Park SangWoo

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EDUCATION

University of California, Berkeley, Berkeley CA
- **Master of Science** in Industrial Engineering and Operations Research **(IEOR).** 2016 – 2017
- **PhD Candidate** in Industrial Engineering and Operations Research **(IEOR)**. 2017– present

Advisor: Javad Lavaei

Johns Hopkins University, Baltimore MD graduated May 2016
- **B.S. in Environmental Engineering** (*GPA*: 3.95 / 4.00)

HONORS

- **Best Student Paper Award of 2020 American Control Conference (ACC)** July 2020
  - Received the Best Student Paper Award (this premier conference of the Control Systems Society accepts over 1,000 papers every year and only one paper is selected for this recognition) for the paper *"Homotopy Method for Finding the Global Solution of Post-contingency Optimal Power Flow"*

- **Marshall-Oliver-Rosenberger Fellowship Award** – UC Berkeley April 2019
  - Prestigious fellowship awarded to PhD students who demonstrated excellence in decision science and analysis of important societal and industrial problems

- **Outstanding Graduate Student Instructor Award** – UC Berkeley March 2019
  - Recognized for my achievements as a teaching assistant

- **Provost's Undergraduate Research Awards (PURA)** – Johns Hopkins University November 2015
  - Received fellowship of $2500 to fund research on *"scenario reduction methods for a stochastic optimization model that integrates renewables to the power transmission system"*

- **International Environmental Project Olympiad** – Silver prize May 2010
  - *Scientific research on "Effective Urban Model to Overcome the Urban Heat Island Effect"*

- **Korean Mathematical Olympiad** – Gold prize May 2007

PREPRINTS

- **Park, S.**, Glista, E., Lavaei, J., Sojoudi, S., *"An Efficient Homotopy Method for Solving the Post-contingency Optimal Power Flow to Global Optimality,"* under review for Operations Research, 2021.
  - Online link: https://lavaei.ieor.berkeley.edu/SCOPF_hom_2020_1.pdf

- Mulvaney-Kemp, J., **Park, S.**, Jin, M., Lavaei, J., *"Dynamic Regret Bounds for Online Nonconvex Optimization,"* under review for IEEE Transactions on Control of Network Systems, 2021.
  - Online link: https://lavaei.ieor.berkeley.edu/ONO_dynamic_2021_1.pdf

- **Park, S.**, Gama. F., Lavaei, J., Sojoudi, S., *"Distributed Power System State Estimation using Graph Convolutional Neural Networks,"* 2021, under review for conference publication.
  - Online link: https://lavaei.ieor.berkeley.edu/GNN_P_2021_1.pdf

JOURNAL PUBLICATIONS

- Zhang, H., **Park, S.**, Lavaei, J., Baldick, R., *"Uniqueness of Power Flow Solutions Using Graph-theoretic*

Notions," accepted for publication in IEEE Transactions on Control of Network Systems, 2021.
- Online link: https://lavaei.ieor.berkeley.edu/Eye_PF_2020_1.pdf

- **Park, S.**, Mohammadi-Ghazi, R., Lavaei, J., "*Nonlinear Least Absolute Value Estimator for Topology Error Detection and Robust State Estimation*," IEEE Access, vol.9, pp. 137198-137210, 2021. (I/F: 3.367)

- **Park, S.**, Zhang, R.Y., Lavaei, J., Baldick, R., *"Uniqueness of Power Flow Solutions Using Monotonicity and Network Topology,"* IEEE Transactions on Control of Network Systems, vol.8(1), pp. 310-330, 2020. (I/F: 4.802)

- **Park, S.**, Xu, Q., Hobbs, B.R., *"Comparing Scenario Reduction Methods for Stochastic Transmission Planning,"* IET Generation, Transmission & Distribution, vol.13(7), pp. 1005-1013, 2019. (I/F: 2.995)

- Hobbs, B.F., Xu, Q., Ho, J.L., Donohoo-Vallett, P.E., Kasina, S., Ouyang, Y., **Park, S.**, Eto, J., Satyal, V., *"Adaptive Transmission Planning: Implementing a New Paradigm for Managing Economic Risks in Grid Expansion,"* IEEE Power and Energy Magazine, vol.14(4), pp. 30-40, 2016. (I/F: 1.43)

CONFERENCE PROCEEDINGS

- **Park, S.**, Mulvaney-Kemp, J., Jin, M., Lavaei, J., *"Diminishing regret for online nonconvex optimization,"* American Controls Conference (ACC) 2021.

- **Park, S.**, Glista, E., Lavaei, J., Sojoudi, S., *"Homotopy Method for Finding the Global Solution of Post-contingency Optimal Power Flow,"* American Controls Conference (ACC) 2020.

- **Park, S.**, Mohammadi-Ghazi, R., Lavaei, J., *"Topology Error Detection and Robust State Estimation Using Nonlinear Least Absolute Value,"* American Controls Conference (ACC) 2019.

- **Park, S.**, Zhang, R.Y., Lavaei, J., Baldick, R., *"Monotonicity Between Phase Angles and Power Flow and Its Implications for the Uniqueness of Solutions,"* Hawaii International Conference on Systems Sciences, 2019.

- Hobbs, B.F., Ho, J.L., Donohoo-Vallett, P.E., Xu, Q., Kasina, S., **Park, S.**, Ouyang, Y., *"What is the Benefit of Including Uncertainty in Transmission Planning? A WECC Case Study,"* Hawaii International Conference on Systems Sciences (HICSS) 2016.

TECHNICAL REPORTS

- Ho, J.L., Hobbs, B.F., Donohoo-Vallett, P.E., Xu, Q., Kasina, S., **Park, S.**, Ouyang, Y., *"Planning Transmission for Uncertainty: Applications and Lessons with the Western Interconnection"* – Technical Report prepared for WECC and Lawrence Berkeley National Laboratory, 2016.

TEACHING EXPERIENCE

- **University of California, Berkeley**

  - *IEOR 160: Nonlinear and Discrete Optimization*, Graduate Student Instructor, Fall 2017.
  - *IEOR 262B: Mathematical Programming II*, Graduate Student Instructor, Spring 2018.
  - *IEOR 258: Control and Optimization for Power Systems*, Graduate Student Instructor, Spring 2019.
  - *IEOR 165: Engi. Statistics, Quality Control, and Forecasting*, Graduate Student Instructor, Spring 2021.
  - *IEOR 160: Nonlinear and Discrete Optimization*, Graduate Student Instructor, Fall 2021.

- **Johns Hopkins University**

  - *ME 550.334: Heat Transfer*, Teaching Assistant, Spring 2016.

INVITED TALKS

- **Seoul National University** August 2021
  - Gave a talk on *"Tackling Non-convexity in Power Systems: Power Flow Problem, State Estimation, Optimal Power Flow"*
- **Korea Advanced Institute of Science and Technology (KAIST)** August 2021
  - Gave a talk on *"Tackling Non-convexity in Power Systems: Power Flow Problem, State Estimation, Optimal Power Flow"*
- **American Control Conference** July 2021
  - Gave a talk on *"Diminishing regret for online nonconvex optimization"*
- **INFORMS Annual Meeting** November 2020
  - Gave a talk on *"Homotopy Method for Finding the Global Solution of Post-contingency Optimal Power Flow"*
- **American Control Conference** July 2020
  - Gave a talk on *"Homotopy Method for Finding the Global Solution of Post-contingency Optimal Power Flow"*
- **American Control Conference** July 2019
  - Gave a talk on *"Topology Error Detection and Robust State Estimation Using Nonlinear Least Absolute Value"*
- **Hawaii International Conference of Systems Sciences** January 2019
  - Gave a talk on *"Monotonicity Between Phase Angles and Power Flow and Its Implications for the Uniqueness of Solutions"*
- **INFORMS Annual Meeting** November 2018
  - Gave a talk on *"Joint State Estimation and Sparse Topology Error Detection for Nonlinear Power Systems"*

PAST RESEARCH EXPERIENCE

Benjamin Hobbs Lab

(a) Optimal Transmission Planning under Uncertainty February 2015 – May 2016

- Developed 3 versions of the JHSMINE (Johns Hopkins Stochastic Multi-stage Integrated Network Expansion) model and applied them to the WECC system: (1) 21-zone model without KVL constraints, (2) 300-bus model with KVL constraints, (3) 21-zone model with unit commitment and hourly loads
- Performed sensitivity analyses concerning different network representations, scenario selections, power flow models, and operation models to see how those influenced the optimal transmission investments

(b) Scenario Reduction Methods for Stochastic Optimization

- Independent research on using the stratified scenario sampling method to reduce the computational time of the JHSMINE model while still capturing the benefits of stochastic optimization.

Markus Hilpert Lab

(a) The Modified Green-Ampt Model May 2012 – July 2012

- Performed experiments on the effects of *Dynamic Capillary Pressure during Water Infiltration*, and studied how the results suggest modifications to the well-known Green-Ampt model.

PROFESSIONAL ORGANIZATION & WORK EXPERIENCE

Tau Beta Pi, Maryland Alpha December 2015 – May 2016

- National Engineering Honor Society

Engineers without Borders (EWB) – JHU October 2011 – May 2015

- Carried out a "sustainable irrigation ram pump project" in rural South Africa; designed pump O&M manuals, developed educational training sessions, installed ram pumps in rural Africa

Korean-American Scientists and Engineers Association (KSEA) March 2015 – May 2016

- Professional networking, organized mentorship events and speaker events for underclassmen

Military Service in ROK (Republic of Korea) Army September 2012 – August 2014