

# Florian Dörfler

Assistant Professor for Complex Systems Control  
Deputy Head of Automatic Control Laboratory

Swiss Federal Institute of Technology (ETH) Zürich  
Automatic Control Laboratory  
Department of Information Technology and Electrical Engineering

Physikstrasse 3, ETL I 26  
Zürich 8092, Switzerland  
Phone: +41 44 632 72 88  
Fax: +41 44 632 12 11  
Email: [dorfler@ethz.ch](mailto:dorfler@ethz.ch)  
URL: <http://control.ee.ethz.ch/~floriand/>

## Academic Positions

July'14–current **ASSISTANT PROFESSOR**, *Swiss Federal Institute of Technology (ETH) Zürich*, Switzerland  
Department of Information Technology and Electrical Engineering

Sep'13–July'14 **ASSISTANT PROFESSOR**, *University of California at Los Angeles*, United States  
Department of Electrical Engineering

## Education

Sep'09–Sep'13 **PH.D.** in Mechanical Engineering, *University of California at Santa Barbara*  
Advisor: Francesco Bullo  
Ph.D. thesis: *Dynamics and Control in Power Grids and Complex Oscillator Networks*

Oct'03–Dec'08 **DIPLOMA** in Engineering Cybernetics, *University of Stuttgart*  
Advisors: Frank Allgöwer (University of Stuttgart) and Bruce Francis (University of Toronto)  
Diploma thesis: *Geometric Analysis of the Formation Problem for Autonomous Robots*  
Student thesis: *Port-Hamiltonian Systems – Stability Analysis and Application in Process Control*

## Research Interests

My research interests are centered around distributed control in complex, cyber-physical, and networked systems with applications to energy systems. Topics of current interest are

1. Distributed control, optimization, and monitoring in cyber-physical systems
2. Plug-and-play control and optimization in smart grid applications
3. Synchronization and dynamic phenomena in complex networks

## Best Paper & Thesis Awards

- 2017 Basil Papadias Best Student Paper Award at IEEE PES PowerTech Conference  
(as advisor)
- 2016 IEEE Circuits and Systems Guillemin-Cauer Best Paper Award  
(awarded for best paper in IEEE Transactions on Circuits and Systems 2016)
- 2016 Top Five Finalist for Best Student Paper Award at American Control Conference  
(as advisor)
- 2015 UC Santa Barbara Mechanical Engineering Department Best PhD Award  
(in recognition of outstanding achievements during PhD studies)
- 2014 IFAC Automatica Best Paper Award  
(awarded for best application paper 2012–2014)
- 2013 Top Five Finalist for Best Student Paper Award at European Control Conference  
(as co-author and co-advisor)
- 2011 O. Hugo Schuck Best Paper Award awarded by American Automatic Control Council  
(awarded for theoretical contributions at one of the two largest annual control conferences)
- 2010 Best Student Paper Award at American Control Conference  
(awarded at one of the two largest annual control conferences)

## Further Honors and Awards

- 2011–2012 Peter J. Frenkel Foundation Fellowship  
(one of two campus-wide awards per academic year)
- 2009–2013 Regent’s Special International Fellowship  
(the Regent’s scholarships are the most prestigious UC scholarship awards)
- 2008 Diplom awarded with special distinction by the University of Stuttgart  
(institutional award)
- 2008 Baden-Württemberg Stipendium Renewed  
(national scholarship)
- 2007–2008 Baden-Württemberg Stipendium  
(national scholarship)
- 2007–2008 Ontario Baden-Württemberg Program Fellow  
(national scholarship)

## Research Experience

- July’14–current **ASSISTANT PROFESSOR**, *Swiss Federal Institute of Technology (ETH) Zürich*  
at *Automatic Control Laboratory*
- Sep’13–July’14 **ASSISTANT PROFESSOR**, *University of California at Los Angeles*  
at *Department of Electrical Engineering*
- Mar’13–July’14 **VISITING PROFESSOR**, *California Institute of Technology*  
at *Rigorous Systems Research Group* hosted by Steven Low and Adam Wierman
- Apr’09–Sep’13 **Graduate Student Researcher** at *University of California at Santa Barbara*  
at *Center for Control, Dynamical Systems, and Computation* advised by Francesco Bullo

- May'11-Jul'11 **Graduate Student Researcher** at Los Alamos National Laboratories  
 &  
 Jun'12-Aug'12 at *Center for Nonlinear Studies* advised by Michael Chertkov and Scott Backhaus
- Aug'08-Dec'08 **Corporate Research Intern** at EADS Astrium, Friedrichshafen, Germany  
 at *Attitude and Orbit Control Group* advised by Jochen M. Rieber and Trond D. Krøvel
- Aug'07-Aug'08 **Graduate Student Researcher** at University of Toronto  
 at *Systems Control Group* advised by Bruce Francis
- May'07-Jul'07 **Student Research Assistant** at University of Stuttgart  
 at *Institute for Systems Theory and Automatic Control* advised by Jørgen K. Johnsen and Frank Allgöwer

## Educational Activities

### LECTURING

Swiss Federal Institute of Technology (ETH) Zürich

- 2015-current *Distributed Systems and Control*  
*Control Systems I*
- 2014 University of California at Los Angeles  
*Linear Systems: State-Space Approach*  
*Distributed Systems and Control*

### GRADUATE SCHOOLS

- 2017 “Innovative controls for renewable source integration into smart energy systems” (INCITE)  
 European Summer School, Barcelona
- 2016 DISC Winter Course on “Power Systems Control - from Circuits to Economics”, Groningen,  
 Netherlands
- 2015 Grid Science Winter School & Conference, Santa Fe, United States
- 2015 MSE Winter School Holistic Modelling and Control of Energy Systems, Ohlstadt, Germany

### DIDACTICS

- 2016 Speaker at ETH LET teaching event “Increasing Interactivity”

## Advising

### PhD Students at ETH Zürich

- Dec'16-current Taouba Jouini
- Jan'16-current Nicolò Pagan
- Apr'15-current Adrian Hauswirth
- Jan'15-current Catalin Arghir
- July'14-current Bala Kameshwar Poolla

### PostDoc Advisees at ETH Zürich

Aug'16–current Marcello Colombino  
Jan'16–current Dominic Groß  
Jan'15–current Saverio Bolognani  
Apr'16–Dec'16 Theodor Borsche  
now at THEMA Consulting Group, Oslo, Norway

**Graduate Student Mentor at ETH Zürich**

Mar'17–Jun'17 Chu Zhongda (supervised jointly with C. Arghir)  
Semester thesis: “Virtual-oscillator-based Analysis and Control of Induction Machines in Power Systems”

Feb'17–current Beat Stadler (supervised jointly with C. Arghir)  
Tentative master thesis title: “Virtual-oscillator based control of inverters in power grids”

Feb'17–June'17 Jean-Sébastien Brouillion (supervised jointly with M. Colombino)  
Semester thesis: “Decentralized synchronization of an inverter based grid”

Nov'16–May'17 József Gábor Pázmány (supervised jointly with A. Hauswirth and S. Bolognani)  
Master thesis: “Robust Optimization of Nonlinear Power Systems in Realtime”

Aug'16–Feb'17 Sebastian Martin Curi (supervised jointly with D. Groß)  
Master thesis title: “Control of Low Inertia Power Grids: A model reduction approach”

Oct'16–Jan'17 Elena Arcari (supervised jointly with S. Bolognani)  
Semester thesis: “Fast chance-constrained optimization using real-time measurements with applications to power distribution systems”

July'16–Jan'17 Philipp Kurt Lütolf (supervised jointly with B.K. Poolla, T. Borsche, and S. Bolognani)  
Master thesis: “Optimal Placement of Virtual Damping and Inertia”

July'16–Oct'16 Ioan-Liviu Aolaritei (supervised jointly with S. Bolognani)  
Semester thesis: “A decentralized Voltage Collapse Distance for Power Distribution Networks”

June'16–Oct'16 Alessandro Zanardi (supervised jointly with A. Hauswirth and S. Bolognani)  
Semester thesis: ‘Constrained optimization over manifolds for power system application”

April'16–Nov'16 Pulkit Nahata (supervised jointly with S. Mastellone)  
Master thesis: “Decentralized Coordinated Control of Photovoltaic Inverters in Residential Microgrids”

May'16–Nov'16 Alexandros Paris Ketsetzis (supervised jointly with A. Hauswirth, E. Kaffe, and A. Brenzikofer)  
Master thesis: “Optimal PMU placement for State Estimation in Power Grids”

Dec'15–June'16 Yannick Meier (externally supervised by N. Li)  
Master thesis: “Parallelized Interior Point Method for Security Constrained Optimal Power Flow (SCOPF) of Distribution Networks”

Dec'15–May'16 Taouba Jouini (supervised jointly with C. Arghir)  
Master thesis: “Grid-Friendly Matching Control of Synchronous Machines by DC/AC converters in Bulk Power Networks”

Oct'15–Feb'16 Cyrill Frei (supervised jointly with M. Schmitt, P. Beuchat, and C. Ramesh)  
Semester thesis: “Gaussian Processes in Reinforcement Learning”

Oct'15–Feb'16 Jan Schulze (supervised jointly with S. Bolognani)  
Semester thesis: “Peer to peer clock synchronization in wireless sensor networks”

- Oct'15–Jan'16 Panagiotis Kyriakis (supervised jointly with S. Bolognani)  
Semester thesis: “Formation of robust networks for secure exchange of cryptocurrencies”
- Oct'15–Jan'16 Matthias Fetzner (supervised jointly with A. Hauswirth and S. Merkli)  
Semester thesis: “Network Reduction applied to Optimal Power Flow Problems”
- May'15–Oct'15 Felix Kottman (supervised jointly with S. Bolognani)  
Master thesis: “Computational Load and Congestion Control in Cloud Environments”
- Jun'15–Aug'15 Dalibor Drzajic (supervised jointly with S. Bolognani)  
Semester thesis: “Energy Theft Detection using Compressive Sensing Methods”
- Mar'15–Jun'15 Lelouvier Aaron (supervised jointly with S. Grammatico)  
Semester thesis: “Decentralized and Distributed Frequency Regulation in Power Grids”
- Apr'15–May'15 Yannick Meier (externally supervised by Mihaela van der Schaar)  
Semester thesis: “Predicting Grades”
- Oct'14–Apr'15 Nahata Pulkit (supervised jointly with B.K. Poolla)  
Semester thesis: “Distributed Control and Optimization in DC Microgrids”

#### **Long-term Visiting Graduate Students and PostDoc Advisees**

- 2016 Xiaofan Wu, Wei Chen
- 2015 Spyros Chatzivasileiadis, Nima Monshizadeh, John W. Simpson-Porco, Marco Todescato, Diego Romeres

#### **Graduate Student Mentor at University of California Los Angeles**

- Nov'13–July'14 Jinxin Zhao  
Project title: “Distributed Control and Optimization in DC microgrids”

#### **Graduate Student Mentor at University of California Santa Barbara**

- Sep'11–Sep'13 John W. Simpson-Porco  
Tentative Ph.D. thesis title: “Microgrids and Droop-Controlled Inverters”
- Feb'13–July'13 Basilio Gentile  
Laurea thesis: “Approximate Solution to the Reactive Power Flow and its Application to Voltage Stability in Microgrids”
- Sep'12–Mar'13 Hedi Bouattour  
Diploma thesis: “Distributed Secondary Control in Microgrids”
- Jan'12–Jul'12 Diego Romeres  
Laurea thesis: “Novel Results on Slow Coherency in Power Networks”

#### **Research Awards**

- 2017 ETH Zürich and ABB Schweiz AG Contract # 12376: “Decentralized Control of Power Converters”
- 2016 European Commission H2020 #691800: *Massive InteGRATion of power Electronic devices – MIGRATE*
- 2015 ETH Seed Project SP-ESC 2015-07(4): *Novel control approaches for low-inertia power grids*
- 2015 SNF Assistant Professor Energy Grant #PYAPP2\_160573: *Plug-and-Play Control & Optimization in Microgrids*

- 2014 NSF EPCN Medium #1406891: *Virtual Oscillator Control for Microgrids*  
(returned and declined when moving from UCLA to ETH Zürich)
- 2011 NSF CPS Medium:#1219917: *The Cyber-Physical Challenges of Transient Stability and Security in Power Grids* (contributed as consultant)

## Professional Service

### TECHNICAL REVIEWER

#### Journals

*Control systems*: IEEE Transactions on Automatic Control ◦ IEEE Transactions on Control of Network Systems ◦ IEEE Transactions on Control Systems Technology ◦ Automatica ◦ SIAM Journal on Control and Optimization ◦ Systems and Control Letters ◦ European Journal of Control ◦ IEEE Transactions on Circuits and Systems Part II ◦ Journal of Process Control ◦ IEEE Control Systems Magazine ◦ IEEE Control Systems Letters

*Power systems & energy*: IEEE Transactions on Power Systems ◦ IEEE Transactions on Energy Conversion ◦ IEEE Transactions on Power Delivery ◦ International Transactions on Electrical Energy Systems ◦ International Journal of Electrical Power and Energy Systems ◦ Sustainable Energy, Grids and Networks ◦ Energies

*Dynamical systems*: Physica D ◦ SIAM Journal on Applied Dynamical Systems ◦ Chaos: An Interdisciplinary Journal of Nonlinear Science ◦ Nonlinearity ◦ Nonlinear Analysis: Hybrid Systems ◦ Communications in Mathematical Sciences ◦ Journal of Statistical Physics ◦ Journal of Mathematical Physics ◦ Applied Mathematical Modeling ◦ New Journal of Physics ◦ Journal of Statistical Physics

*Computer science & discrete mathematics*: IEEE Transactions on Network Science and Engineering ◦ SIAM Journal on Applied Mathematics ◦ Discrete Applied Mathematics ◦ Journal of Complexity

*Miscellaneous journals*: Nature Communications ◦ Nature Scientific Reports ◦ Proceedings of the IEEE ◦ PLOS ONE ◦ Neurocomputing ◦ Robotics and Autonomous Systems ◦ IEEE Transactions on Industrial Informatics

#### Conferences

American Control Conference ◦ IEEE Conference on Decision and Control ◦ European Control Conference ◦ Multi-conference on Systems and Control ◦ IFAC World Congress ◦ IFAC Workshop on Distributed Estimation and Control in Networked Systems ◦ IFAC Conference on Modeling, Identification and Control of Nonlinear Systems ◦ IFAC Conference on Analysis and Control of Chaotic Systems ◦ IFAC Symposium on Nonlinear Control Systems ◦ Mediterranean Conference on Control and Automation ◦ International Symposium on Mathematical Theory of Networks and Systems ◦ Power Systems Computation Conference ◦ Africon ◦ Global Conference on Signal and Information Processing

#### Books

Springer ◦ Birkhäuser ◦ CRC Press, Taylor & Francis Group

### EDITORIAL SERVICE AND TECHNICAL PROGRAM COMMITTEES

- 2017 “Data Mining for Cyber-physical and Industrial Systems” Workshop at IEEE ICDM
- 2017 IEEE International Conference on Smart Grid Communications (SmartGridComm)
- 2017 Greenmetrics (Sigmetrics) Workshop
- 2016

Guest editor for IEEE Transactions on Smart Grid special issue “Distributed Control and Efficient Optimization Methods for Smart Grid”

2016 Workshop on Complex Networks

2015 IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)

2014 IEEE International Conference on Smart Grid Communications (SmartGridComm)

#### REVIEW PANELS AND FUNDING COMMITTEES

2017 Chilean National Science and Technology Commission, FONDECYT

2017 German Research Foundation (DFG), Priority Program “Hybrid and multimodal energy systems: System theoretical methods for the transformation and operation of complex networks”

2017 Swiss National Science Foundation (SNSF) Ambizione Energy

2016 Swiss National Science Foundation (SNSF)

2016 Dutch-Indian Data Driven Science, Netherlands Organisation for Scientific Research (NWO)

2015 Energy System Integration - Planning, Operations and Societal Embedding, Netherlands Organisation for Scientific Research (NWO)

2015 Cyber Physical systems with Model Driven Architectures and resilience (CyPhyMedusa), French National Research Agency (ANR) and CHIST-ERA ERA-NET

2015 European PhD Award on Control for Complex and Heterogeneous Systems

2014 Scientific Independence of Young Researchers (SIR) 2014, Italian Ministry for Education University and Research (MIUR)

#### ORGANIZER/CO-ORGANIZER

2017 Two Invited Sessions on *Control of Low-Inertia Power Systems* at IEEE Conference on Decision and Control, Melbourne, Australia

2017 Invited Session on *Advances on Optimal Power Flow–Robust and Stochastic Approaches* at IEEE Conference on Decision and Control, Melbourne, Australia

2017 Conference on *Future Electric Power Systems and the Energy Transition*, Champéry, Switzerland

2016 Workshop on *Optimization and Control for Tomorrow’s Power Systems* at European Control Conference, Aalborg, Denmark

2016 Invited Session on *Distributed Control & Optimization in Next-Generation Power Networks* at European Control Conference, Aalborg, Denmark

2016 EECI International Graduate School on Control, ETH Zürich

2015 Invited Session on *Distributed Control & Optimization in Next-Generation Power Networks* at American Control Conference, Chicago, IL

2015 MSE Winter School Holistic Modelling and Control of Energy Systems, Ohlstadt, Germany.

2015 Invited Session on *Emerging strategies for stability analysis of electrical power grids* at SIAM Conference on Dynamical Systems, Snowbird, UT.

2014 Invited Session on *Control and Dynamics in Power Networks* at International Symposium on Mathematical Theory of Networks and Systems, Groningen, the Netherlands.

2011 Santa Barbara Control Workshop 2011

## CHAIR/CO-CHAIR

Conf. Sessions IEEE Conference on Decision and Control ◦ European Control Conference ◦ American Control Conference ◦ Southern California Nonlinear Control Workshop ◦ International Symposium on Mathematical Theory of Networks and Systems ◦ IFAC World Congress

## WORKSHOPS AND TUTORIALS

2016 Workshop on *Smart Grid Control* at American Control Conference, Boston, MA, USA, July 2016.  
2016 Workshop on *Distributed and Stochastic Optimization: Theory and Applications* at European Control Conference, Aalborg, Denmark, June 2016.  
2016 Workshop on *Optimization and Control for Tomorrow's Power Systems* at European Control Conference, Aalborg, Denmark, June 2016.  
2014 Workshop on *Open Problems in Multi-Agent Systems* at American Control Conference, Portland, OR, USA, June 2014.  
2012 Tutorial on *Synchronization in Coupled Oscillators: Theory and Applications* at IEEE Conference on Decision and Control, Maui, HI, USA, December 2012.  
2011 Workshop on *Control Systems Security: Challenges and Directions* at IEEE Conference on Decision and Control and European Control Conference, Orlando, FL, USA, December 2011.

## Professional Affiliations

2016–current *Global Network of Synchrophasor Solutions* Steering Committee/Consortium  
2009–current Member, Institute for Electrical and Electronics Engineers (IEEE)  
IEEE Societies: Control Systems Society (CSS) ◦ Power and Energy Society (PES)  
2009–current Member, Society for Industrial and Applied Mathematics (SIAM)

## Talks, Seminars, and Presentations

### INVITED TALKS

Jun'17 CoNDyNet Workshop “Dynamics in Power Systems – From Science to Industry”, Potsdam  
May'17 Institute for Theoretical Studies “Collective dynamics, control and imaging”, ETH Zürich  
Mar'17 Optimization and Inference for Physical Flows on Networks, BIRS, Alberta  
Feb'17 Future Electric Power Systems and the Energy Transition, Champéry, Switzerland  
Dec'16 Energy Seminar, UC Berkeley  
Oct'16 Computer Science Departmental Talk, Swiss Federal Institute of Technology (ETH) Zürich  
Jul'16 National Renewable Energy Laboratory, Golden, CO  
Jun'16 Keynote at Greenmetrics (Sigmetrics) Conference, Nice  
May'16 Automatic Control Seminar, KTH Royal Institute of Technology, Sweden  
May'16 Institute for Mathematics and its Applications, University of Minnesota  
Apr'16 Séminaire d'Automatique du Plateau de Saclay, Laboratoire de Signaux et Systèmes du Supélec  
Nov'15 Laboratoire d'Automatique Seminar, École Polytechnique Fédérale de Lausanne (EPFL)  
Oct'15 KAUST Workshop on Human-Machine Networks and Intelligent Infrastructure, KAUST



Jun'15 Advanced Methods for Energy Systems, Skolkovo Institute for Science and Technology, Moscow  
 Apr'15 Control Systems Seminar, Technical University Berlin  
 Feb'15 Systems and Control Seminar, Université Catholique de Louvain  
 Jan'15 Swiss Federal Laboratories for Materials Science and Technology (EMPA)  
 Jan'15 Grid Science Winter School & Conference, Santa Fe, NM  
 Nov'14 Department of Engineering, University of Cambridge  
 Nov'14 Oxford Control Group, University of Oxford  
 Nov'14 Swissgrid Seminar, Laufenburg  
 Nov'14 Department of Information Engineering, University of Padova  
 Oct'14 Dagstuhl Seminar Modeling, Verification, & Control of Complex Systems for Energy Networks  
 Oct'14 ABB Corporate Research Center Seminar, Baden  
 Oct'14 Dynamics and Control in Networks Workshop, Lund University  
 Sep'14 MnDRIVE Seminar Series, University of Minnesota  
 Jun'14 Rand Corporation Speaker Series, Los Angeles, CA  
 Jun'14 CPS Seminar, Department of Electrical Engineering, UC Los Angeles  
 May'14 Department of Electrical and Computer Engineering, UC San Diego  
 May'14 Department of Civil and Environmental Science, Stanford University  
 Mar'14 RASEI/ECEE Seminar, University of Colorado Boulder  
 Mar'14 National Renewable Energy Laboratory, Golden, CO  
 Feb'14 Rigorous Systems Research Group Seminar, California Institute of Technology  
 Nov'13 Ming Hsieh Department of Electrical Engineering, University of Southern California  
 Jul'13 Center for Nonlinear Studies, Los Alamos National Laboratories  
 Jun'13 Hybrid Control Systems Workshop, Technical University Munich  
 Jun'13 Symposium on Complex Systems Control, Swiss Federal Institute of Technology (ETH) Zürich  
 Mar'13 Department of Electrical Engineering, UC Los Angeles  
 Mar'13 School of Electrical and Computer Engineering, Georgia Institute of Technology  
 Feb'13 Center for Nonlinear Studies, Los Alamos National Laboratories  
 Oct'12 Automatic Control Laboratory, Swiss Federal Institute of Technology (ETH) Zürich  
 Jul'12 Institute for Systems Theory and Automatic Control, University of Stuttgart  
 Jul'12 Siemens Colloquium, Siemens AG, Munich  
 May'12 Optimization and Control for Smart Grids, Santa Fe, NM  
 Apr'12 Department of Mathematics, UI Urbana-Champaign  
 Feb'12 Department of Electrical Engineering, UC Los Angeles  
 Oct'11 Institute for Energy Efficiency, UC Santa Barbara  
 Jun'11 Center for Nonlinear Studies, Los Alamos National Laboratories  
 Sep'10 Systems Control Group, University of Toronto  
 Aug'10 Institute of Automatic Control Engineering, Technical University Munich  
 May'10 Control and Dynamical Systems, California Institute of Technology

#### CONTRIBUTED TALKS AT CONFERENCES, COLLOQUIA, ETC.

Jul'17	IFAC World Congress, Toulouse, France
Jul'16	American Control Conference, Boston, MA
Dec'15	IEEE Conference on Decision and Control, Osaka, Japan
Sep'15	Allerton Conference, UI Urbana-Champaign, IL
Jun'15	NetSci 2015, Zaragoza, Spain
May'15	Social Norms and Institutions, Monte Verità, CH
Sep'14	Allerton Conference, UI Urbana-Champaign, IL
Jul'14	Int. Symposium on Mathematical Theory of Networks and Systems, Groningen, Netherlands
Jun'14	European Control Conference, Strasbourg, France
Feb'14	Information Theory and Applications Workshop, San Diego, CA
Dec'13	IEEE Conference on Decision and Control, Florence, Italy
Jul'13	IEEE Power & Energy Society General Meeting
Jul'13	SIAM Conference on Control and its Applications
Dec'12	IEEE Conference on Decision and Control, Maui, HI
Dec'11	IEEE Conference on Decision and Control, Orlando, FL
Sep'11	Allerton Conference, UI Urbana-Champaign, IL
Jun'11	American Control Conference, San Francisco, CA
Oct'10	IEEE SmartGridComm Conference, Gaithersburg, MD
Sep'10	IFAC NecSys Workshop, Annecy, France
Jun'10	American Control Conference, Baltimore, MD
Aug'09	European Control Conference, Budapest, Hungary
Jun'08	American Control Conference, Seattle, WA

#### FORMAL INTERNAL SEMINARS, THESES PRESENTATIONS, & REVIEW COMMITTEE MEETINGS

Oct'14	Introductory Lecture, Swiss Federal Institute of Technology (ETH) Zürich
Jun'12	Center for Nonlinear Studies, Los Alamos National Laboratories
Mar'12	Center for Nonlinear Studies, Los Alamos National Laboratories
Jun'10	Center for Control, Dynamical Systems and Computation, UC Santa Barbara
May'09	Center for Control, Dynamical Systems and Computation, UC Santa Barbara
Sep'08	Institute for Systems Theory and Automatic Control, University of Stuttgart
Aug'08	Systems Control Group, University of Toronto
Sep'07	Systems Control Group, University of Toronto
Jul'07	Institute for Systems Theory and Automatic Control, University of Stuttgart

## Journal Publications

- [J1] C. De Persis, E.R.A. Weitenberg, and F. Dörfler. A power consensus algorithm for dc microgrids. *Automatica*, February 2017. Submitted. Available at <https://arxiv.org/pdf/1611.04192.pdf>.

- [J2] D. Molzahn, F. Dörfler, H. Sandberg, S. H. Low, S. Chakrabarti, R. Baldick, and J. Lavaei. A survey of distributed optimization and control algorithms for electric power systems. *IEEE Transactions on Smart Grid*, February 2017. In press.
- [J3] S. Bolognani, E. Arcari, and F. Dörfler. A fast method for real-time chance-constrained decision with application to power systems. *IEEE Control Systems Letters*, 1(1):152 – 157, 2017.
- [J4] T. Borsche and F. Dörfler. On placement of synthetic inertia with explicit time-domain constraints. *IEEE Transactions on Power Systems*, 2017. Submitted. Available at <https://arxiv.org/abs/1705.03244>.
- [J5] F. Dörfler and S. Grammatico. Gather-and-broadcast frequency control in power systems. *Automatica*, 79:296–305, 2017.
- [J6] T. Jouini, C. Arghir, and F. Dörfler. Grid-forming control for power converters based on matching of synchronous machines. *Automatica*, 2017. Submitted. Available at <https://arxiv.org/pdf/1706.09495.pdf>.
- [J7] J. Schiffer, F. Dörfler, and E. Fridmann. Robustness of distributed averaging control in power systems: Time delays & dynamic communication topology. *Automatica*, 80:261–271, 2017.
- [J8] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Voltage stabilization in microgrids via quadratic droop control. *IEEE Transactions on Automatic Control*, 3(62):1239 – 1253, 2017. Available at <http://arxiv.org/pdf/1507.00431v1.pdf>.
- [J9] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Uncovering droop control laws embedded within the nonlinear dynamics of Van der Pol oscillators. *IEEE Transactions on Control of Network Systems*, 2(4):347 – 358, 2017. Available at <http://arxiv.org/abs/1411.6973>.
- [J10] M. Fazlyab, F. Dörfler, and V. M. Preciado. Optimal network design for synchronization of Kuramoto oscillators. *Automatica*, February 2016. To appear.
- [J11] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Voltage collapse in complex power grids. *Nature Communications*, 7:1–8, February 2016.
- [J12] M. Todescato, J. W. Simpson-Porco, F. Dörfler, R. Carli, and F. Bullo. Online distributed voltage stress minimization by optimal feedback reactive power control. *IEEE Transactions on Control of Network Systems*, February 2016. In press. Available at <http://ieeexplore.ieee.org/document/7967778/>.
- [J13] F. Dörfler, J. W. Simpson-Porco, and F. Bullo. Breaking the Hierarchy: Distributed Control & Economic Optimality in Microgrids. *IEEE Transactions on Control of Network Systems*, 3(3):241–253, 2016.
- [J14] D. Groß, C. Arghir, and F. Dörfler. On the steady-state behavior of a nonlinear power system model. *Automatica*, 2016. Submitted. Available at <https://arxiv.org/abs/1607.01575>.
- [J15] B. Johnson, M. Sinha, N. Ainsworth, F. Dörfler, and S. Dhople. Synthesizing virtual oscillators to control islanded inverters. *IEEE Transactions on Power Electronics*, 31(8):6002 – 6015, 2016.
- [J16] B. K. Poolla, S. Bolognani, and F. Dörfler. Optimal placement of virtual inertia in power grids. *IEEE Transactions on Automatic Control*, 2016. In press. Available at <http://ieeexplore.ieee.org/document/7924418/>.
- [J17] X. Wu, F. Dörfler, and M. R. Jovanovic. Input-output analysis and decentralized optimal control of inter-area oscillations in power systems. *IEEE Transactions on Power Systems*, 31(3):2434 – 2444, 2016. Available at <http://arxiv.org/abs/1502.03221>.

- [J18] Y. Xiao, F. Dörfler, and M. van der Schaar. Incentive design in peer review: Rating and repeated endogenous matching. *IEEE Transactions on Network Science and Engineering*, 2016. In press. Available at <http://arxiv.org/abs/1411.2139>.
- [J19] J. W. Simpson-Porco, Q. Shafiee, F. Dörfler, J. M. Vasquez, J. M. Guerrero, and F. Bullo. Secondary frequency and voltage control of islanded microgrids via distributed averaging. *IEEE Transactions on Industrial Electronics*, 62(15):7025 – 7038, November 2015. Available at <http://arxiv.org/abs/1504.06784>.
- [J20] F. Pasqualetti, F. Dörfler, and F. Bullo. Control-theoretic methods for cyber-physical security. *IEEE Control Systems Magazine*, 35(1):110–127, February 2015.
- [J21] D. Mehta, N. Daleo, F. Dörfler, and J. D. Hauenstein. Algebraic geometrization of the kuramoto model: Equilibria and stability analysis. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 25(5), January 2015. Available at <http://arxiv.org/abs/1412.0666>.
- [J22] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. On resistive networks of constant power devices. *IEEE Transactions on Circuits and Systems II: Express Briefs*, 62(8):811–815, 2015. Available at <http://arxiv.org/pdf/1503.04769v1.pdf>.
- [J23] J. Zhao and F. Dörfler. Distributed control and optimization in DC microgrids. *Automatica*, 61:18 – 26, 2015.
- [J24] S. Dhople, B. Johnson, F. Dörfler, and A. Hamadeh. Synchronization of nonlinear circuits in dynamic electrical networks with general topologies. *IEEE Transactions on Circuits and Systems I: Regular Papers*, 61(9):2677–2690, September 2014.
- [J25] F. Dörfler, M. R. Jovanovic, M. Chertkov, and F. Bullo. Sparsity-promoting optimal wide-area control of power networks. *IEEE Transactions on Power Systems*, 29(5):2281–2291, September 2014.
- [J26] F. Dörfler and F. Bullo. Synchronization in complex oscillator networks: A survey. *Automatica*, 50(6):1539–1564, June 2014.
- [J27] F. Pasqualetti, F. Dörfler, and F. Bullo. Attack detection and identification in cyber-physical systems. *IEEE Transactions on Automatic Control*, 58(11):2715–2729, November 2013.
- [J28] F. Dörfler, F. Pasqualetti, and F. Bullo. Continuous-time distributed observers with discrete communication. *IEEE Journal of Selected Topics in Signal Processing*, 7(2):296–304, April 2013.
- [J29] F. Dörfler, M. Chertkov, and F. Bullo. Synchronization in complex oscillator networks and smart grids. *Proceedings of the National Academy of Sciences*, 110(6):2005–2010, February 2013.
- [J30] F. Dörfler and F. Bullo. Kron reduction of graphs with applications to electrical networks. *IEEE Transactions on Circuits and Systems I: Regular Papers*, 60(1):150–163, January 2013.
- [J31] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Synchronization and power sharing for droop-controlled inverters in islanded microgrids. *Automatica*, 49(9):2603–2611, 2013.
- [J32] F. Dörfler and F. Bullo. Synchronization and transient stability in power networks and non-uniform Kuramoto oscillators. *SIAM Journal on Control and Optimization*, 50(3):1616–1642, 2012.
- [J33] F. Dörfler and F. Bullo. On the critical coupling for Kuramoto oscillators. *SIAM Journal on Applied Dynamical Systems*, 10(3):1070–1099, 2011.
- [J34] F. Dörfler and B. Francis. Geometric Analysis of the Formation Problem for Autonomous Robots. *IEEE Transactions on Automatic Control*, 55(10):2379–2384, October 2010.

- [J35] F. Dörfler, J. K. Johnsen, and F. Allgöwer. An Introduction to Interconnection and Damping Assignment Passivity-Based Control in Process Engineering. *Journal of Process Control*, 19(9):1413–1426, October 2009.

## Refereed Conference Proceedings

- [C1] L. Aolaritei, S. Bolognani, and F. Dörfler. A distributed voltage stability margin for power distribution networks. In *IFAC World Congress*, November 2017. To appear.
- [C2] C. De Persis, E.R.A. Weitenberg, and F. Dörfler. A power consensus algorithm for dc microgrids. In *IFAC World Congress*, November 2017. To appear.
- [C3] D. Groß and F. Dörfler. On the steady-state behavior of low-inertia power systems. In *IFAC World Congress*, November 2017. To appear.
- [C4] P. Nahata, S. Mastellone, and F. Dörfler. Decentralized optimal projected control of pv inverters in residential microgrids. In *IFAC World Congress*, November 2017. To appear.
- [C5] P. Nahata, S. Mastellone, and F. Dörfler. A decentralized switched system approach to overvoltage prevention in pv residential microgrids. In *IFAC World Congress*, November 2017. To appear.
- [C6] A. Hauswirth, A. Zanardi, S. Bolognani, F. Dörfler, and G Hug. Online optimization in closed loop on the power flow manifold. In *IEEE PES PowerTech Manchester*, pages 1–6, June 2017.
- [C7] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Synchronization of liénard oscillators in heterogenous electrical networks. In *Proceedings of the 4th Indian Control Conference*, May 2017. Submitted.
- [C8] M. Colombino, D. Groß, and F. Dörfler. Global phase and voltage synchronization for power inverters: a decentralized consensus-inspired approach. In *Proceedings of the 56th IEEE Conference on Decision and Control*, March 2017. To appear.
- [C9] S. Curi, D. Groß, and F. Dörfler. Control of low inertia power grids: A model reduction approach. In *Proceedings of the 56th IEEE Conference on Decision and Control*, March 2017. To appear.
- [C10] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Phase balancing in globally connected networks of liénard oscillators. In *Proceedings of the 56th IEEE Conference on Decision and Control*, March 2017. To appear.
- [C11] D. Groß, S. Bolognani, B. K. Poolla, and F. Dörfler. Increasing the resilience of low-inertia power systems by virtual inertia and damping. In *Bulk Power Systems Dynamics and Control Symposium (IREP)*, 2017. To appear.
- [C12] B. K. Poolla, D. Groß, T. Borsche, S. Bolognani, and F. Dörfler. Virtual inertia placement in electric power grids. In Jakob Stoustrup, editor, *Energy Markets and Responsive Grids*, 2017. To appear.
- [C13] C. De Persis, N. Monshizadeh, J. Schiffer, and F. Dörfler. A lyapunov approach to control of microgrids with a network-preserved differential-algebraic model. In *Proceedings of the 55th IEEE Conference on Decision and Control*, pages 2595–2600, December 2016.
- [C14] J. W. Simpson-Porco, B. K. Poolla, N. Monshizadeh, and F. Dörfler. Quadratic performance of primal-dual methods with application to secondary frequency control of power systems. In *Proceedings of the 55th IEEE Conference on Decision and Control*, pages 1840–1845, December 2016.

- [C15] C. Arghir, D. Groß, and F. Dörfler. On the steady-state behavior of a nonlinear power network model. In *6th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, pages 61–66, September 2016.
- [C16] T. Jouini, C. Arghir, and F. Dörfler. Grid-friendly matching of synchronous machines by tapping into the dc storage. In *6th IFAC Workshop on Distributed Estimation and Control in Networked Systems*, pages 192–197, September 2016. To appear.
- [C17] F. Kottmann, S. Bolognani, and F. Dörfler. A separation principle for optimal iaas cloud computing distribution. In *European Signal Processing Conference (EUSIPCO)*, pages 1393–1397, August 2016.
- [C18] F. Dörfler and S. Grammatico. Amidst centralized and distributed frequency control in power systems. In *American Control Conference*, pages 5909–5914, Boston, MA, July 2016.
- [C19] B. Li, G. Sansavini, S. Bolognani, and F. Dörfler. Linear implicit AC PF cascading failure analysis with power system operations and automation. In *IEEE Power & Energy Society General Meeting*, pages 1–5, Boston, MA, July 2016.
- [C20] B. K. Poolla, S. Bolognani, and F. Dörfler. Placing rotational inertia in power grids. In *American Control Conference*, pages 2314–2320, Boston, MA, July 2016.
- [C21] X. Wu, F. Dörfler, and M. R. Jovanovic. Topology identification and design of distributed integral action in power networks. In *American Control Conference*, Boston, MA, July 2016. To appear.
- [C22] J. Schiffer and F. Dörfler. On stability of a distributed averaging pi frequency and active power controlled differential-algebraic power system model. In *European Control Conference*, pages 1487–1492, June 2016.
- [C23] S. Bolognani and F. Dörfler. Fast scenario-based decision making in unbalanced distribution networks. In *Power Systems Computation Conference (PSCC)*, pages 1–7, June, 2016.
- [C24] A. Hauswirth, S. Bolognani, G. Hug, and F. Dörfler. Projected gradient descent on riemannian manifolds with applications to online power system optimization. In *Allerton Conf. on Communications, Control and Computing*, pages 1–8, 2016.
- [C25] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Synchronization of lienard-type oscillators in uniform electrical networks. In *American Control Conference*, 2016. To appear.
- [C26] F. Pasqualetti, F. Dörfler, and F. Bullo. A divide-and-conquer approach to distributed attack identification. In *IEEE Conf. on Decision and Control*, pages 5801–5807, Osaka, Japan, December 2015.
- [C27] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. A solvability condition for reactive power flow. In *IEEE Conf. on Decision and Control*, pages 2013–2017, Osaka, Japan, December 2015.
- [C28] M. Todescato, J. W. Simpson-Porco, F. Dörfler, R. Carli, and F. Bullo. Optimal voltage support and stress minimization in power networks. In *IEEE Conf. on Decision and Control*, pages 6921–6926, Osaka, Japan, December 2015.
- [C29] X. Wu, F. Dörfler, and M. R. Jovanovic. Decentralized optimal control of inter-area oscillations in bulk power systems. In *IEEE Conf. on Decision and Control*, pages 5532 – 5537, Osaka, Japan, December 2015.
- [C30] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Virtual oscillator control subsumes droop control. In *American Control Conference*, pages 2353–2358, Chicago, IL, July 2015.

- [C31] M. Sinha, B. Johnson, N. Ainsworth, F. Dörfler, and S. Dhople. Nonlinear supersets to droop control. In *IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Vancouver, BC, July 2015.
- [C32] C. Zhao, E. Mallada, and F. Dörfler. Distributed frequency control for stability and economic dispatch in power networks. In *American Control Conference*, pages 2359–2364, Chicago, IL, July 2015.
- [C33] J. Zhao and F. Dörfler. Distributed control, load sharing, and dispatch in DC microgrids. In *American Control Conference*, pages 3304–3309, Chicago, IL, July 2015.
- [C34] S. Bolognani and F. Dörfler. Fast power system analysis via implicit linearization of the power flow manifold. In *Allerton Conf. on Communications, Control and Computing*, 2015.
- [C35] T. Summers, I. Shames, J. Lygeros, and F. Dörfler. Topology design for optimal network coherence. In *European Control Conference*, 2015. Available at <http://arxiv.org/abs/1411.4884>.
- [C36] F. Dörfler, J. W. Simpson-Porco, and F. Bullo. Plug-and-play control and optimization in microgrids. In *IEEE Conf. on Decision and Control*, pages 211–216, Los Angeles, CA, USA, December 2014.
- [C37] X. Wu, F. Dörfler, and M. R. Jovanovic. Analysis and design trade-offs for power network inter-area oscillations. In *International Symposium on Mathematical Theory of Network and Systems*, July 2014.
- [C38] F. Dörfler, S. Dhople, B. Johnson, and A. Hamadeh. Synchronization of nonlinear circuits in dynamic electrical networks. In *European Control Conference*, pages 552–557, Strasbourg, France, June 2014.
- [C39] B. Gentile, J. W. Simpson-Porco, F. Dörfler, S. Zampieri, and F. Bullo. On reactive power flow and voltage stability in microgrids. In *American Control Conference*, pages 759–764, Portland, OR, June 2014.
- [C40] Y. Xiao, F. Dörfler, and M. van der Schaar. Rating and matching in peer review systems. In *Allerton Conf. on Communications, Control and Computing*, pages 54–61, 2014.
- [C41] J. W. Simpson-Porco, F. Dörfler, Q. Shafiee, J. M. Guerrero, and F. Bullo. Stability, power sharing, & distributed secondary control in droop-controlled microgrids. In *IEEE Int. Conf. on Smart Grid Communications*, pages 672–677, Vancouver, BC, Canada, October 2013.
- [C42] F. Dörfler and F. Bullo. Novel Insights into Lossless AC and DC Power Flow. In *IEEE Power & Energy Society General Meeting*, July 2013.
- [C43] D. Romeres, F. Dörfler, and F. Bullo. Novel results on slow coherency in consensus and power networks. In *European Control Conference*, pages 742–747, Zürich, Switzerland, July 2013.
- [C44] F. Dörfler, M. R. Jovanovic, M. Chertkov, and F. Bullo. Sparse and optimal wide-area damping control in power networks. In *American Control Conference*, pages 4295–4300, Washington, DC, USA, June 2013.
- [C45] H. Bouattour, J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Further results on distributed secondary control in microgrids. In *IEEE Conf. on Decision and Control*, pages 1514–1519, March 2013. Extended manuscript available at <http://motion.me.ucsb.edu/pdf/2013j-bsdb.pdf>.

- [C46] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Voltage stabilization in microgrids via quadratic droop control. In *IEEE Conf. on Decision and Control*, pages 7582–7589, February 2013.
- [C47] F. Dörfler and F. Bullo. Exploring synchronization in complex oscillator networks. In *IEEE Conf. on Decision and Control*, pages 7157–7170, Maui, HI, USA, December 2012.
- [C48] F. Dörfler, M. Chertkov, and F. Bullo. Synchronization assessment in power networks and coupled oscillators. In *IEEE Conf. on Decision and Control*, pages 4998–5003, Maui, HI, USA, December 2012.
- [C49] F. Pasqualetti, F. Dörfler, and F. Bullo. Cyber-physical security via geometric control: Distributed monitoring and malicious attacks. In *IEEE Conf. on Decision and Control*, pages 3418–3425, Maui, HI, USA, December 2012.
- [C50] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Droop-controlled inverters are Kuramoto oscillators. In *IFAC Workshop on Distributed Estimation and Control in Networked Systems*, pages 264–269, Santa Barbara, CA, USA, September 2012.
- [C51] F. Dörfler and F. Bullo. Topological equivalence of a structure-preserving power network model and a non-uniform Kuramoto model of coupled oscillators. In *IEEE Conf. on Decision and Control and European Control Conference*, pages 7099–7104, Orlando, FL, USA, December 2011.
- [C52] F. Pasqualetti, F. Dörfler, and F. Bullo. Cyber-physical attacks in power networks: Models, fundamental limitations and monitor design. In *IEEE Conf. on Decision and Control and European Control Conference*, pages 2195–2201, Orlando, FL, USA, December 2011.
- [C53] F. Dörfler, F. Pasqualetti, and F. Bullo. Distributed detection of cyber-physical attacks in power networks: A waveform relaxation approach. In *Allerton Conf. on Communications, Control and Computing*, pages 1486–1491, September 2011.
- [C54] F. Dörfler and F. Bullo. On the critical coupling strength for Kuramoto oscillators. In *American Control Conference*, pages 3239–3244, San Francisco, CA, USA, June 2011.
- [C55] F. Dörfler and F. Bullo. Spectral Analysis of Synchronization in a Lossless Structure-Preserving Power Network Model. In *Proceedings of the 1st IEEE Conference on Smart Grid Communications in Gaithersburg, Maryland, USA*, pages 179–184, October 2010.
- [C56] F. Dörfler and F. Bullo. Synchronization of Power Networks: Network Reduction and Effective Resistance. In *Proceedings of the 2nd IFAC Workshop on Distributed Estimation and Control in Networked Systems in Annecy, France*, pages 197–202, September 2010.
- [C57] F. Dörfler and F. Bullo. Synchronization and Transient Stability in Power Networks and Non-Uniform Kuramoto Oscillators. In *Proceedings of the American Control Conference in Baltimore, Maryland, USA*, pages 930–937, June 2010.
- [C58] T. D. Krøvel, F. Dörfler, M. Berger, and J. M. Rieber. High-Precision Spacecraft Attitude and Manoeuvre Control Using Electric Propulsion. In *Proceedings of the 60th International Astronautical Congress in Seoul, Korea*, October 2009.
- [C59] F. Dörfler and B. Francis. Formation control of autonomous robots based on cooperative behavior. In *European Control Conference in Budapest*, pages 2432–2437, Budapest, Hungary, August 2009.
- [C60] J. K. Johnsen, F. Dörfler, and F. Allgöwer. L<sub>2</sub>-gain of Port-Hamiltonian systems and application to a biochemical fermenter. In *American Control Conference*, pages 153–158, Seattle, Washinton, USA, June 2008.



## Theses

- [T1] F. Dörfler. *Dynamics and Control in Power Grids and Complex Oscillator Networks*. Ph.d. thesis, University of California at Santa Barbara, September 2013.
- [T2] F. Dörfler. *Geometric Analysis of the Formation Problem for Autonomous Robots*. Diploma thesis, University of Toronto, August 2008.
- [T3] F. Dörfler. *Port-Hamiltonian Systems – Stability Analysis and Application in Process Control*. Student thesis, Universität Stuttgart, July 2007.

## Thesis Advised/Co-Advised

- [A1] E. Arcari. *Fast chance-constrained optimization using real-time measurements with applications to power distribution systems*. Semester thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A2] J.S. Brouillion. *Decentralized synchronization of an inverter based grid*. Semester thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A3] S. Curi. *Control of Low Inertia Power Grids: A model reduction approach*. Master thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A4] P. Lütolf. *Optimal Placement of Virtual Damping and Inertia*. Master thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A5] J.G. Pázmány. *Robust Optimization of Nonlinear Power Systems in Realtime*. Master thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A6] C. Zhongda. *Virtual-oscillator-based Analysis and Control of Induction Machines in Power Systems*. Semester thesis, ETH Zürich, 2017. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A7] L. Aolaritei. *A decentralized Voltage Collapse Distance for Power Distribution Networks*. Semester thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A8] M. Fetzner. *Network Reduction for Optimal Power Flow Problems*. Semester thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A9] C. Frei. *Gaussian Processes in Reinforcement Learning*. Semester thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A10] T. Jouini. *Grid-friendly Matching Control of Synchronous Machines by DC/AC Converters in Bulk Power Networks*. Master thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A11] A. Ketssetzis. *Optimal PMU placement for State Estimation in Power Grids*. Master thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A12] P. Kyriakis. *Formation of robust networks for secure exchange of cryptocurrencies*. Semester thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.

- [A13] Y. Meier. *Parallelized Interior Point Method for Security Constrained Optimal Power Flow (SCOPF) of Distribution Networks*. Master thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A14] A. Zanardi. *Constrained optimization over manifolds for power system application*. Semester thesis, ETH Zürich, 2016. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A15] D. Drzajic. *Energy Theft Detection using Compressive Sensing Methods*. Semester thesis, ETH Zürich, 2015. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A16] F. Kottmann. *Computational Load and Congestion Control in Cloud Environments*. Master thesis, ETH Zürich, 2015. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A17] A. Lelouvier. *Decentralized and Distributed Frequency Regulation in Power Grids*. Semester thesis, ETH Zürich, 2015. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A18] Y. Meier. *Predicting Grades*. Semester thesis, ETH Zürich, 2015. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A19] P. Nahata. *Distributed Control and Optimization in DC Microgrids*. Semester thesis, ETH Zürich, 2014. Available at <http://control.ee.ethz.ch/index.cgi?page=publications>.
- [A20] H. Bouattour. *Distributed Secondary Control in Microgrids*. M.Sc. thesis, Universität Stuttgart, 2013.
- [A21] B. Gentile. *Approximate Solution to the Reactive Power Flow and its Application to Voltage Stability in Microgrids*. Laurea thesis, Università Degli Studi di Padova, 2013.
- [A22] D. Romeres. *Novel Results on Slow Coherency in Power Networks*. Laurea thesis, Università Degli Studi di Padova, 2012.

## Miscellaneous

- [M1] T. Borsche and F. Dörfler. On placement of synthetic inertia with explicit time-domain constraints, 2017. Available at <https://arxiv.org/abs/1705.03244>.
- [M2] F. Dörfler. Lecture notes on "circuits & power grids", 2017. Part of the "Advanced Topics in Control" Course 2017. Available at [http://control.ee.ethz.ch/~floriand/docs/Teaching/ATIC\\_2017/Circuits\\_Lecture.pdf](http://control.ee.ethz.ch/~floriand/docs/Teaching/ATIC_2017/Circuits_Lecture.pdf).
- [M3] F. Dörfler. Lecture notes on "distributed consensus-based optimization", 2017. Part of the "Advanced Topics in Control" Course 2017. Available at [http://control.ee.ethz.ch/~floriand/docs/Teaching/ATIC\\_2017/Optimization\\_Lecture.pdf](http://control.ee.ethz.ch/~floriand/docs/Teaching/ATIC_2017/Optimization_Lecture.pdf).
- [M4] T. Jouini, C. Arghir, and F. Dörfler. Grid-forming control for power converters based on matching of synchronous machines, 2017. Available at <https://arxiv.org/abs/1706.09495>.
- [M5] T. Summers, I. Shames, J. Lygeros, and F. Dörfler. Correction to "topology design for optimal network coherence", 2017. Available at [http://www.utdallas.edu/~tyler.summers/papers/ECC\\_Correction.pdf](http://www.utdallas.edu/~tyler.summers/papers/ECC_Correction.pdf).
- [M6] L. Aolaritei, S. Bolognani, and F. Dörfler. A distributed voltage stability margin for power distribution networks, December 2016. Available at <https://arxiv.org/abs/1612.00207>.

- [M7] D. Groß, C. Arghir, and F. Dörfler. On the steady-state behavior of a nonlinear power system model, July 2016. Available at <https://arxiv.org/abs/1607.01575>.
- [M8] J. Schiffer, F. Dörfler, and E. Fridmann. Cyber-physical aspects of distributed averaging control in power systems: Time delays & dynamic communication topology, July 2016. Available at <http://arxiv.org/abs/1607.07743>.
- [M9] F. Dörfler and S. Grammatico. Gather-and-broadcast frequency control in power systems, May 2016. Available at <http://arxiv.org/abs/1605.09560>.
- [M10] M. Fazlyab, F. Dörfler, and V. M. Preciado. Optimal network design for synchronization of kuramoto oscillators, February 2016. Available at <http://arxiv.org/abs/1503.07254>.
- [M11] M. Todescato, J. W. Simpson-Porco, F. Dörfler, R. Carli, and F. Bullo. Voltage stress minimization by optimal reactive power control, February 2016. Available at <http://arxiv.org/abs/1602.01969>.
- [M12] B. K. Poolla, S. Bolognani, and F. Dörfler. Optimal placement of virtual inertia in power grids, January 2016. Available at <http://arxiv.org/pdf/1510.01497v2.pdf>.
- [M13] C. De Persis, E.R.A. Weitenberg, and F. Dörfler. A power consensus algorithm for dc microgrids, 2016. Available at <https://arxiv.org/abs/1611.04192>.
- [M14] B. K. Poolla, S. Bolognani, and F. Dörfler. Placing rotational inertia in power grids, October 2015. Available at <http://arxiv.org/pdf/1510.01497v1.pdf>.
- [M15] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Voltage stabilization in microgrids via quadratic droop control, July 2015. Available at <http://arxiv.org/pdf/1507.00431v1.pdf>.
- [M16] J. W. Simpson-Porco, Q. Shafiee, F. Dörfler, J. M. Vasquez, J. M. Guerrero, and F. Bullo. Distributed averaging controllers for secondary frequency and voltage control in microgrids, April 2015. Available at <http://arxiv.org/abs/1504.06784>.
- [M17] M. Fazlyab, F. Dörfler, and V. M. Preciado. Optimal design for synchronization of kuramoto oscillators in tree networks, March 2015. Available at <http://arxiv.org/abs/1503.07254v1>.
- [M18] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. On resistive networks of constant power devices, March 2015. Available at <http://arxiv.org/pdf/1503.04769v1.pdf>.
- [M19] X. Wu, F. Dörfler, and M. R. Jovanovic. Input-output analysis and decentralized optimal control of inter-area oscillations in power systems, February 2015. Available at <http://arxiv.org/abs/1502.03221>.
- [M20] Y. Xiao, F. Dörfler, and M. van der Schaar. Incentive design in peer review: Rating and repeated endogenous matching, November 2014. Available at <http://arxiv.org/abs/1411.2139>.
- [M21] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Voltage stability of droop-controlled microgrids (Extended Abstract), July 2014. Available at [http://control.ee.ethz.ch/~floriand/docs/Articles/SimpsonPorco\\_MTNS\\_2014.pdf](http://control.ee.ethz.ch/~floriand/docs/Articles/SimpsonPorco_MTNS_2014.pdf).
- [M22] F. Dörfler, J. W. Simpson-Porco, and F. Bullo. Breaking the Hierarchy: Distributed Control & Economic Optimality in Microgrids, January 2014. Available at <http://arxiv.org/abs/1401.1767>.
- [M23] F. Dörfler and J. M. Hendrickx. Synchronization of oscillators: Feasibility and non-local analysis, 2014.

- [M24] D. Mehta, N. Daleo, F. Dörfler, and J. D. Hauenstein. Algebraic geometrization of the kuramoto model: Equilibria and stability analysis, 2014. Available at <http://arxiv.org/abs/1412.0666>.
- [M25] M. Sinha, F. Dörfler, B. Johnson, and S. Dhople. Uncovering droop control laws embedded within the nonlinear dynamics of Van der Pol oscillators, 2014. Available at <http://arxiv.org/abs/1411.6973>.
- [M26] T. Summers, I. Shames, J. Lygeros, and F. Dörfler. Topology design for optimal network coherence, 2014. Available at <http://arxiv.org/abs/1411.4884>.
- [M27] S. Dhople, B. Johnson, F. Dörfler, and A. Hamadeh. Synchronization of nonlinear circuits in dynamic electrical networks with general topologies, October 2013. Available at <http://arxiv.org/abs/1310.4550>.
- [M28] F. Dörfler, M. R. Jovanović, M. Chertkov, and F. Bullo. Sparsity-promoting optimal wide-area control of power networks, July 2013. Available at <http://arxiv.org/abs/1307.4342>.
- [M29] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Synchronization and power sharing for droop-controlled inverters in islanded microgrids, November 2012. Available at <http://arxiv.org/abs/1206.5033>.
- [M30] F. Dörfler and F. Bullo. Exploring synchronization in complex oscillator networks, September 2012. Extended version including proofs. Available at <http://arxiv.org/abs/1209.1335>.
- [M31] F. Dörfler, M. Chertkov, and F. Bullo. Synchronization in complex oscillator networks and smart grids, July 2012. Available at <http://arxiv.org/abs/1208.0045>.
- [M32] J. W. Simpson-Porco, F. Dörfler, and F. Bullo. Droop-controlled inverters are Kuramoto oscillators, June 2012. Available at <http://arxiv.org/pdf/1206.5033v1.pdf>.
- [M33] F. Pasqualetti, F. Dörfler, and F. Bullo. Attack detection and identification in cyber-physical systems – Part I: Models and fundamental limitations, February 2012. Available at <http://arxiv.org/abs/1202.6144>.
- [M34] F. Pasqualetti, F. Dörfler, and F. Bullo. Attack detection and identification in cyber-physical systems – Part II: Centralized and distributed monitor design, February 2012. Available at <http://arxiv.org/abs/1202.6049>.
- [M35] F. Pasqualetti, F. Dörfler, and F. Bullo. Cyber-physical attacks in power networks: Models, fundamental limitations and monitor design, September 2011. Available at <http://arxiv.org/abs/1103.2795>.
- [M36] F. Dörfler and F. Bullo. Kron reduction of graphs with applications to electrical networks, February 2011. Available at <http://arxiv.org/abs/1102.2950>.
- [M37] F. Dörfler and F. Bullo. On the critical coupling for Kuramoto oscillators, November 2010. Available at <http://arxiv.org/abs/1011.3878>.
- [M38] F. Dörfler and B. Francis. Geometric Analysis of the Formation Problem for Autonomous Robots, January 2010. Available at <http://arxiv.org/abs/1001.4494>.
- [M39] F. Dörfler and F. Bullo. Synchronization and transient stability in power networks and non-uniform Kuramoto oscillators, October 2009. Available at <http://arxiv.org/abs/0910.5673>.

## Patents

- [P1] B. Johnson, N. Ainsworth, S. Dhople, and F. Dörfler. A systematic procedure for synthesizing virtual oscillators for inverter-based power systems. US62/329,266. November 2016.