

## PARITOSH P. RAMANAN

CONTACT INFORMATION	#306, ISyE Main, 755 Ferst Drive NW, H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA	+1 (404) 980 8841 paritoshpr@gatech.edu paritoshpr.github.io
RESEARCH INTERESTS	<i>Methodology:</i> Decentralized Optimization, Distributed Computing, Asynchronous Computation, Large Scale Mixed-Integer Optimization <i>Applications:</i> Blockchain Based Decentralized Applications (dApps), Federated Machine Learning, Cyber Physical Systems, Power Systems, Data Privacy and Security	
EDUCATION	<b>Georgia Institute of Technology</b> , Atlanta, GA Ph.D., <b>Computational Science and Engineering</b> December 2020 <ul style="list-style-type: none"><li>Thesis Title: <i>Decentralized Optimization for Large Scale Power Systems</i><ul style="list-style-type: none"><li>Scalable, asynchronous, multi-threaded decentralized solutions of Mixed Integer problems.</li><li>Blockchain based, data privacy preserving, decentralized cyber attack detection mechanisms.</li></ul></li><li>Advisors: Nagi Z. Gebraeel and Edmond Chow</li></ul> <b>Georgia State University</b> , Atlanta, GA M.S., <b>Computer Science</b> August 2015 <ul style="list-style-type: none"><li>Thesis Title: <i>INDIGO: An In-Situ Distributed Gossip System Design and Evaluation</i><ul style="list-style-type: none"><li>Design, development of a seismic tomography testbed with BeagleBone Black and XBee radios.</li><li>Participated in field deployment and evaluation on Llaima volcano, Chile.</li></ul></li><li>Advisor: WenZhan Song</li></ul> <b>Birla Institute of Technology and Science-Pilani, Goa Campus</b> , Goa, India M.Sc(Tech), <b>Information Systems</b> August 2013	
PROFESSIONAL EXPERIENCE	<u>Co-Founder</u> , Blockalytics LLC, Atlanta, GA, (August 2020 -) <u>NASA HOME Post Doctoral Fellow</u> , School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA, (November 2020 -) <i>Vertical Federated Learning for Smart Habitats on Mars</i> , Mentor: Dr. Nagi Gebraeel <u>Graduate Research Intern</u> , Energy Management Division, NEC Laboratories America, San Jose, CA, (Summer 2019) <i>Blockchain based Decentralized Federated Learning</i> , Mentor: Dr. Kiyoshi Nakayama <u>Graduate Summer Research Intern</u> , Computer Science Research Institute, Sandia National Laboratories, Albuquerque, NM, (Summer 2017) <i>Asynchronous Iterative Linear Solvers</i> , Mentor: Dr. Siva Rajamanickam	
PREPRINTS/ SUBMITTED WORKS	[1] <u>Ramanan P.</u> , Yildirim M., Gebraeel N. and Chow E. “Decentralized and Secure Generation Maintenance with Differential Privacy”, arXiv preprint arXiv:2010.09099, submitted to <i>IEEE Transactions on Cybernetics</i>	
JOURNAL PUBLICATIONS	[1] <u>Ramanan P.</u> , Li D. and Gebraeel N. “Decentralized Blockchain based Replay Attack Detection for Power Systems”, arXiv preprint arXiv:2010.09086, accepted to <i>IEEE Transactions on Systems, Man and Cybernetics: Systems</i> , (acceptance ratio: 0.1, Impact Factor:13.45) [2] <u>Ramanan P.</u> , Yildirim M., Gebraeel N. and Chow E. “Large-Scale Maintenance and Unit Commitment: A Decentralized Subgradient Approach”, accepted to <i>IEEE Transactions on Power Systems</i> , (Impact Factor:6.663), May 2021	

- [3] [Ramanan P.](#), Yildirim M., Chow E., and Gebraeel N. “An Asynchronous, Decentralized Solution Framework for the Large Scale Unit Commitment Problem” *IEEE Transactions on Power Systems*, (**Impact Factor:6.663**),, 34 (5), 3677-3686, Sept. 2019.
- [4] [Ramanan, P.](#), [Kamath G.](#) and [Song WZ.](#) “INDIGO: An In Situ Distributed Gossip Framework for Sensor Networks.” *International Journal of Distributed Sensor Networks*, 11(10), 76-83, Oct 2015
- CONFERENCE PUBLICATIONS
- [1] [Li D.](#), [Ramanan P.](#), [Gebraeel N.](#), [Paynabar K.](#) “Deep Learning based Covert Attack Identification for Industrial Control Systems” *IEEE ICMLA 2020*, Miami, Florida, December 2020
- [2] [Ramanan P.](#), [Nakayama K.](#) “BAFFLE : Blockchain based Aggregator Free Federated Learning” *IEEE Blockchain 2020*, Rhodes Island, Greece, November 2020 (acceptance ratio: 0.16)
- [3] [Glusa C.](#), [Boman EG.](#), [Chow E.](#), [Rajamanickam S.](#) and [Ramanan P.](#), “Asynchronous One-Level and Two-Level Domain Decomposition Solvers,” *Domain Decomposition Methods in Science and Engineering XXV (Domain Decomposition 2018)*, St. John’s, Newfoundland, Canada, July 2018
- [4] [Ramanan P.](#), [Yildirim M.](#), [Chow E.](#), and [Gebraeel N.](#) “Asynchronous Decentralized Framework for Unit Commitment in Power Systems” *International Conference on Computational Science (ICCS 2017)*, Zurich, Switzerland, June 2017 (acceptance ratio: 0.25)
- [5] [Kamath G.](#), [Ramanan P.](#) and [Song WZ.](#) “Distributed Randomized Kaczmarz and Applications to Seismic Imaging in Sensor Network” *IEEE International Conference on Distributed Computing in Sensor Systems (IEEE DCOSS)* Fortaleza, Brazil, May 2015
- [6] [Ramanan P.](#), [Kamath G.](#) and [Song WZ.](#) “NetTomo: A Tomographic Approach towards Network Diagnosis” *IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WoWMoM)* Boston, MA, June 2015 (acceptance ratio: 0.21)
- [7] [Kamath G.](#), [Song WZ.](#), [P. Ramanan](#), [Shi L.](#) and [Yang J.](#), “DRISTI: Distributed Real-Time In-Situ Seismic Tomographic Imaging” *IEEE International Conference on Ubiquitous Computing and Communication (IEEE IUCC)* Liverpool, UK, October 2015
- [8] [Ramanan P.](#), [Gaikwad P.](#), and [Vidyadharan S.](#) “Achieving connectivity in an Unstructured Wireless Sensor Network using Optimal Assignment of Mobile Nodes” *International Conference on Networking (ICN)* 2013, Seville, Spain, Jan 2013
- BOOK CHAPTERS
- [Ramanan P.](#), “Conflict Reduction and Deterrence in the Power Grid of the Future: A Cyber Security Perspective”, *Emerging Technologies and Future of Conflict Deterrence: Governance, Development, Diplomacy, and Armed Conflict*, under review at Routledge Press.
- PATENTS
- [Ramanan P.](#), [Nagi Gebraeel](#) “BLOCKCHAIN-BASED DECENTRALIZED COMPUTING”, USPTO Application Number 17372064, July 2021.
- HONORS AND AWARDS
- Winner of the Institute of Information Security and Privacy (IISP) Demo Day 2020 Commercialization Track for Blockalytics.
    - Judged as the most innovative solution for ensuring privacy and reducing computational cost for Industrial IoT analytics.
    - Awarded a cash prize of \$5000.
  - Co-founder of [blockalytics.io](#), selected for CREATE-X startup competition with a \$34,000 seed award
    - The CREATE-X program is highly competitive with acceptance rates historically being around 14% with 350 competing teams comprising of 1000 participating students.
    - Blockalytics was inspired by national security loopholes in the power grid discovered during research conducted during the Sam Nunn Fellowship Program
  - Recipient of the Sam Nunn Security Program (SNSP) Fellowship 2018-2019
    - Delivered an invited talk on cyber security deterrence for the U.S. power grid at the Special Operations Command Centre (SOCOM) of the United States Department of Defense in Tampa FL in May 2019.

- Delivered briefings on technical aspects of multi-modal cyber security threats faced by the US power grid system to:
  - Fmr. Deputy Secretary of Energy, Dr. Elizabeth Sherwood-Randall
  - Fmr. Vice Chairman of the Joint Chiefs of Staff, Retd. Admiral James Alexander Winnefeld Jr.
  - Fmr. Supreme Allied Commander Europe (SACEUR) of NATO Allied Command Operations, Retd. General Philip Mark Breedlove

PRESENTATIONS	<ul style="list-style-type: none"> <li>• Blockchain based Decentralized Global Cyber Attack Detection for Power Systems, INFORMS Annual Meeting 2020, online</li> <li>• Blockchain based Cyber Analytics for Large Scale Power Systems, IISE 2020 Annual Meeting, online</li> <li>• Decentralized Multithreaded Maintenance For Large Scale Power Systems, INFORMS Annual Meeting 2019, October 20-23, Seattle, WA</li> <li>• Decentralized Asynchronous Framework for Large Scale Power System Planning Problems, IISE 2019 Annual Meeting, May 19-21, Orlando, FL</li> <li>• Asynchronous Decentralized Framework for Unit Commitment in Power Systems, SIAM CSE 2019, Feb 25-Mar 1, Spokane, WA</li> <li>• Asynchronous Large-scale Decentralized Unit Commitment, INFORMS Annual Meeting 2018, November 4-7, Phoenix, AZ</li> <li>• ACHILES: An Asynchronous Iterative Linear Solver, SIAM Parallel Processing 2018, March 7-10, 2018, Tokyo, Japan</li> <li>• Scalable static deployment pattern for WSNs, ICICIC 2012, Dec 2012, Chennai, India</li> </ul>
SERVICE	<ul style="list-style-type: none"> <li>• Session Chair: Addressing Computation and Market Integration Challenges in Power Systems, INFORMS Annual Meeting 2019.</li> <li>• Reviewer: IEEE Transactions on Power Systems, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Systems, Man and Cybernetics: Systems, IEEE Transactions on Industrial Informatics, IEEE Wireless Communications Magazine, Information Processing and Management, Computational Optimization and Applications, AAAI Conference on Artificial Intelligence 2021 (AAAI 2021), 2nd Workshop on Secure IoT, Edge and Cloud systems (SIoTEC) 2021</li> </ul>
GRADUATE COURSEWORK	<ul style="list-style-type: none"> <li>• <i>Computational Science</i>: High Performance Computing, High Performance Parallel Computing, Numerical Linear Algebra, Iterative Methods for Linear and Non-Linear Systems</li> <li>• <i>Computer Science (Systems)</i>: Blockchain and Cryptocurrencies, Wireless Sensor Networks, Optical Networks, Operating Systems, Computer Organization and Architecture, Computer Networks, Database Systems and Applications.</li> <li>• <i>Computer Science (Theory)</i>: Machine Learning, Data Structures and Algorithms, Discrete Math, Theory of Automata, Programming Languages.</li> <li>• <i>Operations Research</i>: Linear Optimization, Integer Optimization, Theoretical Statistics</li> </ul>
TEACHING EXPERIENCE	<p>Teaching Assistant:</p> <ul style="list-style-type: none"> <li>• ISyE3770: Statistics and Applications (Fall 2015), Georgia Tech</li> <li>• CS C313/IS C313 : Object Oriented Programming and Design (Fall 2012), BITS-Pilani, Goa</li> </ul>

## REFERENCES

Nagi Z. Gebraeel

Georgia Power Early Career Professor  
School of Industrial and Systems Engineering  
Georgia Institute of Technology

[nagi.gebraeel@isye.gatech.edu](mailto:nagi.gebraeel@isye.gatech.edu)

Edmond Chow

Associate Professor  
School of Computational Science Engineering  
Georgia Institute of Technology

[echow@cc.gatech.edu](mailto:echow@cc.gatech.edu)

Santanu Dey

Professor  
School of Industrial and Systems Engineering  
Georgia Institute of Technology

[santanu.dey@isye.gatech.edu](mailto:santanu.dey@isye.gatech.edu)