

SAPTARSHI DEBROY

PERSONAL INFORMATION

Saptarshi Debroy
Assistant Professor of Computer Science, Hunter College
Doctoral Faculties of Computer Science, The Graduate Center
The City University of New York
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RESEARCH INTERESTS

Cyber Security: Cloud security, end-to-end security assurance, federated identity and access management, trust and reputation analysis, moving target defense.
Distributed Computing: Resource allocation in cloud environments, edge/fog computing under challenged environments, federated network performance monitoring frameworks, perfSONAR.
Big Data Networking: Campus cyberinfrastructure, Science DMZ, system performance evaluation, software-defined networking, network function virtualization.
Wireless Networking: Dynamic spectrum access, spectrum sharing and resource management, communication protocol design, Internet of things.

PROFESSIONAL APPOINTMENTS

2016–present: **Assistant Professor**, City University of New York, New York, NY
2014–2016: **Postdoctoral Fellow**, University of Missouri, Columbia, MO
2008–2014: **Graduate Assistant**, University of Central Florida, Orlando, FL
2014: **Research Intern**, University of Missouri, Columbia, MO
2012: **Research Intern**, Indian Institute of Technology, New Delhi, India
2011: **Summer Intern**, BlueCoat Systems, Sunnyvale, CA
2009: **Summer Intern**, Motorola Inc., Plantation, FL

EDUCATION

University of Central Florida, Orlando, FL
Ph.D., Computer Engineering, 2014

Jadavpur University, Kolkata, India
M.Tech., Distributed & Mobile Computing, 2008

West Bengal University of Technology, Kolkata, India
B.Tech., Information Technology, 2006

RESEARCH GRANTS

Funded

- CAREER: Anahita: A Resilient and Agile Fog Framework for Large-scale Disaster Incidence Response*
Agency: National Science Foundation; Award amount: \$523,360; Duration: 2020-2025, Role: Principal investigator.
- CC* Integration: End-to-End Performance and Security Driven Federated Data-Intensive Workflow Management*

Agency: National Science Foundation; Award amount: \$500,000; Duration: 2018-2020, Role: Co-Principal investigator.

3. *Project Khaleesi - Mentoring tomorrow's Cyber Security Queen of Dragons*
Agency: Women in Technology and Entrepreneurship in New York; Award amount: \$25,000; Duration: 2017-2018, Role: Principal investigator.

Under review

1. *CC* Integration: Socializing Measurement Functions for Federated Network Performance Expectation Management*
Agency: National Science Foundation; Role: Co-Principal investigator.
2. *Agile Resource Management for Software-defined Networking driven Resilient Cloud Environments*
Agency: Army Research Office; Role: Principal investigator.

Other grant writing and consulting experience

1. *Multi-Domain Network Performance Sampling*
Agency: Department of Energy; Role: Postdoctoral fellow.
2. *CC-NIE Integration: Innovations to Transition a Campus Core Cyberinfrastructure to Serve Diverse and Emerging Researcher Needs*
Agency: National Science Foundation; Role: Postdoctoral fellow.

BOOK CHAPTERS

1. **Saptarshi Debroy**, Mainak Chatterjee, "Radio Environment Maps and Its Utility in Resource Management for Dynamic Spectrum Access Networks", *Book Chapter for 'Resource Allocation in Next-Generation Broadband Wireless Access Networks'*, IGI Global, ISBN - 9781522520238, 2017. (Invited)
2. **Saptarshi Debroy**, Prasad Calyam, Matthew Dickinson, "Orchestrating Science DMZs for Big Data Acceleration: Challenges and Approaches", *Book Chapter for 'Networking for Big Data'*, CRC Press, ISBN - 9781482263497, 2015.

JOURNAL ARTICLES

1. **Saptarshi Debroy**, Prasad Calyam, Minh Nguyen, Roshan Lal Naupane, Bidyut Mukherjee, Ajay Kumar Eeralla, Khaled Salah, "Frequency-Minimal Utility-Maximal Moving Target Defense against DDoS in Cloud", *Accepted at IEEE Transactions on Network and Service Management*, 2020.
2. **Saptarshi Debroy**, Priyanka Samanta, Amina Bashir, Mainak Chatterjee, "SpEED-IoT: Spectrum Aware Energy Efficient Routing for Device-to-Device IoT Communication", *Elsevier International Journal of Future Generation Computer Systems*, vol. 93, pp. 833-848, 2019.
3. Ravi Akella, **Saptarshi Debroy**, Prasad Calyam, Alex Berryman, Kumpeng Zhu, Mukundan Sridharan, "Security Middleground for Resource Protection in Measurement Infrastructure-as-a-Service", *IEEE Transactions on Services Computing*, vol. 12, no. 4, pp. 621-638, 2019.
4. Matthew Dickinson, **Saptarshi Debroy**, Prasad Calyam, Samaikya Valluripally, Yuanxun Zhang, Ronny Bazan Antequera, Trupti Joshi, Tommi White, Dong Xu, "Multi-cloud Performance and Security Driven Federated Workflow

Management”, *IEEE Transactions on Cloud Computing*, In press, Available Online, 2018.

5. Ronny Bazan Antequera, Prasad Calyam, **Saptarshi Debroy**, Longhai Cui, Sripriya Seetharam, Matthew Dickinson, Trupti Joshi, Dong Xu, Tsegereda Beyene, “ADON: Application-Driven Overlay Network-as-a-Service for Data-Intensive Science”, *IEEE Transactions on Cloud Computing*, vol. 6, no. 3, pp. 640-655, 2018.
6. Yuanxun Zhang, Prasad Calyam, **Saptarshi Debroy**, Sai Shreya Nuguri “Social Plane for Recommenders in Network Performance Expectation Management”, *IEEE Transactions on Network and Service Management*, vol. 15, no. 1, pp. 97-111, 2018.
7. Shameek Bhattacharjee, **Saptarshi Debroy**, Mainak Chatterjee, “Quantifying Trust for Robust Spectrum Fusion in Distributed Multi-channel Cognitive Radio Networks”, *IEEE Transactions on Cognitive Communications and Networking*, vol. 3, no. 2, pp. 138-154, 2017.
8. Yuanxun Zhang, **Saptarshi Debroy**, Prasad Calyam, “Network-wide Anomaly Event Detection and Diagnosis in perfSONAR”, *IEEE Transactions on Network and Service Management*, vol. 13, no. 3, pp. 666-680, 2016.
9. **Saptarshi Debroy**, Shameek Bhattacharjee, Mainak Chatterjee, “Spectrum Map and its application in Resource Management in Cognitive Radio Networks”, *IEEE Transactions on Cognitive Communications and Networking*, vol. 1, no. 4, pp. 406-419, 2015.
10. **Saptarshi Debroy**, Swades De, Mainak Chatterjee, “Contention based Multi-channel MAC Protocol for Distributed Cognitive Radio Networks”, *IEEE Transactions on Mobile Computing*, vol. 13, no. 12, pp. 2749 - 2762, 2014.

CONFERENCE
PROCEEDINGS

1. Xiaojie Zhang, Amitangshu Pal, **Saptarshi Debroy**, “EFFECT: Energy-efficient Disaster Response Edge Computing Framework for Real-time Video Processing”, *Under review at IEEE ICDCS*, 2020.
2. Xiaojie Zhang, **Saptarshi Debroy**, “Energy Efficient Task Offloading for Compute-intensive Mobile Edge Applications”, *Accepted at IEEE ICC*, 2020.
3. Jordi Navarrette, Subash Shankar, Xiaojie Zhang, **Saptarshi Debroy**, “Formal Modeling and Analysis of Multi-Rogue Backoff Manipulation Attacks in Unlicensed Networks”, *Accepted at IEEE DRCN*, 2020.
4. Minh Nguyen, **Saptarshi Debroy**, Prasad Calyam, Zhen Lyu, Trupti Joshi, “Security-aware Resource Brokering for Bioinformatics Workflows across Federated Multi-cloud Infrastructures”, *Proc. of ACM ICDCN*, 2020.
5. Xiaojie Zhang, **Saptarshi Debroy**, “Migration-driven Resilient Disaster Response Edge-Cloud Deployments”, *Proc. of IEEE NCA*, 2019.
6. Xiaojie Zhang, **Saptarshi Debroy**, “Adaptive Task Offloading over Wireless in Mobile-Edge Computing”, *Proc. of IEEE/ACM SEC*, 2019.
7. Minh Nguyen, **Saptarshi Debroy**, Prasad Calyam, Zhen Lyu, Trupti Joshi, “Multi-Cloud Performance and Security-driven Brokering for Bioinformatics Workflows”, *Proc. of IEEE ICNP Workshops*, 2019.
8. Minh Nguyen, Amitangshu Pal, **Saptarshi Debroy**, “Whack-a-Mole: Software-defined Networking Driven Multi-level DDoS Defense for Cloud Environments”, *Proc. of IEEE LCN*, 2018.

9. Minh Nguyen, Priyanka Samanta, **Saptarshi Debroy**, “Analyzing Moving Target Defense for Resilient Campus Private Cloud”, *Proc. of IEEE CLOUD*, 2018.
10. Priyanka Samanta, Elizabeth Kelly, Amina Bashir, **Saptarshi Debroy**, “Collaborative Adversarial Modeling for Spectrum Aware IoT Communications”, *Proc. of IEEE ICNC*, 2018.
11. Yuanxun Zhang, **Saptarshi Debroy**, Prasad Calyam, “Network measurement recommendations for performance bottleneck correlation analysis”, *Proc. of IEEE LANMAN*, 2016.
12. Matthew Dickinson, **Saptarshi Debroy**, Prasad Calyam, “End-to-End Security Formalization and Alignment in Federated Data-intensive Application Workflows”, *Proc. of IEEE CLOUD*, 2016.
13. **Saptarshi Debroy**, Prasad Calyam, Minh Nguyen, Allen Stage, Vladimir Georgiev, “Frequency- Minimal Moving Target Defense using Software Defined Networking”, *Proc. of IEEE ICNC*, 2016.
14. Yuanxun Zhang, Prasad Calyam, **Saptarshi Debroy**, Mukundan Sridharan, “PCA-based Network wide Correlated Anomaly Event Detection and Diagnosis”, *Proc. of IEEE DRCN*, 2015.
15. **Saptarshi Debroy**, Mainak Chatterjee, “Spectrum map aided multi-channel multi-hop routing in distributed cognitive radio networks”, *Proc. of IEEE PIMRC*, 2014.
16. **Saptarshi Debroy**, Swades De, Mainak Chatterjee, “Contention based Multi-channel MAC Protocol for Distributed Cognitive Radio Networks”, *Proc. of IEEE Globecom*, 2013.
17. **Saptarshi Debroy**, Mohammed Z. Ahmed, Mukundan Iyengar, Mainak Chatterjee, “Critical Sections in Networked Games”, *Proc. of IEEE ICC*, 2013.
18. Shameek Bhattacharjee, **Saptarshi Debroy**, Mainak Chatterjee, Kevin Kwait, “Utilizing Misleading Information for Cooperative Spectrum Sensing in Cognitive Radio Networks”, *Proc. of IEEE ICC*, 2013.
19. **Saptarshi Debroy**, Shameek Bhattacharjee, Mainak Chatterjee, Kevin Kwait, “An Effective Use of Spectrum Usage Estimation for IEEE 802.22 Networks”, *Proc. of IEEE WCNC*, 2012.
20. Shameek Bhattacharjee, **Saptarshi Debroy**, Mainak Chatterjee, Kevin Kwait, “Trust based Fusion over Noisy Channels through Anomaly Detection in Cognitive Radio Network”, *Proc. of ACM SIN*, 2011.
21. **Saptarshi Debroy**, Shameek Bhattacharjee, Mainak Chatterjee, Kevin Kwait, “Spectrum Usage Estimation and Channel Allocation in IEEE 802.22 Networks”, *Proc. of ACM AINTEC*, 2011.
22. **Saptarshi Debroy**, Shameek Bhattacharjee, Mainak Chatterjee, “Performance based channel allocation in IEEE 802.22 networks”, *Proc. of IEEE PIMRC*, 2011.
23. Shameek Bhattacharjee, **Saptarshi Debroy**, Mainak Chatterjee, “Trust Computation Through Anomaly Monitoring in Distributed Cognitive Radio Networks”, *Proc. of IEEE PIMRC*, 2011.
24. **Saptarshi Debroy**, Shameek Bhattacharjee, Mainak Chatterjee, “Spectrum Map: Toward predicting the spatial distribution of spectrum usage in CRNs”, *Proc. of ICST CROWNCOM*, 2011.
25. **Saptarshi Debroy**, Mainak Chatterjee, “Intra-cell Channel Allocation scheme in IEEE 802.22 Networks”, *Proc. of IEEE CCNC*, 2010.

26. **Saptarshi Debroy**, Sabyasachi De, Pradip K. Das, “GRASP: Geographic Rendezvous Application through SMS Pushing”, *Proc. of IEEE ICON*, 2008.
27. **Saptarshi Debroy**, Sabyasachi De, Saikat Das, Angshuman Chakraborty, Pradip K. Das, Sanjoy Paul, “MyPULSE: Mobile Yellow Pages with User interest & Location Sensing Ensemble”, *Proc. of IEEE TENCON*, 2008.
28. **Saptarshi Debroy**, Sabyasachi De, Saikat Das, Angshuman Chakraborty, “Location, Device & User Profile Sensitive Mobile Yellow Pages”, *Proc. of ICEMC2*, 2007.

TEACHING

Fall 2019

CSCI 36000/73000: Computer Architecture III/Computer Systems at Hunter College, CUNY

CSCI 39596: Advanced Networks and Cloud at Hunter College, CUNY

Spring 2019

CSCI 39583/71100: Cloud Computing/Cloud Database Security and Integrity at Hunter College, CUNY

CSCI 39595: Networking at Hunter College, CUNY

Fall 2018

CSCI 36000/73000: Computer Architecture III/Computer Systems at Hunter College, CUNY

CSCI 39596: Advanced Networks and Cloud at Hunter College, CUNY

Spring 2018

CSc 80010: Survey Research at The Graduate Center, CUNY

CSCI 39554: Networking at Hunter College, CUNY

Fall 2017

CSCI 36000: Computer Architecture III at Hunter College, CUNY

Spring 2017

CSc 87100: Advanced Networks and Security at The Graduate Center, CUNY

CSCI 39554: Networking at Hunter College, CUNY

Fall 2016

CSCI 36000: Computer Architecture III at Hunter College, CUNY

CSCI 13500: Systems Analysis and Design I at Hunter College, CUNY

Spring 2016

CS 4850/7850: Computer Networks I at University of Missouri

CS 4001/7001: Cloud Computing I at University of Missouri

Fall 2015

CS 4850/7850: Computer Networks I at University of Missouri

CS 8001: Cloud Computing II at University of Missouri

Spring 2015

CS 4001/7001: Cloud Computing I at University of Missouri

PhD student advising

- Minh Nguyen, The Graduate Center, CUNY
- Xiaojie Zhang, The Graduate Center, CUNY

Graduate student mentoring

- Matthew Dickinson, Ravi Akella, Samaikya Vallarupally, Yuanxun Zhang, Ronny B. Antequera, Bidyut Mukherjee, and Roshan Lal Naupane at University of Missouri
- Shameek Bhattacharjee at University of Central Florida

Undergraduate student mentoring

- Amina Bashir, and Elizabeth Kelly at Hunter College, CUNY
- Allen Stage, and Vladimir Georgiev at University of Missouri

Research community service

- NSF review panelist
- Conference publicity chair:
 1. IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks 2019.
 2. ACM International Conference on Distributed Computing and Networking 2018.
 3. ACM Workshop on Mobile Video Delivery 2013.
- Conference technical program committee member:
 1. IEEE Global Communications Conference 2018, 2019.
 2. International Conference on Embedded Wireless Systems and Networks 2018.
 3. IEEE International Conference on Communications 2017, 2018, 2019, 2020.
 4. IEEE International Conference on Computing, Networking and Communications 2015, 2016, 2017, 2018, 2019, 2020.
 5. ACM International Conference on Distributed Computing and Networking 2017.
 6. IEEE International Conference on Advanced Networks and Telecommunication Systems 2014, 2015, 2016, 2017.
 7. IEEE International Workshop on Security and Privacy in Big Data in conjunction with International Conference on Computer Communications 2017.
 8. IEEE International Workshop on Quality of Experience Centric Management 2015, 2016.
 9. International Conference on Information Technology 2015, 2016.
 10. IEEE International Workshop on Cloud-based Networks and Applications 2016.
 11. International Conference on Algorithms and Architectures for Parallel Processing 2015, 2016.
 12. IEEE International Conference on Big Data Computing Service and Applications 2015, 2016.

13. ACM Workshop on Mobile Video Delivery 2013.
- Journal and Conference Reviewer:
 1. IEEE Access Journal
 2. Elsevier Journal on Computer Communications
 3. ACM Transactions on Internet Technology
 4. IEEE Networking Magazine
 5. IEEE Transactions on Network and Service Management
 6. IEEE Transactions on Mobile Computing
 7. ACM Transactions on Sensor Networks
 8. IEEE Transactions on Parallel and Distributed Computing
 9. IEEE International Conference on Computing, Networking and Communications 2019
 10. IEEE Global Communications Conference 2019
 11. IEEE International Conference on Communications 2019
 12. IEEE Journal on Special Areas on Communications Special Issue on Spectrum Sharing
 13. IEEE Transactions on Wireless Communications
 14. IEEE Transactions on Cloud Computing
 15. Elsevier Journal on Pervasive and Mobile Computing
 16. Elsevier Journal on Parallel and Distributed Computing
 17. International Conference on Embedded Wireless Systems and Networks 2018.
 18. ACM International Conference on Distributed Computing and Networking 2017.
 19. IEEE International Conference on Advanced Networks and Telecommunication Systems 2014, 2015, 2016, 2017.
 20. IEEE International Conference on Computing, Networking and Communications 2017.
 21. IEEE Global Communications Conference 2009, 2011, 2012, 2015.
 22. IEEE International Conference on Communications 2017, 2018.
 23. IEEE International Workshop on Quality of Experience Centric Management 2016.
 24. International Conference on Information Technology 2015, 2016.
 25. IEEE International Conference on Big Data Computing Service and Applications 2015.
 26. International Conference on Algorithms and Architectures for Parallel Processing 2015, 2016.
 27. IEEE International Conference on Computer Communications 2013, 2014, 2016.
 28. IEEE International Conference on Computer Communications 2013, 2014, 2016.

29. IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks 2013.
30. IEEE IEEE Consumer Communications & Networking Conference 2015.
31. IEEE International Symposium on Dynamic Spectrum Access Networks 2014.
32. IEEE International Workshop on Emerging Cognitive Radio Applications and Algorithms 2013.
33. International Conference for Military Communications 2010.
34. International Wireless Communications and Mobile Computing Conference 2010.
35. IEEE International Conference on High Performance Computing, Data, and Analytics 2009.

University and community service

- Member of the CUNY Graduate Center Executive Committee representing Hunter College
- Member of the Hunter College sub-committee of National Center for Women & Information Technology.
- Organizer of ‘Cyber security queen of dragons’ summer school at Hunter College, CUNY for incoming CUNY freshman women students.
- Former mentor for ‘Summers at Mizzou’ 2015, 2016 programs at University of Missouri for research exposure of High School students
- Tutorial instructor at Cloud Security Curriculum Development Workshop by NSF Project Silver at University of North Carolina-Chappell Hill
- Secretary of the Graduate Students’ Association at University of Central Florida for 2010-11
- Treasurer of the Graduate Students’ Association at University of Central Florida for 2009-10

AWARDS AND ACHIEVEMENTS

- NSF CAREER award winner 2020.
- Nominated for PECASE award.
- Best paper award winner at IEEE PIMRC 2011.
- Travel grant award winner for IEEE PIMRC 2011.
- Travel grant award winner for IEEE DySPAN 2014.
- University Gold Medallist (1st ranked) from Jadavpur University (11th ranked among Indian Engineering Schools), 2006.
- National merit fellowship (Government of India) for 2006 - 2008.
- Ranked 717 in All India Graduate Aptitude Test for Engineering, 2006.
- National merit scholarship (106th out of 200,000 students), 2002
- National merit Scholarship (ranked 38th out of 400,000 students), 2000.