili Qiu
- CGPA: 3.92/4.0

### Indian Institute of Technology Kharagpur

Kharagpur, WB, India

M.S. (BY RESEARCH) IN COMPUTER SCIENCE AND ENGINEERING

2012 - 2014

- Thesis: Improving Localization and Energy Efficiency of Smartphone Applications
- Advisor: Niloy Ganguly
- CGPA: 9.66/10.0

### Jadavpur University

Kolkata, WB, India

B.E. (HONORS) IN INFORMATION TECHNOLOGY

2007 - 2011

- University Gold Medal
- CGPA: 9.45/10.0

## Publications

CONFERENCE/JOURNAL PAPERS [PEER-REVIEWED]

### 1. RNN-based Room Scale Hand Motion Tracking

MOBICOM

WENGUANG MAO, MEI WANG, WEI SUN, LILI QIU, **SWADHIN PRADHAN**, AND YI-CHAO CHEN

Oct. 2019

- The 25th Annual International Conference on Mobile Computing and Networking (MobiCom), 2019, Los Cabos, Mexico

### 2. Combating Replay Attacks Against Voice Assistants

UBICOMP

**SWADHIN PRADHAN**, WEI SUN, GHUFRAN BAIG, AND LILI QIU

Sept. 2019

- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) Journal Issue 3, September, 2019 (Presented in the 2019 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP), September, 2019, London, UK)

### 3. Smartphone-based Indoor Space Mapping

UBICOMP

**SWADHIN PRADHAN**, GHUFRAN BAIG, WENGUANG MAO, LILI QIU, GUOHAI CHEN, AND BO YANG

Oct. 2018

- Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) Journal Issue 2, June, 2018 (Presented in the 2018 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP), October, 2018, Singapore)

### 4. RIO: A Pervasive RFID-based Touch Gesture Interface

MOBICOM

**SWADHIN PRADHAN**, EUGENE CHAI, KARTHIK SUNDARESAN, LILI QIU, MOHAMMAD A. KHOJASTEPOUR, AND

SAMPATH RANGARAJAN

Oct. 2017

- The 23rd Annual International Conference on Mobile Computing and Networking (MobiCom), 2017, Snowbird, UT, USA

### 5. Understanding and managing notifications

INFOCOM

**SWADHIN PRADHAN**, LILI QIU, ABHINAV PARATE, AND KYU-HAN KIM

May 2017

- The 36th IEEE International Conference on Computer Communications (INFOCOM), 2017, Atlanta, GA, USA

### 6. ActivPass: Your Daily Activity is Your Password

CHI

SOURAV KUMAR DANDAPAT, **SWADHIN PRADHAN**, ROMIT ROY CHOUDHURY, NILOY GANGULY, AND BIVAS MITRA

April 2015

- The 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI), 2015, Seoul, Korea
- Extensively covered in popular technical press such as MIT Technology Review, Boston Globe, The Guardian, American Banker etc.

### 7. Aggregating Inter-App Traffic to Optimize Cellular Radio Energy Consumption on Smartphones

COMSNETS

**SWADHIN PRADHAN**, SOURAV KUMAR DANDAPAT, NILOY GANGULY, BIVAS MITRA, AND PRADIPTA DE

Jan. 2015

- The 7th International Conference on COMMunication Systems & NETWORKS (COMSNETS), 2015, Bangalore, India

## 8. (Stable) Virtual Landmarks: Spatial Dropbox to enhance Retail Experience

COMSNETS

SWADHIN PRADHAN, ANANTH BALASHANKAR, NILOY GANGULY, AND BIVAS MITRA

Jan. 2014

- The 6th International Conference on COMMunication Systems & NETWORKS (COMSNETS), 2014, Bangalore, India

### WORKSHOP PAPERS [PEER-REVIEWED]

## 9. Konark: A RFID based system for enhancing in-store shopping experience

WPA, co-located with MobiSys

SWADHIN PRADHAN, EUGENE CHAI, KARTHIK SUNDARESAN, LILI QIU, AND SAMPATH RANGARAJAN

June 2017

- The 4th Workshop on Physical Analytics (WPA), co-located with the 15th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys), 2017, Niagara Falls, NY, USA
- A Patent no. US20180307877A1 is filed by NEC Labs America based on this paper

## 10. Sprinkler: Distributed content storage for just-in-time streaming

Cellnet, co-located with MobiSys

SOURAV KUMAR DANDAPAT, SWADHIN PRADHAN, NILOY GANGULY, AND ROMIT ROY CHOUDHURY

June 2013

- The 2013 workshop on Cellular networks: operations, challenges, and future design (Cellnet), co-located with the 11th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys), 2013, Taipei, Taiwan

## Papers under Review

### 1. Data-Driven Synchronization for Compressive Sensing

YI-CHAO CHEN, SWADHIN PRADHAN, AND LILI QIU

- Proposed an algorithm which reduces the rank of data matrix exploiting the domain specific synchronization opportunities

## Honors & Awards

2019	<b>Recipient</b> , UT Austin Graduate Continuing Fellowship	Austin, Tx, USA
2018	<b>Student Travel Grant Recipient</b> , ACM MobiCom 2018	New Delhi, India
2018	<b>Student Travel Grant Recipient</b> , SIGCHI (for attending ACM UbiComp 2018)	Singapore
2017	<b>Travel Scholarship Recipient</b> , UT Austin Graduate School Professional Development Award	Austin, Tx, USA
2017	<b>Student Travel Grant Recipient</b> , IEEE INFOCOM 2017	Georgia, USA
2011	<b>University Gold Medal Recipient</b> , For ranking 1st in class of B.E. (IT) in Jadavpur University	WB, India
2007	<b>Ranked within top 0.5% (approx. 100,000 aspirants)</b> , State engineering entrance examination	WB, India
2005	<b>Gold Medal Recipient</b> , District Topper in Secondary Examination and ranked 39 in the state	WB, India

## Patents

### 1. Battery-free touch-aware user input using RFID tags

US Patent: 10,346,655

EUGENE CHAI, SWADHIN PRADHAN, SAMPATH RANGARAJAN, MOHAMMAD KHOJASTEPOUR, AND KARTHIKEYAN

July 2019

SUNDARESAN

- Patent is filed with NEC Labs America
- Proposes a design of battery-free touch interface using RFID tags

### 2. Mobile Device Notification Scheduling

WIPO Patent: WO/2017/131748

SWADHIN PRADHAN, ABHINAV PARATE, KYU-HAN KIM, AND JUSTIN COOK

Aug. 2017

- Patent is filed with HPE Labs
- Proposes a system which schedules notifications in mobile devices intelligently

## Experience

### RESEARCH

#### NEC Labs America, Mobile Communications + Networking Group

Princeton, NJ, USA

RESEARCH INTERN

May 2017 - Oct. 2017

- Built a prototype of mobile voice assistant for future smart homes
- Two internal patents are filed based on the work

## NEC Labs America, Mobile Communications + Networking Group

Princeton, NJ, USA

### RESEARCH INTERN

May 2016 - Oct. 2016

- Built a prototype of RFID based seamless retail checkout system
- Built a RFID based battery-free touch interface
- Presented finding in ACM MobiCom 2017 and a workshop and filed a patent

## Hewlett-Packard Enterprise Labs, Mobility & Networking Group

Palo Alto, CA, USA

### RESEARCH INTERN

May 2015 - Aug. 2015

- Built a mobile application to assess notification importance based on user engagement level
- Presented findings in IEEE InfoCom 2017 and filed a patent

## Computer Science & Engineering, Indian Institute of Technology Kharagpur

Kharagpur, WB, India

### UNDERGRADUATE RESEARCH INTERN

May 2010 - July 2010

- Exploring the feasibility of NS2 for simulating a heterogeneous network
- Worked under the supervision of Prof. Arobinda Gupta

## DEVELOPMENT

### Interra Systems India Pvt. Ltd.

Kolkata, WB, India

#### SOFTWARE ENGINEER

May 2011 - Jan. 2012

- Successfully built an XML parser for a data format converter named OVC
- Built a front-end and command parser of a Graphical User Interface (GUI) viewer tool named Mirus3G

### Interra Systems India Pvt. Ltd.

Kolkata, WB, India

#### SOFTWARE ENGINEERING INTERN

June 2009 - Aug. 2009

- Developed a SWIG interface for Python for a suite of C++ IP Libraries
- Developed a C++ template library to support easier management of products

## Technical Skills

### Programming Languages

Python, C, Java, C++, MySQL

### Scripting

Bash Shell, C Shell, Awk, Sed, Perl

### Web Technologies

HTML, PHP, Javascript, CSS, Ajax, JSP

### Tools extensively used

Weka, MATLAB, NS3,  $\text{\LaTeX}$

### Other Tools

OpenCL, Scikit-learn, Doxygen, SWIG, Pajek, NS2, FFMpeg, Flex, Bison

### Deep Learning Frameworks

TensorFlow, PyTorch, Keras

### Hardwares used

Embedded Platforms (Arduino, Raspberry Pi, HummingBoard Pro, BeagleBone), Ettus USRP N200/N210

### Others

Android Programming, GTK Programming, Socket Programming

## Interesting Projects

### Capturing ECG using wrist-worn IMUs

UT Austin, USA

#### GRADUATE RESEARCH PROJECT

March 2016 - May 2016

- Attempted to measure ECG exploiting the vibrations of IMUs embedded in wrist-worn wearables

### Predicting Sarcasm in Tweets

UT Austin, USA

#### GRADUATE COURSE PROJECT

March 2015 - May 2015

- Attempted to measure the level of sarcasm present in tweets

### Automatic Facial Expression Detection using EEG headset

UT Austin, USA

#### GRADUATE COURSE PROJECT

Oct. 2014 - Dec. 2014

- Designed a system to detect the facial expression using the MUSE EEG headset

### A Browser plug-in for Search Trail Suggestion

IIT Kharagpur, India

#### YAHOO HACK U

June 2013

- Designed a prototype which provided users with different series of search trail suggestions

### Analysing the impact of group performance in Test Cricket

IIT Kharagpur, India

#### GRADUATE COURSE PROJECT

Feb. 2013 - April 2013

- Designed a novel metric to measure the impact of performance from the cricinfo data of test matches

## Setting up Low Cost GSM Network

UNDERGRADUATE THESIS PROJECT

- Designed and implemented a prototype of multi-hop delay-tolerant cellular network in a Java based simulation

Jadavpur University, India

July 2010 - March 2011

## C to Assembly Translator

UNDERGRADUATE COURSE PROJECT

- Designed and implemented a whole pipeline of compiler and assembler for a subset of C language

Jadavpur University, India

May 2010 - July 2010

## Teaching Assistantships

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Spring '19 **Computer Networks**, Instructor: Mohamed G. Gouda

UT Austin, USA

Fall '18 **Introduction to Wireless Networks**, Instructor: Lili Qiu

UT Austin, USA

Spring '18 **Computer Networks**, Instructor: Mohamed G. Gouda

UT Austin, USA

Spring '17 **Introduction to Wireless Networks**, Instructor: Lili Qiu

UT Austin, USA

Spring '16 **Natural Language Processing**, Instructor: Raymond Mooney

UT Austin, USA

Fall '15 **Computer Networks**, Instructor: David A. Bryan

UT Austin, USA

Spring '15 **Big Data Programming**, Instructor: David Franke

UT Austin, USA

Fall '14 **Big Data Programming**, Instructor: David Franke

UT Austin, USA

Spring '14 **Distributed Systems**, Instructor: Niloy Ganguly

IIT Kharagpur, India

Fall '13 **Discrete Structures**, Instructor: Animesh Mukherjee

IIT Kharagpur, India

Spring '13 **Programming and Data Structure Lab**, Instructor: Niloy Ganguly

IIT Kharagpur, India

## Extramural Engagements

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### ACM S3 student workshop co-located with ACM Mobicom 2018

New Delhi, India

PROGRAM CO-CHAIR

Oct. 2018

- Formed and steered the student program committee to evaluate the submitted papers
- Successfully organized the workshop consisting of invited talks, panel discussion, and paper presentations

### IEEE Transactions on Mobile Computing (TMC)

REVIEWER

2016 - Present

- Reviewed multiple technical papers related to wireless sensing and mobile systems

### Texas Venture Labs Practicum

Austin, Tx, USA

GROUP MEMBER

Spring 2015

- Worked with Austin based start-ups: Assero Security (security provider for SMBs) and Athletebuilder (Netflix of sports coaching)
- Helped them to formulate better business strategy and market positioning

### Srijan, Annual Technical Festival (Techfest) of Jadavpur University

Kolkata, India

CORE COMMITTEE MEMBER

Spring 2010

- Organized the robotics events in the Techfest
- Actively planned various events happened in the Techfest

### Teach India Campaign

Kolkata, India

VOLUNTEER

2009

- Taught under-privileged school-going children in a Kolkata slum

## References

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1. **Lili Qiu**, Email: lili@cs.utexas.edu

Professor, CS Dept.,

UT Austin

2. **Karthikeyan Sundaresan**, Email: karthiks@nec-labs.com

Senior Researcher,

NEC Labs America

3. **Kyu-Han Kim**, Email: kyu-han.kim@hpe.com

Director, Intelligent

Edge, HPE Labs

4. **Romit Roy Choudhury**, Email: croy@illinois.edu

Professor, Dept. of

ECE and CS, UIUC

5. **Niloy Ganguly**, Email: niloy@cse.iitkgp.ernet.in

Professor, CSE

Dept., IIT Kharagpur