Sabur Hassan Baidya — curriculum vitae

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Research Interests

Intelligent and Autonomous Systems (UAVs, Connected and Autonomous Vehicles, Tactile Robots), Internet of Things (IoT), Wireless Networks (5G/6G, LTE, C-V2X, mmWave), Distributed Computing (Edge/Cloud), Video Streaming and Processing, Machine Learning, AR/VR/MR, Smart and Connected Health

Current Position

Assistant Professor July 2021 - Present
University of Louisville Louisville, KY
Computer Science and Engineering Dept.
J.B. Speed School of Engineering

Affiliation, Louisville Automation and Robotics Research Institute (LARRI)

Education

University of California, Irvine Sept.'14 - Sept.'19
Ph.D. in Computer Science GPA: 3.95/4
Awards: Graduate Fellowship, Best Poster Award, People's Choice Award

University of Texas at Dallas Aug.'11 - Aug.'13
M.S. in Computer Science GPA: 3.96/4
Awards: Certificate of Academic Excellence

West Bengal University of Technology, India Aug.'03 - Aug.'07
B.Tech in Electronics & Communication Engineering GPA: 8.93/10
Class rank: 2nd in a class of **65** students
Awards: IDB Scholarship for 4 years

Past Appointments

University of California, San Diego Oct.'19 - Jun'21
Postdoctoral Scholar, ECE Department San Diego, CA
Mobile Systems Design Lab Supervisor: Prof. Sujit Dey

Nokia Bell Labs Jun.'17 - Sept.'17
Research Intern, Murray Hill, NJ
Edge-Cloud Research Group Supervisor: Dr. Prasanth Ananth

Futurewei Research Lab Jun.'16 - Sept.'16
Research Intern, Network Virtualization Group Santa Clara, CA

Cisco Systems Sept.'13 - Sept.'14
Software Engineer, Software Routing Group for 3G/4G San Jose, CA

BlackBerry Ltd. Jan.'13 - May'13
Software Developer Intern, Radio Applications R&D Irving, TX

WINLAB, Rutgers University May'12 - Aug.'12
Summer Research Intern North Brunswick, NJ
Project: Mobility First Future Internet Architecture Supervisor: Dr. Dipankar Ray

IBM Sept.'07 - Jun.'11
Senior System Engineer, Telecom Group Noida, India

Funding

- **NSF EPSCOR Grant (Award #1849213): "RII Track-1: Kentucky Advanced Manufacturing Partnership for Enhanced Robotics and Structures."** (Role: Senior Personnel), 7/1/2021 - 6/30/2024; Personal Share: $500,000
  ∗ *In collaboration with PI Rodney Andrews at the University of Kentucky, Co-PI Dan Popa at the University of Louisville, and Co-PIs John Anthony, Czarena Crofcheck, and Seth DeBolt at the University of Kentucky.*
- **DARPA AISS Grant: Automatic Implementation of Secure Silicon**; Prime Contract: Synopsys; Subcontract Share at UofL: $50,000; Role: Campus PI
  ∗ *In collaboration with other subcontractor collaborators: Sujit Dey (UCSD), Anand Raghunathan (Purdue University)*

Honors & Awards

- **People's Choice Award** for the best research talk at the Graduate Research Symposium, UCI. 2018
- **Best Poster Award** in Computer Science Research Showcase, UCI. 2016
- **Third best poster award** in Intern Research Showcase at Huawei Research Labs, Santa Clara, CA. 2016
- Selected among **8 teams nationwide** for DARPA SDR Hackfest 2017
- **Mentoring Excellence** Stipend award, GRC, UCI. 2015 - 2017
- **Graduate Fellowship** from Computer Science dept. of UC Irvine. 2014
- **Certificate of Academic Excellence**, for outstanding performance in the Computer Science Department, University of Texas at Dallas. 2013
- Nominated for **'Golden Key International Honour Society'** by the University of Texas at Dallas for academic excellence. 2012
- **5th Place award** in the workshop and competition on Cyber Security and ethical hacking at TexSAW in University of Texas at Dallas. 2011
- **Conference Travel Grant Awards:**
  - **NSF travel grant** offer for ACM SIGCOMM Conference (declined). 2019
  - **AFRL travel grant** for presenting poster at Beyond 5G Showcase. 2019
  - **NSF travel grant** for attending ACM MobiHoc Conference. 2018
  - **ACM grant** for attending SIGMETRICS Conference. 2018

Research in News

- **PC Magazine:** S.C. Stuart, Inside the DARPA's Hackfest at the NASA Research Park. Dec.'17
- The Official US Defense Department Science Blog. Armed with Science: DARPA Puts Techies to the Test at Bay Area Hackfest. Nov.'17
- UCI News. Levorato and DeepEdge tackle DARPA SDR Hackfest Dec.'17
- USC Viterbi News. CCI Team Participates in DARPA SDR Hackefest Nov.'17

Publications

Journal Publications (Peer-reviewed):

[1] Basar Kutukcu, **Sabur Baidya**, Anand Raghunathan, Sujit Dey. *"Contention Grading and Adaptive Model Selection for Machine Vision in Embedded Systems"*. ACM Transactions on Embedded Computing Systems (ACM TECS) 2021. (*under review*)

[2] Yu-Jen Ku, **Sabur Baidya**, Sujit Dey. *"Renewable Energy-Aware Resource-Efficient Vehicular Edge Computing Systems"*. IEEE Transactions on Vehicular Technology (IEEE TVT) 2021.

[3] Yoshitomo Matsubara, Davide Callegaro, **Sabur Baidya**, Marco Levorato, Sameer Singh. *"Head Network Distillation: Splitting Distilled Deep Neural Networks for Resource-constrained Edge Computing Systems"*. IEEE Access 2020.

[4] **Sabur Baidya**, Marco Levorato. *"Content-Aware Cognitive Interference Control for Urban IoT Systems"*. IEEE Transactions on Cognitive Communications and Networking, (IEEE TCCN) 2018.

Conference Proceedings (Peer-reviewed):

[5] Kun Suo, Junggab Son, Dazhao Cheng, Wei Chen, **Sabur Baidya**. *"Tackling Cold Start of Serverless Applications by Efficient and Adaptive Container Runtime Reusing"*. IEEE International Conference on Cluster (CLUSTER) 2021.

[6] Basar Kutukcu, **Sabur Baidya**, Anand Raghunathan, Sujit Dey. *"Contention-aware Adaptive Model Selection for Machine Vision in Embedded Systems"*. IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS) 2021.

[7] Kousalya Banka, Kun Suo, Yong Shi, **Sabur Baidya**. *"A Study of State-of-the-art Energy Saving on Edges"*. ACM Southeast Conference (ACMSE) 2021.

[8] Kun Suo, Yong Shi, Ahyoung Lee, **Sabur Baidya**. *"Characterizing Networking Performance and Interrupt Overhead of Container Overlay Networks"*. ACM Southeast Conference (ACMSE) 2021.

[9] **Sabur Baidya**, Yu-Jen Ku, Hengyu Zhao, Jishen Zhao, Sujit Dey. *"Vehicular and Edge Computing for Emerging Connected and Autonomous Vehicle Applications"*. 57th ACM/EDAC/IEEE Design Automation Conference (DAC), 2020.

[10] Yu-Jen Ku, Sandalika Sapra, **Sabur Baidya**, Sujit Dey. *"State of Energy Prediction in Renewable Energy-driven Mobile Edge Computing using CNN-LSTM Networks"*. IEEE Green Energy and Smart Systems Conference (IGESSC), 2020.

[11] **Sabur Baidya** and Marco Levorato. *"On the Feasibility of Infrastructure Assistance to Autonomous UAV Systems"*. 16th International Conference on Distributed Computing in Sensor Systems (DCOSS) 2020.

[12] Davide Callegaro , **Sabur Baidya**, Marco Levorato. *"Dynamic Distributed Computing for Infrastructure-Assisted Autonomous UAVs"*. IEEE International Conference on Communications. IEEE ICC 2020.

[13] **Sabur Baidya**, Peyman Tehrani and Marco Levorato. *"Data-Driven Path Selection for Real-Time Video Streaming at the Network Edge"*. IEEE ICC Workshop on Edge Machine Learning for 5G Networks and Beyond, 2020.

[14] Yoshitomo Matsubara, **Sabur Baidya**, Davide Callegaro, Marco Levorato, Sameer Singh. *"Distilled Split Deep Neural Networks for Edge-Assisted Real-Time Systems"*. ACM MobiCom Workshop on HotEdgeVideo, 2019.

[15] Davide Callegaro , **Sabur Baidya**, Gowri Sankar Ramachandran, Bhaskar Krishnamachari, Marco Levorato. *"Information Autonomy: Self-Adaptive Information Management for Infrastructure-Assisted Autonomous UAV Systems"*. IEEE Military Communications Conference (MILCOM), 2019.

[16] Davide Callegaro , **Sabur Baidya**, Marco Levorato. *"A Measurement Study on Edge Computing for Autonomous UAVs"*. ACM SIGCOMM Workshop on MAGESys, 2019.

[17] **Sabur Baidya**, Zoheb Shaikh, Marco Levorato. *"FlyNetSim: An Open Source Synchronized UAV Network Simulator based on ns-3 and Ardupilot"*. 21st ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (ACM MSWiM), 2018.

[18] Zoheb Shaikh, **Sabur Baidya**, Marco Levorato. *"Robust Multi-Path Communications for UAVs in the Urban IoT"*. IEEE SECON Workshop on CPC-UAV 2018.

[19] **Sabur Baidya**, Yan Chen and Marco Levorato. *"eBPF-based Content and Computation-aware Communication for Real-time Edge Computing"*. IEEE INFOCOM WKSHPS, 2018.

[20] **Sabur Baidya**, Marco Levorato. *"Edge-assisted Content and Computation-Driven Dynamic Network Selection for Real-Time Services in the Urban IoT"*. IEEE INFOCOM WKSHPS, 2017.

[21] **Sabur Baidya**, Marco Levorato. *"Content-Based Interference Management for Video Transmission in D2D Communications Underlaying LTE"*. IEEE International Conference on Computing, Networking and Communications (ICNC), 2017.

[22] **Sabur Baidya**, Marco Levorato. *"Content-based Cognitive Interference Control for City Monitoring Applications in the Urban IoT"*. IEEE Global Communications Conference (GLOBECOM), 2016.

[23] **Sabur Baidya**, Ravi Prakash. *"Improving the performance of Multipath TCP over Heterogeneous Paths using Slow Path Adaptation"*. IEEE International Conference on Communications (ICC), 2014.

Book Chapter, Abstracts & Technical Reports:

[24] Yoshitomo Matsubara, **Sabur Baidya**, Davide Callegaro, Marco Levorato and Sameer Singh *"Distilled Split Deep Neural Networks for Edge-Assisted Real-Time Systems."* In Southern California Machine Learning Symposium (SCMLS), 2020.

[25] A. Chowdhery, M. Levorato, I. Burago and **S. Baidya**, *Book Chapter: "Urban IoT Edge Analytics"* in Fog Computing in the Internet of Things (Intelligence at the Edge), Springer International Publishing, in press 2018. 101-120

[26] **Sabur Baidya**, Pramod Shirol, Abhishek Basu, Ravi Prakash. *"Employing WiFi Direct to Build a Wireless Network over both 2.4 GHz and 5.8 GHz bands"*. Technical Report UTDCS-16-13, Computer Science Department, University of Texas at Dallas, Richardson, Texas, Sept. 2013.

Selected Posters

[1] **Sabur Baidya**, Yu-Jen Ku, Henyu Zhao, Jishen Zhao and Sujit Dey. *"Vehicular and Edge Computing for Emerging Connected and Autonomous Vehicle Applications"* at CWC Research Review, UC San Diego, CA (May. 2020).

[2] D. Callegaro, **S. Baidya**, Y. Matsubara, M. Levorato,G. Ramachandran and B. Krishnamachari. *"Resilient Communication and Computation for Heterogeneous Infrastructure-Assisted UAV Swarms"*, Beyond 5G SDR Showcase, Air Force Research Lab (AFRL), Wright Brother Institute, Dayton, OH (May. 2019).

[3] **Sabur Baidya**, Yan Chen. *"eBPF Filtering and Packet Processing in Virtual Network Environment"* at Intern Research Showcase, Huawei Research Lab, CA (Aug. 2016). [**3rd Best Poster Award**]

[4] **Sabur Baidya**, Marco Levorato. *"Content-based Cognitive Interference Control for City Monitoring Applications in the Urban IoT"* at Computer Science Research Showcase., UC Irvine (Jun. 2016). [**Best Poster Award**]

[5] **Sabur Baidya**, Kai Su, Kiran Nagaraja, Ivan Seskar, Dipankar Raychaudhuri. *"Multihoming in Mobility First Future Internet Architecture"* at WINLAB Summer Research Program Open House, Rutgers University (Aug. 2012).

Software Release

FlyNetSim https://github.com/saburhb/FlyNetSim

- An open source synchronized UAV-Network simulator using ns-3 and Ardupilot.
- It can simulate multi-UAVs, multiple Wireless Networks and IoT applications.

eBPF-cast https://github.com/saburhb/eBPF-cast

- An open source software for real-time Network Function Virtualization (NFV), created using extended Berkeley Packet Filter (eBPF) of Linux Kernel.

Selected Talks

02/2021 : *Adaptive Computation Partitioning and Offloading in Sustainable Vehicular Edge Computing*, Computer Science Seminar, **University of Louisville (UofL)**

06/2020 : *On the Feasibility of Infrastructure Assistance to Autonomous UAV Systems*, International Conference on Distributed Computing in Sensor Systems **(DCOSS 2020)**

06/2020 : *Data-Driven Path Selection for Real-Time Video Streaming at the Network Edge*, IEEE International Conference on Communications **(IEEE ICC 2020)**

03/2020 : *Adaptive Computing & Communications for Intelligent and Autonomous Systems in the Internet-of-Things*, **University of Louisville (UofL)**

03/2019 : *Adaptive Communications for Intelligent & Autonomous Systems*, **University of Southern California (USC)**

04/2018 : *Robust Multi-Path Communications for UAVs in the Urban IoT*, AGS Symposium, University of California Irvine **(UCI)**

04/2018 : *eBPF-based Content and Computation-aware Communication for Real-time Edge Computing*, **IEEE INFOCOM 2018**, Honolulu, HI

12/2016 : *Content-based Cognitive Interference Control for City Monitoring Applications in the Urban IoT*, **IEEE GLOBECOM 2016**, Washington DC

08/2016 : *eBPF Filtering and Packet Processing in Virtual Network Environment*, **Huawei Research Labs**, Santa Clara, CA

06/2016 : *Content-based Cognitive Interference Control for City Monitoring Applications*, Graduate Research Showcase, University of California, Irvine **(UCI)**

06/2014 : *Improving the performance of MPTCP using Slow Path Adaptation*, IEEE International Conference on Communications **(IEEE ICC 2014)**, Sydney Australia

12/2013 : *Information-Centric Networking*, **Cisco Systems**, San Jose, CA

08/2012 : *Multihoming in Mobility First Future Internet Architecture*, **WINLAB, Rutgers University**, North Brunswick, NJ

Teaching Experience

University of Louisville

- Internet of Things: From Technology to Applications (CSE 590) - Special Topics — Fall '21
- Mobile Computing (CSE 617) — Spring '22

University of California, Irvine

- Guest lecture on Queuing Theory in Computer Communications & Networks course (CS 232) - Graduate level) — Fall '15
- Guest tutorial lecture on Networks Simulator NS-3 for Wireless Networks course (Graduate level) — W'16, Sp'17, Sp'18

Student Mentoring

Current Students (UofL):

- Mohammad Helal Uddin (PhD, CSE, UofL)
- Darian Zeis (Undergrad, CSE, UofL)
- Billy Smart (Undergrad, CSE, UofL)
- Smaran Alli (K12 - Dupont Manual High School)

Current Students (UCSD) - External Mentoring:

- Basar Kutukcu (PhD, ECE, UCSD)
- Yujen Ku (PhD, ECE, UCSD)
- Bryse Flowers (PhD, ECE, UCSD)

Past Students:

- Sandalika Sapra, (MS, ECE, UCSD)
- Runfa Li, (MS, ECE, UCSD)
- Marve Kilic, (BS, ECE, UCSD)
- Zijia Guo, (BS, ECE, UCSD)
- Yaocong Hu, (BS, ECE, UCSD)
- Zoheb Shaikh, (MS, CS, UCI)
- Jatin Mehta, (MS, CS, UCI)
- Beichen Yang, (MS, CS, UCI)

Professional Services

Committee:

- TPC Member for COMSNETS 2022 Graduate forum
- TPC Member for COMSNETS 2021 Graduate forum
- TPC Member, 18th ACM Conference on Embedded Networked Sensor Systems (SenSys 2020), Posters/Demos
- TPC Member for IEEE ICNC 2017
- Student Organizer for Campus visit event for incoming PhD students, Computer Science department, UCI, 2018
- External Relations Committee IEEE-UCI 2016

Reviewer:

- **Reviewer for Journals:**
  - IEEE Transactions on Mobile Computing (IEEE TMC)
  - IEEE Open Journal of the Communications Society (OJ-COMS)
  - IEEE Consumer Electronics Magazine
  - ACM Computing Surveys
  - IEEE Transactions of Cognitive Comm. & Networking (IEEE TCCN)
  - IEEE Access

- **Reviewer for Conferences:**
  - IEEE International Conference on Robotics and Automation (ICRA)
  - IEEE International Conference on Sensing,Communication and Networking (SECON)
  - IEEE International Conference on Computing, Networking and Communication (ICNC)
  - IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)
  - IEEE Wireless Communications and Networking Conference (WCNC)
  - ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWIM)
  - IEEE International Conference on Communication Systems Networks (COMSNETS)
  - ACM Conference on Embedded Networked Sensor Systems (SenSys)

Volunteer:

- **Student Volunteer**, IEEE SECON Conference 2017, San Diego, CA
- **Student Speaker**, Workshop on "Understanding the U.S. Classroom as a Student and Teaching Assistant" at GRC, UC Irvine (Oct. 22, 2015)
- **Peer mentor**, Graduate Resource Center, UC Irvine (2015 - 2017)

Affiliations:

- Member, Golden Key International Honour Society
- Member, IEEE
- Member, IEEE Communication Society.
- Member, Association of Computing Machinery (ACM)

References

Dr. Sujit Dey
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Email: dey@ece.ucsd.edu
Phone: (858)-761-7518
Web: http://mesdat.ucsd.edu/sujit-dey

Dr. Bhaskar Krishnamachari
Professor, Ming Hsieh Faculty Fellow
Department of Electrical Engineering
University of Southern California
Email: bkrishna@usc.edu
Phone: (213)-821-2528
Web: http://ceng.usc.edu/~bkrishna

Dr. Marco Levorato
Associate Professor,
Dept. of Computer Science
University of California, Irvine
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Dr. Ravi Prakash
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University of Texas at Dallas
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