SANKARDAS ROY
Curriculum Vitae
May, 2020

I. Academic Degrees

2009	Doctor of Philosophy in Information Technology, George Mason University, Fairfax, VA. Title of Dissertation: "Secure Data Aggregation in Wireless Sensor Networks (WSNs)."
2001	Master of Science in Computer Science, Indian Statistical Institute, Kolkata, West Bengal, India. Title of Thesis: "A Hybrid Approach in Applying SVD for Image Compression."
1997	Bachelor of Engineering in Electrical Engineering, Bengal Engineering College, Kolkata, West Bengal, India.

II. Academic Positions
A. Teaching Positions

2015 – present	Assistant Professor of Computer Science, Bowling Green State University, Bowling Green, OH.
2012 – 2015	Instructor and Research Associate, Computing and Information Sciences, Kansas State University, Manhattan, KS.
2010 – 2012	Postdoctoral Research Scientist and Adjunct Faculty, Department of Systems and Computer Science, Howard University, Washington, DC.

B. Administrative Positions
N/A

III. Non-academic Positions
N/A

IV.   Research Interests

Security Analysis of Android Apps (via static analysis and/or dynamic analysis)
Application of Machine Learning and Deep Learning for cybersecurity
Cybersecurity and Digital Forensics
Computer Networks
Game Theory
In-network Data Aggregation in Distributed Systems

V.   Research Projects and Grants

A. Grants Under Review

N/A

B. Funded Grants

2017-2019   NIST SSCD Program, Proposal Title: Incorporating Standards Education into Digital Forensics Curricula, (Co-PI, $56K). Project period: from September of 2017 to December of 2019.

2017-2021   NSF CNS Secure and Trustworthy Cyberspace Program, Proposal Title: *SaTC: Core: Small: Collaborative: Data-driven Approaches for Large-scale Security Analysis of Mobile Applications*, (PI, BGSU part of funding is $100,000 whereas total funding is $500,000.). Project period: from August of 2017 to July of 2021.

VI.   Publications

1. Books
   a. Chapters of Books
      1) Sankardas Roy, Dewan Chaulagain, and Shiva Bhusal: Static Analysis for Security Vetting of Android Apps. **Book: From Database to Cyber Security**. Samarati, Ray, and Ray (Eds.), Springer, ISBN 978-3-030-04833-4, 2018.

      2) Sanjeev Setia, Sankardas Roy, and Sushil Jajodia. Secure Data Aggregation in Wireless Sensor Networks. **Book: Wireless Sensor Network Security,** J. Lopez, J. Zhou (Eds.), ISBN 978-1-58603-8137, IOS Press, 2008.
2. Journal/Conference Articles
   a. Refereed Articles
      1) Journals

1. Andrew Meyer and S. Roy. Do Metadata-based Deleted File Recovery Tools Meet NIST Guidelines?. **EAI Endorsed Transactions on Security and Safety**. (2019).

2. Fengguo Wei, Sankardas Roy, Xinming Ou and Robby. Amandroid: A Precise and General Inter-component Data Flow Analysis Framework for Security Vetting of Android Apps. **ACM Transactions on Privacy and Security** 21(3): 14:1-14:32 (2018).

3. Sankardas Roy and Yan Wu. Cognitive Game Theory Models for Cyber Security. **Journal of Industrial Information Technology and Application**, vol. 2, no. 1, pp11-16, Mar, 2018.

4. Harkeerat Bedi, Sankardas Roy, and Sajjan Shiva. "Mitigating Congestion-based DoS Attacks with an Enhanced AQM Technique", **Elsevier Journal of Computer Communications,** Vol. 56, 2015, pp. 60-73.

5. Sankardas Roy, Mauro Conti, Sanjeev Setia, and Sushil Jajodia. "Attack-resilient Data Aggregation in Wireless Sensor Networks: Filtering out the Attacker's Impact", **IEEE Transactions on Information Forensics and Security**, Vol. 9, No. 4, 2014, pp. 681-694.

6. Harkeerat Bedi, Sajjan Shiva, and Sankardas Roy. "A Game Inspired Defense Mechanism against DDoS Attacks", (Wiley) **Security and Communication Networks,** Vol. 7, No. 12, 2014, pp. 2389-2404.

7. Jiazhen Jhou, Sankardas Roy, Jiang Li, and Yi Qian. "Minimizing the Average Delay of Messages in Pigeon Networks", **IEEE Transactions on Communication**, Vol. 61, No. 8, 2013, pp. 3349-3361.

8. Sankardas Roy, Mauro Conti, Sanjeev Setia, and Sushil Jajodia. "Secure Data Aggregation in Wireless Sensor Networks". **IEEE Transactions on Information Forensics and Security**, Vol. 7, No. 3, 2012, pp. 1040-1052.

9. Jiazhen Jhou, Jiang Li, Yi Qian, Sankardas Roy, and Kenneth Mitchell. "Quasi-Optimal Dual-phase Scheduling for Pigeon Networks", **IEEE Transactions on Vehicular Technology,** Vol. 61, No. 9, 2012, pp. 4157-4169.

10. Bo Zhu, Sanjeev Setia, Sushil Jajodia, Sankardas Roy, and Lingyu Wang. "Localized Multicast: Efficient and Distributed Replica Detection in Large-scale Sensor Networks". **IEEE Transactions on Mobile Computing**, Vol. 9, No. 7, 2010, pp. 913-926.

11. Sankardas Roy, Mauro Conti, Sanjeev Setia and Sushil Jajodia. "Secure Median Computation in Wireless Sensor Networks", **Elsevier Ad Hoc Networks,** Vol. 7, No. 8, 2009, pp. 1448-1462.

12. Mauro Conti, Lei Zhang, Sankardas Roy, Roberto Di Pietro, Sushil Jajodia and Luigi V. Mancini. "Privacy-preserving Robust Data Aggregation in Wireless Sensor Networks", (Wiley) **Security and Communication Networks**, Vol. 2, No. 2, 2009, pp. 195-213.

2) Proceedings

1. Dewan Chaulagain, Prabesh Poudel, Prabesh Pathak, Sankardas Roy, Doina Caragea, Guojun Liu, Xinming Ou: Hybrid Analysis of Android Apps for Security Vetting using Deep Learning. **IEEE Conference on Communications and Network Security** (CNS 2020).

2. Emily Alfs, Doina Caragea, Dewan Chaulagain, Sankardas Roy, Nathan Albin and Pietro Poggi-Corradini: Identifying Android Malware Using Network-Based Approaches. **International Symposium on Foundations of Open Source Intelligence and Security Informatics**. (FOSINT-SI with ASONAM 2019).

3. Sankardas Roy, Yan Wu, Kristina LaVenia: Experience of Incorporating NIST Standards in a Digital Forensics Curricula. The **7th International Symposium on Digital Forensics and Security** (ISDFS 2019).

4. Sankardas Roy, Daniele Tomasi, Mauro Conti, Shiva Bhusal, Arkajyoti Roy, Jiang Li: Optimizing Message Ferry Scheduling in a DTN. **16th ACM International Symposium on Mobility Management and Wireless Access** (MobiWac 2018).

5. Sankardas Roy and Yan Wu. Cognitive Game Theory Models for Cyber Security. Proceedings of the **International Symposium on Innovation in Information Technology and Applications**, Kata Kinabalu, Malaysia, 2018.

6. Zhaohui Xu, Pooja Yadav, Zhizhou Zhang, Sankardas Roy, and Huimin Zhang, "Quantification of Microbial Species in Solid State Fermentation Samples Using Signature Genomic Sequences". **IEEE International Conference on Bioinformatics and Biomedicine** (Industrial Track), Kansas

City, MO, 2017.

7. Fengguo Wei, Yuping Li, Sankardas Roy, Xinming Ou, Wu Zhou, "Deep Ground Truth Analysis of Current Android Malware". **Proceedings of the 14th Conference on Detection of Intrusions and Malware & Vulnerability Assessment (**DIMVA 2017), Bonn, Germany, 2017.

8. Sankardas Roy, Jordan DeLoach, Yuping Li, Nic Herndon, Doina Caragea, Xinming Ou, Venkatesh Ranganathan, Hongmin Li and Nicolais Guevara, "Experimental Study with Real-world Data for Android App Security Analysis using Machine Learning", **Proceedings of the Annual Computer Security Applications Conference (ACSAC 2015),** Los Angeles, CA, December, 2015.

9. Justin Paupore, Earlence Fernandes, Atul Prakash, Sankardas Roy, Xinming Ou, "Practical Always-on Taint Tracking on Mobile Devices", **Proceedings of the HotOS 2015**, Kartause Ittingen, Switzerland, May, 2015.

10. Fengguo Wei, Sankardas Roy, Xinming Ou and Robby, "Amandroid: A Precise and General Inter-component Data Flow Analysis Framework for Security Vetting of Android Apps", **Proceedings of the ACM Conference on Computer and Communications Security (CCS 2014)**, Scottsdale, Arizona, November, 2014.

11. Harkeerat Bedi, Sankardas Roy, and Sajjan Shiva, "Mitigating Congestion-based Denial of Service Attacks with Active Queue Management", **Proceedings of the IEEE Global Communications Conference (Globecom 2013)**, Atlanta, GA, December, 2013.

12. Jiazhen Zhou, Sankardas Roy, Jiang Li, and Yi Qian, "A Geographical Partitioning-based Pigeon Assignment in a Pigeon Network", **Proceedings of the IEEE International Conference on Communications (ICC 2012)**, Ottawa, Canada, June, 2012.

13. Sankardas Roy, Charles Ellis, Sajjan Shiva, Dipankar Dasgupta, Vivek Shandilya and Qishi Wu, "A Survey of Game Theory as Applied to Network Security", **Proceedings of the 43rd Hawaii International Conference on System Sciences (HICSS 2010)**, Manoa, Hawaii, January, 2010.

14. Qishi Wu, Sajjan Shiva, Sankardas Roy, Charles Ellis, and Vivek Datla, "On Modeling and Simulation of Game Theory-based Defense Mechanisms against DoS and DDoS Attacks", **The Spring Simulation Multi-conference (SpringSim 2010)**, Orlando, FL, April, 2010.

15. Sankardas Roy, Mauro Conti, Sanjeev Setia and Sushil Jajodia, "Securely Computing an Approximate Median in Wireless Sensor Networks", **Proceedings of the Fourth International Conference on Security and Privacy in Communication Networks (SecureComm 2008)**, Istanbul, Turkey, September, 2008.

16. Bo Zhu, Venkata Addada, Sanjeev Setia, Sushil Jajodia, and Sankardas Roy, "Efficient Distributed Detection of Node Replication Attacks in Sensor Networks", **Proceedings of Computer Security Applications Conference (ACSAC 2007)**, Miami Beach, Florida, December, 2007.

17. Sankardas Roy, Sanjeev Setia, and Sushil Jajodia, "Attack-resilient Hierarchical Data Aggregation in Sensor Networks", **Proceedings of the Fourth ACM Workshop on Security of Ad Hoc and Sensor networks (SASN 2006)**, Alexandria, VA, November, 2006.

18. Sankardas Roy, Venkata Addada, Sanjeev Setia, and Sushil Jajodia, "Securing MAODV: Attacks and Countermeasures", **Proceedings of the Second IEEE Comm. Society Conference on Sensor and Ad Hoc Comm. and Networks (SECON 2005)**, San Jose, CA, June, 2005.

b. Non-Refereed Articles
   1) Miscellaneous
      1. Sankardas Roy, and M. Chuah, "Secure Data Retrieval Based on Ciphertext Policy Attribute-Based Encryption (CP-ABE) System for the DTNs", **CSE Technical Report**, Lehigh University, May, 2009.

VII. Papers Read to Professional Societies

A. Invited Talks
   a. Presented the summary of our NIST project in the ANSI-NIST symposium (in Washington DC) on Nov 6 of 2019, which is about incorporating standards education in digital forensics curricula at BGSU.

b. Presented my research work on "Security Analysis of Android Apps" in ARO / GMU / CSU Invitational Workshop on Information Security and Privacy: Status and Prospects, August 9, 2017.

c. Offered a Graduate Seminar on "Security Vetting of Android apps" at University of Toledo, November 28, 2016.

B. Refereed Papers

a. "Experience of Incorporating NIST Standards in a Digital Forensics Curricula". **The 7th International Symposium on Digital Forensics and Security (ISDFS 2019).**

b. "Optimizing Message Ferry Scheduling in a DTN". **16th ACM International Symposium on Mobility Management and Wireless Access** (MobiWac 2018)

c. "Quantification of Microbial Species in Solid State Fermentation Samples Using Signature Genomic Sequences". **IEEE International Conference on Bioinformatics and Biomedicine** (Industrial Track), Kansas City, MO, 2017.

d. "Deep Ground Truth Analysis of Current Android Malware". **The 14th Conference on Detection of Intrusions and Malware & Vulnerability Assessment** (DIMVA 2017), Bonn, Germany, 2017.

e. "Amandroid: A Precise and General Inter-component Data Flow Analysis Framework for Security Vetting of Android Apps", **ACM Conference on Computer and Communications Security (CCS 2014)**, Scottsdale, Arizona, November, 2014.

f. "Attack-resilient Hierarchical Data Aggregation in Sensor Networks", **Fourth ACM Workshop on Security of Ad Hoc and Sensor networks (SASN 2006)**, Alexandria, VA, November, 2006.

g. "Securing MAODV: Attacks and Countermeasures", **Second IEEE Comm. Society Conference on Sensor and Ad Hoc Comm. and Networks (SECON 2005)**, San Jose, CA, June, 2005.

C. Non-Refereed Papers

a. "Evaluating the GENI Interface for Simulating Wireless Pigeon Networks," NSF GENI Conference, Boston, MA, July 2012. (This talk was to report the progress of GENI project at Howard University.)

VIII. Service

A. Department

2019 (Fall) – present	Chair, Continuous Improvement Committee
2015 (Fall) – present	Member, Digital Forensics Specialization Committee
2015 (Fall) – present	Course Coordinator: CS 3000, CS 3210, CS 4390
2016 (Fall) – 2019 (Sp)	Member, Continuous Improvement Committee

2015 (Fall) – 2019 (Sp)   Member, Undergraduate Committee

2017 (Fall) – 2018 (Sp)   Member, Faculty Search Committee

2017 (Summer)   Member, Narayen Endowed Professorship Committee

B. College
2018 (Fall) – present   Member, Diversity Committee (This committee is organized by BGSU A&S College, and is responsible to find ways to promote diversity and inclusion.)

C. University
2018 (Fall) – present   Member, Graduate Award Committee (This committee is organized by BGSU Graduate College to evaluate graduate students' award applications.)

D. Professional
a. **Publicity Chair for Conferences.**
   1. Served as a publicity co-chair for the International Conference on Security and Privacy in Communication Networks (SecureComm). 2018
c. **Panelist in Conferences.**
   1. Served on a panel in the Midwest Region (MW) of the Consortium for Computing Sciences in Colleges (CCSC-MW). The panel topic: How to incorporate computer security education through core computer science courses. Lisle, IL. 2019.
d. **Technical Program Committee Member for Conferences.**
   1. International Conference on Applied Cryptography and Network Security (ACNS). 2020
   2. International Conference on Security and Privacy in Communication Networks (SecureComm). 2020, 2019, 2018, 2017, 2014, 2013
   3. 14th Annual Symposium on Information Assurance (ASIA '19), Albany, NY, USA. 2019
   4. IEEE workshop CPS-Sec 2019 (which is a workshop on CPS, which is held in conjunction with IEEE CNS conference)
   5. IEEE Symposium Series on Computational Intelligence (SSCI). 2018
   6. IEEE Vehicular Technology Conference (VTC Fall 2017, VTC Fall 2016, VTC Fall 2013, and VTC Spring 2013)
   7. MCURCSM (Midstates Conference for Undergraduate Research in Computer Science and Mathematics). 2017
   8. IEEE Consumer Communications & Networking Conference (CCNC) 2016, 2017
   9. IEEE Region 10 Technical Symposium (TenSymp 2015)
   10. Program Committee member, IEEE Symposium on Computational Intelligence in Cyber Security (CICS 2015)

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Program Committee member, International Conference on Game Theory for Security (GameSec 2014).
Program Committee member, IEEE GLOBECOM: Comm. and Info. Systems Security (CISS) Symposium. 2014, 2013

e. **Reviewer for professional journals and conferences**

1. 2016 – present. Served as a manuscript referee for: ACM Transactions on Privacy and Security (TOPS), Journal of Computer Security, Elsevier Journal of Pervasive and Mobile Computing, IEEE Transactions on Information Forensics and Security (TIFS), IEEE Transactions on Vehicular Technology (TVT), ETRI journal, ACM SACMAT 2019, IEEE SSCI (cybersecurity track) 2018, SecureComm 2018, SecureComm 2017, IEEE SSCI 2016, ACM SPSM 2016, IEEE Infocom 2016.

2. 2012 – 2015. Served as a manuscript referee for: ACM Transactions on Intelligent Systems and Technology, IEEE INFOCOM Conference, ACM Symp. on Information, Computer and Communication Security (ASIACCS), Annual Computer Security Applications Conference (ACSAC), International Conference on Distributed Computing and Networking (ICDCN), Elsevier Journal of Information and Software Technology, IEEE Transactions on Wireless Communications, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Cybernatics, IEEE Transactions on Vehicular Technology, IEEE Transactions on Information Forensics and Security, IEEE Transactions on Computational Intelligence and AI in Games, Elsevier CoSe, IEEE Transactions on Mobile Computing, IEEE/ACM Transactions on Networking.

E. **Community**

a. **Organized and offered a workshop on digital forensics (DF)**

1. 2019 (Summer). As part of dissemination effort of the NIST project at BGSU (CS), I and PI Yan Wu organized and offered a DF workshop. Relevant teachers from local high schools, faculty/students from neighboring universities, and BGSU undergraduate and graduate students attended the workshop.

b. **Served as a mentor**

1. 2016 (Summer) – 2019 (Summer). Mentoring a vision-impaired student (who was associated with Bowling Green School System first and then Penta Career Center) in mathematics and computer programming.

IX. **Research or Professional Consultantships**

a. **Served as a reviewer for UAB (University of Alabama at Birmingham) Grand Challenge**

1. 2019 (Spring). I have reviewed one proposal (submitted to UAB Grand Challenge) in terms of technical merit in the context of cybersecurity.

X. Membership in Professional Organization

2012 – present   Member, Institute of Electrical and Electronics Engineers (IEEE)
2012 – present   Member, Association for Computing Machinery (ACM)

XI. Honors and Awards
a. Awards
 i. Got "Certificate of Appreciation" from BGSU Associate Vice Provost Julie Matuga for "being recognized by BGSU students as making a difference". Awarded on 22nd of March, 2017.

 ii. Best Paper Award for "On Modeling and Simulation of Game Theory-based Defense Mechanisms" in Spring Simulation Multi-conference (SpringSim), 2010

 iii. CSIS Graduate Research Endowed Assistantship, George Mason University, Fairfax, VA, 2006 – 2007.

 iv. Provost's High Potential Graduate Assistantship, George Mason University, Fairfax, VA, 2002 – 2005.

 v. M.S. with Distinction, Indian Statistical Institute, Kolkata, India, 2001.