DR. VASSILIS KEKATOS

Purdue University
Elmore Family School of Electrical and Computer Engineering
516 Northwestern Ave, 2063 Wang Hall
West Lafayette, IN 47906

Cell: +1-(612) 227-0206
Work: +1-(765) 494-5486
kekatos@purdue.edu
https://engineering.purdue.edu/~kekatos/

OBJECTIVE

Teaching, research, and leadership in learning and optimization solutions to smart grid challenges.

CURRENT RESEARCH INTERESTS

Machine learning and quantum computing for power systems operations. Machine learning for inferring grid dynamics. Network topology and load inference through smart meter and inverter data. Novel and provably correct solutions for the optimal distribution grid operation during normal and abnormal conditions. Physics-aware machine learning-based solutions for optimization and control in distribution grids.

EDUCATION

Ph.D. in Computer Science & Engineering [2003-2007]
University of Patras, Greece
Advisor: Prof. Kostas Berberidis

M. Sc. in Computer Science & Engineering [2001-2003]
University of Patras, Greece
Advisor: Prof. Kostas Berberidis

Diploma (5-yr degree) in Computer Science & Engineering [1996-2001]
University of Patras, Greece
Advisor: Prof. Kostas Berberidis

PROFESSIONAL APPOINTMENTS

Purdue University
Associate Professor [2024-now]

Virginia Tech
Associate Professor [2021-2023]
Assistant Professor [2015-2021]

Ohio State University [F'2014]
Visiting researcher (hosted by Prof. Antonio J. Conejo)

University of Texas at Austin [F'2014]
Visiting researcher (hosted by Prof. Ross Baldick)

University of Minnesota [2013-2014]
Research associate (w/ G. B. Giannakis group)

Marie Curie Fellow [2009-2012]
Universities of Minnesota and Patras, Greece (w/ G. B. Giannakis and K. Berberidis)

Windlogics Inc. (Saint Paul, MN) [S'2012]
Consultant: modeled congestion on transmission grids with renewables

Greek Navy [2008]
Communication engineer (mandatory service)

University of Patras, Greece [2003-2007]
PhD student (advisor Kostas Berberidis): signal processing for wireless communications

Computer Technology Institute (Patras, Greece) [2002-2004]
Signal processing engineer: speaker verification models - image watermarking algorithms

Teaching Experience

- **Power Distribution System Analysis (ECE 5984)** [F'2017, F'2018, S'2021, S'2024]
  ECE Dept., Virginia Tech; 15 students per year. Newly introduced graduate-level course on modeling, analysis, and optimization of unbalanced multi-phase distribution feeders. For slides and more, visit https://www.faculty.ece.vt.edu/kekatos/pdsa.php.

- **Power System Operation and Control (ECE 5314)** [F'2015, F'2016, F'2019, F'2021, F'2023]
  ECE Dept., Virginia Tech; 15 graduate students per year. An optimization and algorithmic perspective of network-constrained economic dispatch, energy markets, unit commitment, contingency analysis, optimal power flow, state estimation, and control of power systems. For slides and more, visit https://www.faculty.ece.vt.edu/kekatos/psoc.php.

- **Introduction to Power Systems (ECE 3304)** [S'2016, S'2017, S'2018]
  ECE Dept., Virginia Tech; 60 students per year. Fundamental concepts and models for single- and three-phase AC circuits, transformers, transmission lines, synchronous generators and motors, induction machines, DC machines, power flow analysis and solvers.

- **Signals and Systems (ECE 2704 and ECE 2714)** [S'2019, F'2020, S'2023]
  ECE Dept., Virginia Tech; 60 students per year. Fundamental models and properties for continuous-time signals and systems in the time, Laplace, and Fourier domains under code ECE 2704. The course later was changed to include continuous- as well as discrete-time signals and systems in the time and Fourier domains under code ECE 2714.

- **Convex Optimization** [S'2015]
  ECE Dept., Univ. of Minnesota; 50 students across college of engineering.

Funding

- "Power Systems Dynamics from Real-Time Data: Modeling, Inference, and Stability-Aware Optimization"
  NSF-ENG-EPCN, $280,000
  PI: V. Kekatos ($280,000); PI: Hao Zhu (collaborative project with Un. of Texas Austin) [2022-2025]

- "Quantum Computations for Smart Electric Grids: Enhancing Situational Awareness and Securing Power Systems Operations"
  Virginia Commonwealth Cybersecurity Initiative (CCI), $20,000
  PI: V. Kekatos ($14,000); co-PI: J. Sikora (CS-VT) [2022-2023]

- "Machine Learning for Communication-Cognizant Smart Inverter Control"
  NSF-ENG-EPCN, $390,000
  PI: V. Kekatos ($273,000); co-PI: Ming Jin (Virginia Tech) [2020-2023]

- **CAREER:** "Probe-to-Learn Power Distribution Networks"
  NSF-ENG-EPCN, $500,000
  PI: V. Kekatos [2018-2023]

- "Monitoring and Optimization in Coupled Natural Gas and Electric Power Networks"
  NSF-ENG-EPCN, $285,000
  PI: V. Kekatos [2017-2021]

- "Model Reduction for Analysis, Identification, and Optimal Design of Power Networks"
  NSF-DMS-AMPS, $376,000
  PI: S. Gugercin; co-PIs: C. Beattie, M. Embree, and **V. Kekatos** ($34,819) [2019-2022]

- "Solar Inverter Dispatch & Demand Response for Voltage Regulation"
  NextEra Analytics Inc., $417,000
  PI: V. Kekatos [2016-2021]

- Award from ARPA-E Grid Optimization Competition (Challenge-2)
  Department of Energy, $40,000
  PI: V. Kekatos [11/2021, 11/2022]

- "Stochastic Power Control and Learning for Energy Grids"
  Energy, Power, Networks, and Control (EPCN), NSF, $300,000
  PI: G. B. Giannakis, **co-PI: V. Kekatos** [2015-2018]

- "Distributed Estimation in Sensor Networks"
  FP7-PEOPLE-IOF, European Commission, $250,000
  PI: V. Kekatos; Co-PIs: K. Berberidis. [2009-2012]

Mentoring Experience

Postdoctoral researchers

- Guido Cavraro, 2016-2018, now with NREL

PhD graduates

- Siddharth Bhela, 2015-2019, now with Siemens Technology R&D
- Manish K. Singh, 2016-2021, now as Assistant Professor, Un. of Wisconsin-Madison
- Sina Taheri, 2017-2021, now with Ibotta
- Mana Jalali, 2017-2022, now with Invenia
- Sarthak Gupta, 2019-2022, now with C3.AI

PhD students

- Jinlei Wei, 2022-now
- Thinh Le, 2022-now
- Ashutossh Gupta, 2022-now
- Ridley Annin, 2023-now

MSc graduates

- Sarthak Gupta, 2015-2017, first job with NYISO and returned for PhD
- Aditie Garg, 2017-2018, now with EPRI
- Abhi Ojha, 2017-2018, now with Udacity
- Mathirush Pillai, 2021-2022, now with MEPPI

Professional Service

- Associate Editor for the *IEEE Trans. on Power Systems* during 2024-now.
- Associate Editor for the *IEEE Trans. on Smart Grid* during 2015-2022.
- Organizer for three panel sessions for the 2023 IEEE PES General Meeting, July 2023, Orlando, FL:
  'Quantum Computing for Power Systems Operations: A Pragmatic View' (with S. Chatzivasileiadis, DTU)
  'Learning for Power Distribution System Optimization, Control, and Protection' (with N. Yu, UC Riverside)
  'Machine Learning Applications in Power Distribution System Operation' (with Ning Liu, NCSU)
- Organizer of a special session for the 2023 IEEE Intl. Conf. on Acoustics, Speech, and Signal Processing, June 2023, Rhodes, Greece:
  'Quantum Computing for Machine Learning and Signal Processing'
- Organizer for two panel sessions for *IEEE PES General Meeting*, Aug 2020, Montreal, QB, Canada:
  'Learning to Model, Monitor, and Control Power Distribution Systems' (with Nanpeng Yu, UC Riverside)
  'Learning to Optimize Power Transmission Systems' (with Lang Tong, Cornell University)
- Organizer for two panel sessions for *INFORMS Annual Meeting,* November 2020, National Harbor, MD.
- Presented tutorial on *'Learning for Monitoring and Control in Power Distribution Grids'* under the webinar

series organized by the IEEE Big Data Analytics subcommittee, October 2020.

- Tutorial presenter for Summer School organized by the Technical University of Denmark (DTU), June 2020, Copenhagen, Denmark: *'Learning and Optimization for Power Distribution Systems'.* [postponed for 2021 due to COVID pandemic]

- Tutorial presenter for the IEEE Intl. Conf. on Smart Grid Synchronized Measurements and Analytics (SGSMA), Texas A&M University, College Station, TX, June 2019.

- Guest editor of the special issue on *'Theory and Applications of PMUs in Power Distribution Systems'* for the *IEEE Trans. on Smart Grid*, 2017-2018.

- General program chair for *Smart Grid Symposium* under IEEE GlobalSIP, Nov 2017, Montreal, Canada.

- Technical program chair for *Smart Grid Symposium* under IEEE GlobalSIP, Nov 2016, Washington, DC.

- Organizer of a *Special Session on Smart Grids,* IEEE Intl. Workshop on Computational Advances in Multi-Sensor Adaptive Processing, Curacao, Dec 2017, Dutch Antilles.

- Technical program committee member
  IEEE GlobeComm 2022, Rio de Janeiro, Dec. 2022
  IEEE Smart Grid Communications, Oct 2022, Singapore
  IEEE GlobeComm 2021, Madrid, Dec. 2021
  IEEE PowerTech 2021 (online)
  IEEE Smart Grid Communications, Oct 2020, Phoenix, AZ
  Probabilistic Methods Applied to Power Systems (PMAPS), Aug 2020, Liege, Belgium
  IEEE GlobalSIP Conf., Nov 2019, Ottawa, Ontario, CA
  IEEE Smart Gric Communications, Oct 2019, Bejing, China
  IEEE GlobalSIP Conf., Nov 2018, Annaheim, CA
  IEEE Smart Grid Communications Conf., Oct 2018, Aalborg, Denmark
  IEEE Global Communications Conf., Dec 2017, Singapore
  IEEE GlobalSIP, Dec 2015, Miami, FL

- Tutorial presenter: *"Optimization for Power Grids: A Signal Processing Perspective"*
  IEEE ICASSP conference, May 2013, Vancouver, Canada.
  EUSIPCO conference, Sept. 2013, Marrakech, Morocco.
  IEEE GLOBECOM conference, Dec. 2013, Atlanta, Georgia.

- Reviewer for the IEEE Trans. on Power Systems, IEEE Trans. on Smart Grid, IEEE Trans. on Sustainable Energy, IEEE Power Engineering Letters, IEEE Trans. on Signal Processing, IEEE Trans. on Control of Network Systems, IEEE Journal of Selected Topics in Signal Processing, IEEE Trans. on Automatic Control, IEEE Signal Processing Letters, IEEE Trans. on Neural Networks, IEEE Trans. on Signal Processing over Networks.

- Regular reviewer for the IEEE conferences *Power & Energy Society General Meeting (PES-GM), Power Systems Computations Conference, Conf. on Decision and Control (CDC), American Control Conference (ACC); Intl. Conf. on Acoustics, Speech, and Signal Processing (ICASSP); Smart Grid Communications; North American Power Symposium (NAPS).*

- NSF panel reviewer [2016 (1), 2017 (1), 2018 (1); 2019 (1); 2021 (2)].

- European Research Council panel reviewer [2017 (1)].

- External evaluator for Ph.D. dissertations from Aalto University, Finland, and National University of Singapore

- IEEE Senior Member since 2016.

SELECTED TALKS

- *"Optimization and Learning for Power Systems Dynamics"* [05/2023]
  Electrical & Computer Engineering Dept., Purdue University

- *"Deep Learning for Smart Inverter Optimization and Control"* [11/2022]
  Power Systems Seminar, Technical University of Denmark (DTU), Copenhagen, Denmark
  Power Systems Seminar, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland
  Invited Talk, Mitsubishi Electric Corporation, Tokyo, Japan
  IEEE PES Seminar, National Tech. University of Athens (NTUA), Athens, Greece
- *"Interarea Oscillations: Learning and Optimization Solutions"* [7/2022]
  Autonomous Energy Systems Workshop, NREL, Boulder, CO
- *"Learning to Optimize Power Systems using Sensitivity-Informed Deep Neural Networks"* [7/2021]
  IEEE PES – General Meeting, invited talk at *'Physics-Informed ML for Power Systems'* panel (online)
- *"Learning-based Optimization of Distribution Grids with Renewables"* [3/2021]
  IEEE PES – Boston Chapter, Monthly Technical Meeting, invited talk (online)
- *"Physics-Aware Deep Learning for Optimal Power Flow"* [4/2021]
  enOPTIMAL Seminar at MIT Energy Initiative and LIDS, invited talk (online)
- *"Machine Learning for Optimal Inverter Operation in Distribution Grids"* [3/2021]
  Annual Conference on Information Sciences and Systems (CISS), invited talk (online)
- *"Deep Learning for Smart Inverter Optimization"* [1/2021]
  2021 Grid Science Winter School & Conference, invited talk (online)
- *"Learning to Optimize for Distribution Grids with Renewables"* [1/2021]
  IEEE Greece Section, invited seminar (online)
- *"Operation and Planning for Distribution Grids with Renewables"* [3/2020]
  Iowa State University, power systems seminar, Ames, IA (converted to webinar due to pandemic)
- *"Smart Inverter Control through Kernel-based Learning" and* [10/2019]
  "Modeling and Optimization in Natural Gas and Water Distribution Networks"
  INFORMS General Meeting, Seattle, WA (2 invited talks)
- *"Probe-to-Learn Power Distribution Grids"* [8/2019]
  Panel *'Activities under NSF CAREER awards'*, IEEE PES General Meeting Atlanta, GA, (invited talk)
- *"Inverter Probing for Distribution Grid Learning"* [8/2019]
  University of Minnesota, Minneapolis, MN
- *"Natural Gas Network Modeling and Investment Planning"* [8/2019]
  NextEra Analytics, Saint Paul, MN
- *"System Restoration and Topology Identification in Power Distribution Grids"* [5/2019]
  University of Texas Austin,
- *"Inverter Probing for Distribution Grid Learning"* [10/2018]
  University of Washington, Seattle, WA
- *"Inverter Probing for Distribution Feeder Topology Processing"* [2/2018]
  Conf. on Information Sciences and Systems (CISS), Princeton (invited talk)
- *"Load Learning through Power Distribution Grid Probing"* [10/2017]
  INFORMS Annual Meeting, Houston, TX (invited talk)
- *"Learning from Electricity Market Data"* [11/2015]
  Network Dynamics and Simulation Science Lab, Virginia Bioinformatics Institute, VA
- *"Management and Learning for Future Power Systems"*
  Dartmouth College, Hannover, NH [4/2015]
  Syracuse University, Syracuse, NY [3/2015]
  Virginia Tech, Blacksburg, VA [2/2015]
  Ohio State University, Columbus, OH [11/2014]
  University of Texas at Austin, Austin, TX [10/2014]

ACADEMIC HONORS

- National Science Foundation CAREER Award [2017]
- Postdoctoral career development award (honorable mention), Un. of Minnesota [2014]
- Marie-Curie Fellow [2009-2012]
- Scholar of the Bodossaki Foundation [2003-2005]
- Distinguished scholar award, Technical Chamber of Greece (top 1% of students) [2000]
- Academic excellence award, Greek Scholarship Foundation (ranked #2 in a class of 220) [1999]
- Ranked #1 in Greek university placement exams for Computer Science & Engineering [1996]

STUDENT OUTREACH

- *Building Leaders for Advancing Science and Technology (BLAST):* Four outreach events with 20 middle-school students each. Students visited the power systems lab at VT and engaged in hands-on activities related to transmission lines, transformers, motors, and renewables. [Su'23]
- *TechGirls:* Outreach event with discussions about career opportunities in STEM with 30 high-school young women from the US and abroad. [Su'23]
- *BEE VT:* Discussion about career opportunities in engineering with 60 rising junior and senior high school Black/African American students. [Su'23]
- *STEP (Student Transition Engineering Program):* Delivered 40-min seminar on smart grids to 30 students from under-represented groups entering the College of Engineering at VT. [Su'17, Su'19]
- *Hypatia Course:* This course is offered to first-year female engineering students and aims to help them transition from high school to college and their profession as engineers. Delivered a 30-min presentation and discussion on personal career path, tips for the transition to college, study and career opportunities within electrical engineering. [F'20, F'21]
- *Engineering research seminar*: 10-min presentation on smart grids and the research of my group to 300 freshmen students. [F'17, F'18, F'21]
- *Intro to Engineering*: 30-min presentation on smart grids followed by lively discussion with 40 sophomore students. [S'17, F'17, F'18, F'19, F'20]
- *inVenTs Slush Rush:* An informal meeting with over 30 freshman engineering students at a living and learning community (dorms) discussing about career opportunities in smart grids and electrical engineering. [F'16, S'17, F'17, F'18, F'20]
- *C-Tech^2:* Informal discussion on career and research opportunities over lunch with incoming students from under-represented groups. [Su'17, Su'19]
- *Undergraduate research study:* I have offered independent research studies to four undergraduate students related to power distribution grids. [F'17, S'18, F'21, F'21]

PUBLICATIONS

Students supervised at Virginia Tech are in **boldface**; co-supervised students are <u>underlined</u>.

JOURNAL PAPERS

[J1] **S. Gupta**, S. Chatzivasileiadis, A. Mehrizi-Sani, and V. Kekatos, "Deep Learning for Scalable Optimal Design of Incremental Volt/VAR Control Rules," *IEEE Control Systems Letters*, Vol. 7, pp. 1957-1962, June 2023.

[J2] I. Murzakhanov, **S. Gupta**, S. Chatzivasileiadis, and V. Kekatos, "Optimal Design of Volt/VAR Control Rules for Inverter-Interfaced Distributed Energy Resources," *IEEE Trans. on Smart Grid*, Vol. 15, No. 1, pp. 313-323, Jan. 2024.

[J3] D. Deka, V. Kekatos, and G. Cavraro, "Learning Distribution Grid Topologies: A Tutorial", *IEEE Trans. on Smart Grid*, Vol. 15, No. 1, pp. 999-1013, Jan. 2024.

[J4] **M. Jalali**, **M. K. Singh**, V. Kekatos, G. B. Giannakis, and C. C. Liu, "Fast Inverter Control by Learning the OPF Mapping using Sensitivity-Informed Gaussian Processes," *IEEE Trans. on Smart Grid*, Vol. 14, No. 3, pp. 2432-2445, May 2023.

[J5] **S. Taheri**, V. Kekatos, H. Veeramachaneni, and B. Zhang, "Data-Driven Modeling of Aggregate Flexibility under Uncertain and Non-Convex Load Models," *IEEE Trans. on Smart Grid*, Vol. 13, No. 6, pp. 1949-3053, Nov. 2022.

[J6] **M. Jalali**, V. Kekatos, **S. Bhela**, H. Zhu, and V. Centeno, "Inferring Power System Dynamics from Synchrophasor Data using Gaussian Processes," *IEEE Trans. on Power Systems*, Vol. 37, No. 6, pp. 4409-4423, Nov. 2022.

[J7] **S. Gupta**, V. Kekatos, and M. Jin, "Controlling Smart Inverters using Proxies: A Chance-Constrained DNN-based Approach," *IEEE Trans. on Smart Grid*, Vol. 13, No. 2, pp. 1310-1321, March 2022.

[J8] **M. K. Singh**, V. Kekatos, and G. B. Giannakis, "Learning to Solve the AC-OPF using Sensitivity-Informed Deep Neural Networks," *IEEE Trans. on Power Systems*, Vol. 37, No. 4, pp. 2833-2846, July 2022.

[J9] **S. Taheri**, V. Kekatos, and H. Veeramachaneni, "Strategic Investment in Energy Markets: A Multiparametric Programming Approach," *IEEE Trans. on Power Systems*, Vol. 37, No. 4, pp. 2590-2600, July 2022.

[J10] **S. Bhela**, H. Nagarajan, D. Deka, and V. Kekatos, "Efficient Topology Design Algorithms for Power Grid Stability," *IEEE Control Systems Letters*, Vol. 6, pp. 1100-1105, June 2021.

[J11] **S. Taheri**, **M. Jalali**, V. Kekatos, and L. Tong, "Fast Probabilistic Hosting Capacity Analysis for Active Distribution Systems," *IEEE Trans. on Smart Grid*, Vol. 12, No. 3, pp. 2000-2012, May 2021.

[J12] **M. K. Singh** and V. Kekatos, "On the Flow Problem in Water Distribution Networks: Uniqueness and Solvers," *IEEE Trans. on Control of Network Systems*, Vol. 8, No. 1, pp. 462-474, Mar. 2021.

[J13] **M. K. Singh** and V. Kekatos, "Natural Gas Flow Solvers using Convex Relaxation," *IEEE Trans. on Control of Network Systems*, Vol. 7, No. 3, pp. 1283-1295, Sep 2020.

[J14] **M. Jalali**, V. Kekatos, N. Gatsis, and D. Deka, "Designing Reactive Power Control Rules for Smart Inverters using Support Vector Machines," *IEEE Trans. on Smart Grid*, Vol. 11, No. 2, pp. 1759-1770, Mar. 2020.

[J15] **M. K. Singh** and V. Kekatos, "Optimal Scheduling of Water Distribution Systems," *IEEE Trans. on Control of Network Systems*, Vol. 7, No. 2, pp. 711-723, June 2020.

[J16] **S. Taheri** and V. Kekatos, "Power Flow Solvers for Direct Current Networks," *IEEE Trans. on Smart Grid*, Vol. 11, No. 1, pp. 634-643, Jan. 2020.

[J17] G. Cavraro, A. Bernstein, V. Kekatos, and Y. Zhang, "Real-Time Identifiability of Power Distribution Network Topologies with Limited Monitoring," *IEEE Control Systems Letters*, Vol. 4, No. 2, pp. 325-330, Apr. 2020.

[J18] **S. Bhela**, V. Kekatos, and S. Veeramachaneni, "Smart Inverter Grid Probing for Learning Loads: Part I - Identifiability Analysis," *IEEE Trans. on Power Systems*, Vol. 34, No. 5, pp. 3527-3536, Sep 2019.

[J19] **S. Bhela**, V. Kekatos, and S. Veeramachaneni, "Smart Inverter Grid Probing for Learning Loads: Part II - Probing Injection Design," *IEEE Trans. on Power Systems*, Vol. 34, No. 5, pp. 3537-3546, Sep. 2019.

[J20] G. Cavraro and V. Kekatos, "Inverter Probing for Power Distribution Network Topology Processing," *IEEE Trans. on Control of Network Systems*, Vol. 6, No. 3, pp. 980-992, Sep. 2019.

[J21] G. Cavraro and V. Kekatos, "Graph Algorithms for Topology Identification using Power Grid Probing," *IEEE Control Systems Letters*, Vol. 2, No. 4, pp. 689-694, Oct. 2018.

[J22] **S. Gupta**, V. Kekatos, and W. Saad, "Optimal Real-Time Coordination of Energy Storage Units as a Voltage-Constrained Game," *IEEE Trans. on Smart Grid*, pp. 1-12, Vol. 10, No. 4, pp. 3883-3894, July 2019.

[J23] G. Cavraro, V. Kekatos, and S. Veeramachaneni, "Voltage Analytics for Power Distribution Network Topology Verification," *IEEE Trans. on Smart Grid*, Vol. 10, No. 1, pp. 1058-1067, Jan. 2019.

[J24] **S. Bhela**, V. Kekatos, and S. Veeramachaneni, "Enhancing Observability in Distribution Grids using Smart Meter Data," *IEEE Trans. on Smart Grid*, Vol. 9, No. 6, pp. 5953-5961, Nov. 2018.

[J25] L. M. Lopez-Ramos, V. Kekatos, A. G. Marques, and G. B. Giannakis, "Two-Timescale Stochastic Dispatch of Smart Distribution Grids," *IEEE Trans. on Smart Grid*, Vol. 9, No. 5, pp. 4282-4292, Sep. 2018.

[J26] L. Zhang, V. Kekatos, and G. B. Giannakis, "Scalable Electric Vehicle Charging Protocols," *IEEE Trans. on Power Systems*, Vol. 32, No. 2, pp. 1451-1462, Mar. 2017.

[J27] G. Wang, V. Kekatos, A.-J. Conejo, and G. B. Giannakis, "Ergodic Energy Management Leveraging Resource Variability in Distribution Grids," *IEEE Trans. on Power Systems,* Vol. 31, No. 6, pp. 4765-4775, Nov. 2016.

[J28] V. Kekatos, L. Zhang, G. B. Giannakis, and R. Baldick, "Voltage Regulation Algorithms for Multiphase Power Distribution Grids," *IEEE Trans. on Power Systems,* Vol. 31, No. 5, pp. 3913-3923, Sep. 2016.

[J29] D. Berberidis, V. Kekatos, and G. B. Giannakis, "Online Censoring for Large-Scale Regressions with Application to Streaming Big Data," *IEEE Trans. on Signal Processing,* Vol. 64, No. 15, pp. 3854-3867, Aug. 2016.

[J30] V. Kekatos, G. B. Giannakis, and R. Baldick, "Online Energy Price Matrix Factorization for Power Grid Topology Tracking," *IEEE Trans. on Smart Grid,* Vol. 7, No. 3, pp. 1239-1248, May 2016.

[J31] V. Kekatos, G. Wang, A.-J. Conejo, and G. B. Giannakis, "Stochastic Reactive Power Management in Microgrids with Renewables," *IEEE Trans. on Power Systems,* Vol. 30, No. 6, pp. 3386-3395, Nov. 2015.

[J32] V. Kekatos, Y. Zhang, and G. B. Giannakis, "Electricity Market Forecasting via Low-Rank Multi-Kernel Learning," *IEEE Journal of Selected Topics in Signal Process.* Vol. 8, No. 6, pp. 1182-1193, Dec. 2014.

[J33] G. B. Giannakis, V. Kekatos, N. Gatsis, S.-J. Kim, H. Zhu, and B. Wollenberg, "Monitoring and Optimization for Power Grids: A Signal Processing Perspective," *IEEE Signal Processing Mag.*, Vol. 30, No. 5, pp. 107-128, Sep. 2013.

[J34] V. Kekatos and G. B. Giannakis, "Distributed Robust Power System State Estimation," *IEEE Trans. on Power Systems*, Vol. 28, No. 2, pp. 1617-1626, May 2013.

[J35] V. Kekatos, G. B. Giannakis, and B. Wollenberg, "Optimal Placement of Phasor Measurement Units via Convex Relaxation," *IEEE Trans. on Power Systems*, Vol. 27, No. 3, pp. 1521-1530, Aug. 2012.

[J36] P. A. Forero, V. Kekatos, and G. B. Giannakis, "Robust Clustering Using Outlier-Sparsity Regularization," *IEEE Trans. on Signal Process.*, Vol. 60, No. 8, pp. 4163-4177, Aug. 2012.

[J37] V. Kekatos and G. B. Giannakis, "Sparse Volterra and Polynonial Regression Models: Recoverability and Estimation," *IEEE Trans. on Signal Processing*, Vol. 59, No. 12, pp. 5907-5920, Dec. 2011.

[J38] V. Kekatos and G. B. Giannakis, "From Sparse Signals to Sparse Residuals for Robust Sensing," *IEEE Trans. on Signal Processing*, Vol. 59, No. 7, pp. 3355-3368, Jul. 2011.

[J39] A. Lalos, V. Kekatos, and K. Berberidis, "Adaptive Conjugate Gradient DFEs for Wideband MIMO Systems," *IEEE Trans. on Signal Process.*, Vol. 57, No. 6, pp. 2406-2412, Jun. 2009.

[J40] V. Kekatos, A. A. Rontogiannis, and K. Berberidis, "Cholesky Factorization-Based Adaptive BLAST DFE for Wideband MIMO Channels," *EURASIP Journal on Advances in Signal Processing*, Vol. 2007, pp. 1-11.

[J41] A. Rontogiannis, V. Kekatos, and K. Berberidis," A Square-Root Adaptive V-BLAST Algorithm for Fast Time-Varying MIMO Channels," *IEEE Signal Processing Letters*, Vol. 13, No. 5, pp. 265-268, May 2006.

[J42] V. Kekatos, A. A. Rontogiannis, and K. Berberidis, "A Robust Parametric Technique for Multipath Channel Estimation in the Uplink of a DS-CDMA System," *EURASIP Journal on Wireless Comm. and Networking*, Vol. 2006, Art. ID 47938, pp. 1-12.

PREPRINTS (SEE PERSONAL WEBPAGE FOR MANUSCRIPTS)

[S1] S. Liu, H. Zhu, and V. Kekatos, "Data-driven Forced Oscillation Localization using Inferred Impulse Responses," *Power Systems Computation Conference (PSCC)*, June 2024, Paris, France, (submitted, October 2023).

[S2] P. Ellinas, V. Kekatos, and G. Tsaousoglou, "Inverse Economic Dispatch with Price-Responsive Demand using Bayesian Optimization," *Power Systems Computation Conference (PSCC)*, June 2024, Paris, France, (submitted, October 2023).

[S3] V. Kekatos and **M. K. Singh**, "Deep Learning Techniques for Solving Optimal Power Flow Problems," Chapter in *Smart Cyber-Physical Power Systems: Challenges and Solutions*, Ed. A. Parizad, H. R. Barghaee,

and S. Rahman, Wiley and IEEE Series, (under review).

[S4] **S. Gupta**, S. Chatzivasileiadis, and V. Kekatos, "Deep Learning for Optimal Volt/VAR Control using Distributed Energy Resources," *IEEE Trans. on Smart Grid*, (submitted, November 2022).

CONFERENCE PAPERS

[C1] **J. Wei**, **S. Gupta**, D. C. Aliprantis, and V. Kekatos, "A Chance-Constrained Optimal Design of Volt/VAR Control Rules for Distributed Energy Resources," *North American Power Symposium (NAPS)*, Ashville, NC, October 2023.

[C2] **S. Gupta** and V. Kekatos, "A Quantum Approach for Stochastic Constrained Binary Optimization", *IEEE Intl. Conf. on Acoustics, Speech, and Signal Process. (ICASSP)*, June 2023, Rhodes, Greece.

[C3] Z. Abdeen, R. Jia, V. Kekatos, and M. Jin, "A Theoretical Analysis of Using Gradient Data for Sobolev Training in RKHS," *in Proc. IFAC World Congress*, July 2023, Yokohama, Japan.

[C4] **M. Jalali**, **S. Taheri**, and V. Kekatos, "Strategic Investment in Energy Markets using Bayesian Optimization," *in Proc. IEEE Power & Energy Society General Meeting*, July 2023, Orlando, FL.

[C5] S. Liu, H. Zhu, and V. Kekatos, "Dynamic Response Recovery Using Ambient Synchrophasor Data: A Synthetic Texas Interconnection Case Study," *Hawaii Intl. Conf. on System Sciences (HICCS)*, Jan. 2023, Maui, HI.

[C6] Z. Abdeen, H. Yin, V. Kekatos, and M. Jin, "Learning Neural Networks under Input-Output Specifications," *American Control Conference*, Atlanta, GA, June 2022.

[C7] **S. Gupta**, S. Misra, D. Deka, and V. Kekatos, "DNN-based Policies for Stochastic AC-OPF," *Power Systems Computation Conference (PSCC)*, Porto, Portugal, June 2022 (to appear also in Elsevier Electric Power Systems Research).

[C8] **M. K. Singh** and V. Kekatos, "Optimal Power Flow Schedules with Reduced Low-Frequency Oscillations," *Power Systems Computation Conference (PSCC)*, Porto, Portugal, June 2022 (to appear also in Elsevier Electric Power Systems Research).

[C9] **M. K. Singh**, **S. Taheri**, V. Kekatos, K. P. Schneider, and C.-C. Liu, "Joint Grid Topology Reconfiguration and Design of Watt-VAR Curves for DERs," *IEEE Power and Energy Society General Meeting*, Denver, CO, July 2022.

[C10] **M. Jalali**, V. Kekatos, S. Bhela, and H. Zhu, "Inferring Power System Frequency Oscillations using Gaussian Processes," IEEE Conf. on Decision and Control (CDC), Austin, TX, Dec. 2021.

[C11] **M. K. Singh**, G. Cavraro, A. Bernstein, and V. Kekatos, "Ripple-Type Control for Enhancing Resilience of Networked Physical Systems," *American Control Conference (ACC)*, New Orleans, LA, May 2021.

[C12] **M. K. Singh, S. Gupta**, V. Kekatos, G. Cavraro, and A. Bernstein, "Learning to Optimize Power Distribution Grids using Sensitivity-Aware Deep Neural Networks," *in Proc. IEEE Smart Grid Comm.*, Tempe, AZ, November 2021.

[C13] **S. Gupta**, V. Kekatos, and M. Jing, "Deep Learning for Reactive Power Control of Smart Inverters under Communication Constraints," *in Proc. IEEE Smart Grid Communications*, Tempe, AZ, November 2021.

[C14] **M. K. Singh** and V. Kekatos, "Natural Gas Flow Equations: Uniqueness and an MI-SOCP Solver," *American Control Conference*, Philadelphia, PA, July 2019.

[C15] **S. Bhela**, D. Deka, H. Nagarajan, and V. Kekatos, "Designing Power Grid Topologies for Minimizing Network Disturbances: An Exact MILP Formulation," *American Control Conference*, Philadelphia, PA, July 2019.

[C16] **S. Taheri**, V. Kekatos, and G. Cavraro, "An MILP Approach for Distribution Grid Topology Identification using Inverter Probing," *IEEE PES PowerTech*, Milan, Italy, June 2019.

[C17] **M. K. Singh**, V. Kekatos, and C.-C. Liu, "Optimal Distribution System Restoration with Microgrids and Distributed Generators," *IEEE Power and Energy Society General Meeting*, Atlanta, GA, Aug. 2019.

[C18] **S. Taheri**, V. Kekatos, and H. Veeramachaneni, "Energy Storage Sizing in Presence of Uncertainty," *IEEE Power and Energy Society General Meeting*, Atlanta, GA, Aug. 2019.

[C19] **A. Garg**, **M. Jalali**, V. Kekatos, and N. Gatsis, "Kernel-Based Learning for Smart Inverter Control,"

IEEE Global Conf. on Signal and Inf. Process., Symposium on Smart Grids, Anaheim, CA, Nov. 2018.

[C20] **S. Bhela**, V. Kekatos, and S. Veeramachaneni, "Power Grid Probing for Load Learning: Identifiability over Multiple Time Instances," *IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Proc.*, Curacao, Dec. 2017.

[C21] **S. Bhela**, V. Kekatos, and S. Veeramachaneni, "Power Distribution System Observability with Smart Meter Data," *IEEE Global Conf. on Signal and Inf. Process., Symposium on Smart Grids*, Montreal, Canada, Nov. 2017.

[C22] **A. Ojha**, V. Kekatos, and R. Baldick, "Solving the Natural Gas Flow Problem using Semidefinite Program Relaxation," *IEEE Power and Energy Society General Meeting*, Chicago, IL, July 2017.

[C23] **S. Bhela**, V. Kekatos, L. Zhang, and S. Veeramachaneni, "Enhancing Observability in Power Distribution Grids," *IEEE Intl. Conf. on Acoustics, Speech, and Signal Process.*, New Orleans, LA, Mar. 2017.

[C24] **S. Gupta** and V. Kekatos, "Real-Time Operation of Heterogeneous Energy Storage Units," *IEEE Global Conf. on Signal and Inf. Process. (GlobalSIP), Symposium on Smart Grids*, Washington, DC, Dec. 2016.

[C25] L. Zhang, V. Kekatos, and G. B. Giannakis, "A Generalized Frank-Wolfe Approach to Decentralized Electric Vehicle Charging," *IEEE Conf. on Decision and Control (CDC)*, Las Vegas, NV, Dec. 2016 *(invited)*.

[C26] G. Wang, V. Kekatos, and G. B. Giannakis, "Stochastic Energy Management in Distribution Grids," *IEEE Intl. Conf. on Acoustics, Speech, and Signal Process.*, Shanghai, China, Apr. 2016.

[C27] L. M. Lopez-Ramos, V. Kekatos, A. G. Marques, and G. B. Giannakis, "Microgrid Dispatch and Price of Reliability Using Stochastic Approximation," *IEEE Global Conf. on Signal and Inf. Process. (GlobalSIP),* Orlando, FL, Dec. 2015 *(student travel award).*

[C28] V. Kekatos, L. Zhang, G. B. Giannakis, and R. Baldick, "Fast Voltage Regulation in Single-Phase Distribution Grids," *IEEE Smart Grid Comm.,* Miami, FL, Nov. 2015.

[C29] G. Wang, D. Berberidis, V. Kekatos, and G. B. Giannakis, "Online Reconstruction from Big Data via Compressive Censoring," *IEEE Global Conf. on Signal and Inf. Process. (GlobalSIP)*, Atlanta, GA, Dec. 2014.

[C30] D. Berberidis, G. Wang, G. B. Giannakis, and V. Kekatos, "Adaptive Estimation from Big Data via Censored Stochastic Approximation," *Asilomar Conf. on Signals, Systems, and Computers,* Pacific Grove (CA), Nov. 2014.

[C31] V. Kekatos, G. Wang, and G. B. Giannakis, "Stochastic Loss Minimization for Power Distribution Networks," *IEEE North American Power Symp.,* Pullman, WA, Sep. 2014.

[C32] V. Kekatos, G. B. Giannakis, and R. Baldick, "Grid Topology Identification using Electricity Prices," *IEEE Power & Energy Society General Meeting (PES-GM)*, Washington, DC, July 2014 *(best papers session)*.

[C33] V. Kekatos, Y. Zhang, and G. B. Giannakis, "Kernel Selection for Power Market Inference via Block Successive Upper Bound Minimization," *IEEE Intl. Conf. on Acoustics, Speech, and Signal Process.*, Florence, Italy, May 2014.

[C34] V. Kekatos, E. Vlachos, D. Ampeliotis, G. B. Giannakis, and K. Berberidis, "A Decentralized Approach to Generalized Power System State Estimation," *IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Process. (CAMSAP),* Saint Martin, Dec. 2013.

[C35] V. Kekatos, Y. Zhang, and G. B. Giannakis, "Low-Rank Kernel Learning for Electricity Market Inference," *Asilomar Conf. on Signals, Systems, and Computers,* Pacific Grove, CA, Nov. 2013.

[C36] K. Slavakis, Y. Kopsinis, S. Theodoridis, G. B. Giannakis, and V. Kekatos, "Generalized iterative thresholding for sparsity-aware online Volterra system identification," *Intl. Symposium on Wireless Communication Systems (ISWCS)*, Ilmenau, Germany, Aug. 2013.

[C37] Y. Zhang, N. Gatsis, V. Kekatos, and G. B. Giannakis, "Risk-Aware Management of Distributed Energy Resources," *Intl. Conf. on Digital Signal Processing (DSP)*, Santorini, Greece, July 2013.

[C38] V. Kekatos, M. Light, S. Veeramachaneni, and G. B. Giannakis, "Day-Ahead Electricity Market Forecasting," *IEEE PES Innovative Smart Grid Technologies (ISGT)*, Washington, DC, Feb. 2013.

[C39] V. Kekatos and G. B. Giannakis, "Decentralized Power System State Estimation," *IEEE GLOBECOM*, Anaheim, CA, Dec. 2012.

[C40] V. Kekatos and G. B. Giannakis, "Joint Power System State Estimation and Breaker Status

Identification," *IEEE North American Power Symposium (NAPS)*, Urbana-Champaign, IL, Sep. 2012.

[C41] V. Kekatos and G. B. Giannakis, "A Convex Relaxation Approach to Optimal Placement of Phasor Measurement Units," *IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Proc. (CAMSAP)*, San Juan, Puerto Rico, Dec. 2011.

[C42] V. Kekatos and G. B. Giannakis, "Compressed Sensing for Volterra and Polynomial Regression Models," *European Signal Processing Conf. (EUSIPCO),* Barcelona, Spain, Aug. 2011.

[C43] P. A. Forero, V. Kekatos, and G. B. Giannakis, "Outlier-Aware Robust Clustering," *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, Prague, Czech Republic, May 2011.

[C44] G. B. Giannakis, G. Mateos, S. Farahmand, V. Kekatos, and H. Zhu, "USPACOR: Universal Sparsity-Controlling Outlier Rejection," *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, Prague, Czech Republic, May 2011.

[C45] V. Kekatos and G. B. Giannakis, "Robust Layered Sensing: From Sparse Signals to Sparse Residuals," *Asilomar Conference*, Pacific Grove, CA, Nov. 2010.

[C46] V. Kekatos and G. B. Giannakis, "Selecting Reliable Sensors via Convex Optimization," *IEEE Int. Workshop on Signal Processing Advances in Wireless Communications* , Marrakech, Morocco, June 2010.

[C47] V. Kekatos, D. Angelosante, and G. B. Giannakis, "Sparsity-Aware Estimation of Nonlinear Volterra Kernels," *IEEE Workshop on Comp. Adv. in Multi-Sensor Adaptive Proc.*, Aruba, Dutch Antilles, Dec. 2009.

[C48] V. Kekatos, A. Lalos, and K. Berberidis, "Adaptive Conjugate Gradient DFEs for Wideband MIMO Systems using Galerkin Projections," *IEEE Vehicular Technology Conf.*, Baltimore, MD, Oct. 2007.

[C49] V. Kekatos, K. Berberidis, and A. A. Rontogiannis, "A Block Adaptive Frequency Domain MIMO DFE for Wideband Channels," *IEEE Int. Conf. on Acoustics, Speech, and Signal Process.*, Honolulu, HI, Apr. 2007.

[C50] A. A. Rontogiannis, V. Kekatos, and K. Berberidis, "An Adaptive Decision Feedback Equalizer for Time-Varying Frequency Selective MIMO Channels," *IEEE Intl. Workshop on Signal Proc. in Wireless Comm.*, Cannes, France, July 2006.

[C51] A. A. Rontogiannis, V. Kekatos, and K. Berberidis, "A Square-Root Adaptive V-BLAST Algorithm for Fast Time-Varying MIMO Channels," *IEEE Int. Conf. on Comm.*, Istanbul, Turkey, June 2006.

[C52] A. Kounoudes, V. Kekatos, and S. Mavromoustakos, "Voice Biometric Authentication for Enhancing Internet Service Security," *IEEE Intl. Conf. on Inf. Comm. Tech.*, Oct. 2006.

[C53] V. Kekatos, A. A. Rontogiannis, and K. Berberidis, "A Robust Method for Estimating Multipath Channel Parameters in the Uplink of a DS-CDMA System", *IEEE Vehicular Tech. Conf.,* Stockholm, Sweden, June 2005.

Book Chapters

[B1] G. Cavraro, V. Kekatos, L. Zhang, and G. B. Giannakis, "Learning Power Grid Topologies," in *Advanced Data Analytics for Power Systems*, Ed. A. Tajer, S. Perlaza, and V. Poor. [Online: https://www.faculty.ece.vt.edu/kekatos/papers/LearningPowerGridTopologies.pdf]

[B2] V. Kekatos, G. Wang, H. Zhu, and G. B. Giannakis, "PSSE Redux: Convex Relaxation, Decentralized, Robust, and Dynamic Approaches," in Advances in Power System Estimation, Ed. Mo. El-Hawari, *IEEE-Wiley Press,* 2018. [Online: https://arxiv.org/abs/1708.03981]

Theses

[T1] V. Kekatos, *Space-Time Signal Processing for Wireless Communication Networks,* Ph. D. Thesis, Univ. of Patras, Greece, 2007.

[T2] V. Kekatos, *Subspace Tracking Algorithms and their Applications in Mobile Communications,* M. Sc. Thesis, Univ. of Patras, Greece, 2003.

[T3] V. Kekatos, *Wireless Channel Modeling,* Diploma Thesis, Un. of Patras, Greece, 2001.