

Saleh Soltan
Department of Electrical Engineering
Princeton University, Princeton, NJ
Email: ssoltan@princeton.edu
Web: <http://ssoltan.mycpanel.princeton.edu/>

EDUCATION	Columbia University	New York, NY
	Ph.D., Electrical Engineering	Sept. 2012–August 2017
	<ul style="list-style-type: none">• Advisor: Prof. Gil Zussman• Thesis: <i>Computational and Analytical Tools for Resilient and Secure Power Grids</i>• GPA: 4.13/4.00	
	M.S., Electrical Engineering	Sept. 2011–Sept. 2012
	<ul style="list-style-type: none">• Advisor: Prof. Gil Zussman• GPA: 4.06/4.00	
	Sharif University of Technology	Tehran, Iran
	B.S., Electrical Engineering, Communication Systems	Sept. 2006–June 2011
	<ul style="list-style-type: none">• Thesis: <i>Matrix Completion Applications in Signal Processing</i>• Advisor: Prof. Massoud Babaei-Zadeh	
	B.S., Mathematics, Pure Mathematics,	Sept. 2006–June 2011
	<ul style="list-style-type: none">• Combined GPA: 17.4/20	
PROFESSIONAL EXPERIENCE	Princeton University	Princeton, NJ
	Dept. of Electrical Eng. – Postdoctoral Research Associate	Sept. 2017–Present
AWARDS	<ul style="list-style-type: none">• Author of a paper selected as one of the Best Conference Papers on Power System Modeling and Analysis at the IEEE Power and Energy Society General Meeting (PES-GM), 2016• Defense Threat Reduction Agency (DTRA) basic research technical review Best Poster Award, 2014• Columbia University Electrical Engineering Armstrong Memorial Award (awarded to one outstanding candidate for the M.S. degree and is the highest recognition awarded by the department to an M.S. student), 2013• Iran four-year <i>National Elite Foundation</i> fellowship, 2007• Exempted from Iran’s National Qualification Exam for undergraduate program as an <i>exceptional talent</i>, 2006• Gold medalist of the 23rd <i>National Mathematics Olympiad</i> (among top 12 students in the nation chosen for Iran International Mathematics Olympiad team), 2005• Bronze medalist of the 22nd <i>National Mathematics Olympiad</i> (among top 42 students in Iran), 2004	
RESEARCH INTERESTS	Network Science, Algorithms, Algebraic Graph Theory, Machine Learning, Graph Mining, and Power Systems Analysis	

Conference Proceedings

- Saleh Soltan and Gil Zussman, “Power Grid State Estimation after a Cyber-Physical Attack under the AC Power Flow Model,” to appear in *Proc. IEEE PES-GM’17*, July 2017.
- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Doubly Balanced Connected Graph Partitioning,” in *Proc. SIAM-ACM SODA’17*, Jan. 2017.
- Saleh Soltan and Gil Zussman, “Generation of Synthetic Spatially Embedded Power Grid Networks,” in *Proc. IEEE PES-GM’16*, July 2016.
- Saleh Soltan and Gil Zussman, “Quantifying the Effect of k-line Failures in Power Grids,” in *Proc. IEEE PES-GM’16*, July 2016. **Selected as one of the best papers on power system modeling and analysis**
- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Joint Cyber and Physical Attacks on Power Grids: Graph Theoretical Approaches for Information Recovery,” in *Proc. ACM SIGMETRICS’15*, June 2015.
- Saleh Soltan, Dorian Mazauric, and Gil Zussman, “Cascading Failures in Power Grids – Analysis and Algorithms,” in *Proc. ACM SIGCOMM e-Energy’14*, June 2014.
- Dorian Mazauric, Saleh Soltan, and Gil Zussman, “Computational Analysis of Cascading Failures in Power Networks,” in *Proc. ACM SIGMETRICS’13 (poster description)*, June 2013.

Journal Papers

- Saleh Soltan, Alex Loh and Gil Zussman, “Analyzing and Quantifying the Effect of k-line Failures in Power Grids,” *under minor revision in IEEE Transactions on Control of Network Systems*, 2017.
- Hale Cetinay, Saleh Soltan, Fernando Kuipers, Gil Zussman, and Piet Van Mieghem, “Comparing the Effects of Failures in Power Grids under the AC and DC Power Flow Models,” *under major revision in IEEE Transactions on Network Science and Engineering*, 2017.
- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Doubly Balanced Connected Graph Partitioning,” *submitted (preliminary version in the SIAM-ACM SODA’17)*.
- Saleh Soltan, Alex Loh, and Gil Zussman, “A Learning-based Method for Generating Synthetic Power Grids,” *submitted*.
- Russell Spiewak, Saleh Soltan, Sergey Buldyrev, Yakir Forman, and Gil Zussman, “A Study of Cascading Failures in Real and Synthetic Power Grid Topologies Using DC Power Flows,” *submitted*.
- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Power Grid State Estimation Following a Joint Cyber and Physical Attack”, *to appear in IEEE Transactions on Control of Network System*, 2016.
- Saleh Soltan, Dorian Mazauric, and Gil Zussman, “Analysis of Failures in Power Grids,” *to appear in IEEE Transactions on Control of Network Systems*, 2016.

Workshop Abstracts

- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Theoretical Approach to Power Grid Islanding,” *to be presented at SIAM Workshop on Network Science*, July 2017.

- Saleh Soltan and Gil Zussman, “Evaluating the Topological Robustness of Power Grids to Line Failures,” *presented at SIAM Workshop on Network Science (poster)*, July 2016.
- Saleh Soltan and Gil Zussman, “A Statistical Method for Synthetic Power Grid Generation based on the U.S. Western Interconnection,” *presented at SIAM Workshop on Network Science*, May 2015.
- Saleh Soltan and Gil Zussman, “Analysis of Failures in the Power Grid via the Pseudo-inverse of the Admittance Matrix,” *presented at SIAM Workshop on Network Science*, July 2014.

Technical Reports

- Russell Spiewak, Sergey Buldyrev, Yakir Forman, Saleh Soltan, and Gil Zussman, “A Study of Cascading Failures in Real and Synthetic Power Grid Topologies Using DC Power Flows,” arXiv:1609.07395 [physics.soc-ph], Sept. 2016.
- Saleh Soltan, Mihalis Yannakakis, and Gil Zussman, “Doubly balanced connected graph partitioning,” arXiv:1607.06509 [math.CO], July 2016.
- Saleh Soltan and Gil Zussman, “Generation of Synthetic Spatially Embedded Power Grid Networks,” arXiv:1508.04447 [cs.SY], Aug. 2015.
- Saleh Soltan, Dorian Mazaauric, and Gil Zussman, “Cascading failures in power grids Analysis and algorithms,” arXiv:1402.1780 [cs.SY], Feb. 2014.

ADDITIONAL PRESENTATIONS

- “Analytical Tools for Power Grid Resilience and Security,” at Utopus Insights, July 2017 (invited talk).
- “Analytical Tools for Power Grid Resilience and Security,” at Princeton University, May 2017 (invited talk).
- “Analytical Tools for Power Grid Resilience and Security,” at George Washington University, ECE Seminar, Apr. 2017 (invited talk).
- “Analytical Tools for Power Grid Resilience and Security,” at Communications and Networking Research Group, MIT, Cambridge, MA, Feb. 2017 (invited talk).
- “Power Grid State Estimation Following a Joint Cyber and Physical Attack,” in Grid Science Conference, Santa Fe, NM, Jan. 2017 (talk).
- “Doubly Balanced Connected Graph Partitioning,” in Theory Reading Group, Columbia University, Dec. 2016 (talk).
- “Generation of Synthetic Spatially Embedded Power Grid Networks,” in Data Science Institute, Columbia University, Sept. 2016 (poster).
- “Analysis of Failures in Power Grids”, in Department of Electrical and Computer Engineering, NYU Tandon School of Engineering, New York, Aug. 2016 (invited talk).
- “Modeling the Effects of Attacks on Real and Synthetic Power Grid Networks using DC and AC Power Flow Models”, in DTRA Basic Research Technical Review, Washington D.C., July 2016 (poster).
- “Intelligent Control of Communication Networks and Power Grids for Disaster Response,” in CIAN Site Visit, New York, May 2016 (poster).

- “Generation of Synthetic Spatially Embedded Power Grid Networks,” in Data Science Day, Columbia University, New York, Apr. 2016 (poster).
- “Generation of Synthetic Spatially Embedded Power Grid Networks,” in Network Frontier Workshop, Chicago, Dec. 2015 (poster).
- “Joint Cyber and Physical Attacks on Power Grids: Graph Theoretical Approaches for Information Recovery,” in DTRA Basic Research Technical Review, Washington D.C., July 2015 (poster).
- “Analysis of Failures in the Power Grid via the Pseudo-inverse of the Admittance Matrix,” Engineering Graduate Students Council (EGSC) Scholars Presentation, Columbia University, Sept. 2014 (talk).
- “Cascading Failures in the Power Grid - Analytical Properties and Control with Imperfect Observations,” in DTRA Basic Research Technical Review, Washington D.C., July 2014 (poster). **Best Poster Award**
- “Computational Analysis of Cascading Failures in the Power Grid,” in DTRA Basic Research Technical Review, Washington D.C., July 2013 (poster).
- “Computational Analysis of Cascading Failures in Power Networks,” in DTRA Basic Research Technical Review, Washington D.C., July 2012 (poster).

TEACHING
EXPERIENCE

Columbia University, New York, NY

- Teaching Assistant, *Analysis of Algorithms II*, Prof. Mihalis Yannakakis, Spring 2017
- Teaching Assistant, *Linear System Theory*, Dr. Yi Sun, Spring 2014
- Teaching Assistant, *Computer Networks*, Prof. G. Zussman, Fall 2012
- Teaching Assistant, *Linear System Theory*, Dr. N. Jacobsen, Spring 2012

Sharif University of Technology, Tehran, Iran

- Teaching Assistant, *Discrete Mathematics*, Prof. S. Akbari, Spring 2010
- Instructor, *Logic Circuits Lab*, Prof. M. Tabandeh, Spring 2010

Young Scholars Club, Tehran, Iran

- Instructor for *Euclidean Geometry* in the 26th Iran National Mathematics Olympiad preparation program, Summer 2008
- Instructor for *Advanced Combinatorics* in the 25th Iran National Mathematics Olympiad preparation program, Summer 2007
- Designed questions for Iran National Mathematics Olympiad exams (all stages), 2006-2008

Manzoumeh Kherad Institute, Tehran, Iran

- Instructor for *Intro Mathematics Olympiad* for freshman high school girls, 2008-2011
- Instructor for *Intro Combinatorics* for junior high school girls, 2008-2011

MENTORING
EXPERIENCE

Columbia University, New York, NY

- Tristan Kilper, *High School Student*, Fall 2015–present
- Brandon Bier, *Yeshiva Univ. Undergraduate Student*, Summer 2015
- Yakir Forman, *Yeshiva Univ. Undergraduate Student*, Summer 2014–Summer 2015
- Russell Spiewak, *Yeshiva Univ. Undergraduate Student*, Summer 2014–Summer 2015
- Patrick Clare, *Columbia Univ. M.S. Student*, Fall 2013
- Chang Sun, *High School Student*[†], Summer 2012
- Jia Wen Li, *High School Student*[†], Summer 2012

† As part of the Harlem Children Society Program

CONTRIBUTION TO **DARPA RADICS: “Machine-Intelligence for Advance Notification of Threats**
AWARDED GRANTS **and Energy-Grid Survivable Situational Awareness (MANTESSA)” (Columbia**
Subaward from Vencore Labs)

\$1,066,277, 2016-2020

I assisted Prof. Gil Zussman with the proposal writing based on my previous and preliminary research results.

DOE: “Advanced Machine Learning for Synchrophasor Technology” (Columbia
Subaward from Los Alamos National Lab)

\$450,000, 2016-2019

I assisted Prof. Gil Zussman with the proposal writing based on my previous and preliminary research results.

NSF Center for Integrated Access Networks (CIAN) Engineering Research
Center (ERC): Supplement to CIAN and QESST ERCs–“Cooperative Dis-
aster Response Networks”

\$400,000, 2013-2015

I assisted Prof. Gil Zussman and Prof. Daniel Kilper from the University of Arizona with the proposal writing based on my previous and preliminary research results.

SERVICE

Reviewer, Journals

- IET Generation, Transmission & Distribution, 2017
- IEEE Transactions on Power Systems, 2017
- IEEE Transactions on Smart Grid, 2015-2017
- IBM Journal of Research and Development, 2015
- IEEE Transactions on Network Science and Engineering, 2014-2017
- IEEE Transactions on Wireless Communications, 2011-2014
- IEEE Transactions on Automatic Control, 2013-2014
- IEEE Communications Magazine, 2015

Reviewer, Conferences

- ACM-SIAM SODA'18
- IEEE PES-GM'17
- IEEE ACC'16
- IFIP Performance'14
- ACM PODC'14
- ACM MOBIHOC'14,'15,'16
- ACM COSN'13
- IEEE INFOCOM'13
- ACM SIGMETRICS'13,'15,'16

Volunteer

- ACM STOC'14 Conference
- IEEE INFOCOM'12 TPC Meeting

Professional Memberships

- IEEE Student Member
- ACM Student Member
- SIAM Student Member

SKILLS

Engineering Software: R, MATLAB
Programming Languages: C, Python

ACADEMIC
BACKGROUND

Selected Graduate level Courses

- **Combinatorics & Graph Theory:** Combinatorial Analysis, Algebraic Combinatorics, and Algebraic Graph Theory
- **Algorithms:** Analysis of Algorithms I&II, Intro Computational Complexity, Deterministic Models, and Optimization II
- **Analysis of Social Networks:** Intro Social Networks and Econ of Social Networks
- **Artificial Intelligence/Machine Learning:** Data Mining, Advanced Machine Learning, Foundation of Graphical Models, and Artificial Neural Networks