# Robin Delabays

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www.delabaysrobin.site


## Research experience

*Since Oct. 2020* **Post-doctoral scholar**
Center for Control, Dynamical Systems, and Computation (CCDC),
University of California at Santa Barbara (UCSB).
*Supervised by Prof. Francesco Bullo.*

*Oct. – Dec. 2020* **Visiting scholar**
Mathematics Department, University of Fribourg (Switzerland).
*Invited by Prof. Christian Mazza.*

*Mar. – Jul. 2020*
*Aug. – Dec. 2018* **Post-doctoral scholar**
Institut für Automatik, ETH Zürich.
*Supervised by Prof. Florian Dörfler.*

*Jun. 2018 – Feb. 2020* **Post-doctoral scholar**
HES-SO Valais//Wallis.
*Supervised by Prof. Philippe Jacquod.*

*Jul. – Aug. 2019* **Visiting scholar**
Center for Nonlinear Studies, Los Alamos National Laboratory.
*Supervised by Dr. Andrey Lokhov and Dr. Marc Vuffray.*

## Education

*Sep. – Nov. 2017* **Visiting PhD student**
Institut für Automatik, ETH Zürich.
*Supervised by Prof. Florian Dörfler.*

*Dec. 2014 – May 2018* **PhD in Mathematics** – *Loop Flows in the Kuramoto Model*
University of Geneva & HES-SO Valais//Wallis.
*Supervised by Prof. Yvan Velenik and Prof. Philippe Jacquod.*
[archive-ouverte.unige.ch/unige:106921]

*Sep. 2014* **Master thesis**
University of Geneva.
The Topological Approach to Phase Transitions.
*Supervised by Prof. David Cimasoni and Prof. Yvan Velenik.*

*Sep. 2012 – Sep. 2014* **Master of Science in Mathematics**
University of Geneva.
*Focus in Topology and Probabilities.*

*Sep. 2008 – Sep. 2011* **Bachelor of Science in Mathematics**
University of Geneva.
*Focus in Topology and Probabilities.*

## Teaching and supervision of junior researchers

*Jan. – Dec. 2019* **André Reggio**
Supervision of A. Reggio during his first year of PhD. His work focused on some generalization of the Kuramoto model, referred to as *Kuramoto model with Bounded Confidence*.

*Jun. 2019 – Jul. 2020* **Glory M. Givi**
Supervision of G. M. Givi during her first year of PhD. Her work aims at quantifying the robustness of opinions in a group of interacting agents.

*May 2018* **Guest lecturer**
Course: Graph Spectral Theory, by Prof. Anders Karlsson, University of Geneva.

## Organization of conferences

*Oct. 27, 2020* **CCS 2021 - Satellite Symposium**
Data-based diagnosis of networked dynamical systems
covering the analysis of networks and disturbances therein relying on measurements.
Co-organizers: Laurent Pagnier (University of Arizona, Tucson) and
Melvyn Tyloo (University of Geneva).
[www.delabaysrobin.site/ccs-satellite]

*Feb. 2 – 5, 2020* **GeoCoW 2020**
Geometry of Complex Webs 2020: Interdisciplinary and international workshop covering a wide range of topics related to complex networks and their applications.
Co-organizers: Matthieu Jacquemet (HES-SO Valais-Wallis and University of Fribourg) and Christian Mazza (University of Fribourg).
[https://sites.google.com/view/geocow2020/home]

## Grants and awards

*2020* **PostDoc.Mobility**
Swiss National Science Foundation.

*2012* **Excellence Master Fellowship**
University of Geneva.

## Personal skills

**Languages** French (native), English (fluent), German (intermediate), Russian (basic).

**Programming** Julia, Matlab.

# Publications in peer-reviewed journals

## Preprints

- **R. Delabays**, L. Pagnier, and M. Tyloo, *Locating high-frequency line disturbances with the frequency mismatch*, submitted (2022). [arxiv.org/abs/2202.08317]
- **R. Delabays**, S. Jafarpour, and F. Bullo, *Multistability and Paradoxes in Lossy Oscillator Networks*, submitted (2022). [arxiv.org/abs/2202.02439]
- **R. Delabays** and M. Tyloo, *Heavy-tailed distribution of the number of publications within scientific journals*, under preparation (2020). [arxiv.org/abs/2011.05703]

## Peer-reviewed

- M. Tyloo, **R. Delabays**, and P. Jacquod, *Reconstructing Network Structures from Partial Measurements*, Chaos **31**, 103117 (2021). [doi.org/10.1063/5.0058739], [arxiv.org/abs/2007.16136]
- **R. Delabays**, L. Pagnier, and M. Tyloo, *Locating line and node disturbances in networks of diffusively coupled dynamical agents*, New J. Phys. **23**, 043037 (2021). [doi.org/10.1088/1367-2630/abf54b], [arxiv.org/abs/2003.08786]
- M. Tyloo and **R. Delabays**, *System size identification from sinusoidal probing in diffusive complex networks*, J. Phys. Complex. **2**, 025016 (2021). [doi.org/10.1088/2632-072X/abebd3], [arxiv.org/abs/2009.03824]
- A. Reggio, **R. Delabays**, and P. Jacquod, *Clusterization and phase diagram of the bimodal Kuramoto model with bounded confidence*, Chaos **30**, 093134 (2020). [doi.org/10.1063/5.0020436], [arxiv.org/abs/2007.01214]
- **R. Delabays**, *Dynamical equivalence between Kuramoto models with first- and higher-order coupling*, Chaos **29**, 113129 **(2019)**. [doi.org/10.1063/1.5118941], [arxiv.org/abs/1907.03699]
- **R. Delabays**, M. Tyloo, and P. Jacquod, *Rate of Change of Frequency under Line Contingencies in High Voltage Electric Power Networks with Uncertainties*, Chaos **29**, 103130 (2019). [doi.org/10.1063/1.5115002], [arxiv.org/abs/1906.05698]
- M. Tyloo, **R. Delabays**, and P. Jacquod, *Noise-Induced Desynchronization and Stochastic Escape from Equilibrium in Complex Networks*, Phys. Rev. E **99**, 062213 (2019). [doi.org/10.1103/PhysRevE.99.062213], [arxiv.org/abs/1812.09497]
- D. Cimasoni and **R. Delabays**, *The Topological Hypothesis for Discrete Spin Models*, J. Stat. Mech. **2019** (2019). [doi.org/10.1088/1742-5468/ab0c14], [arxiv.org/abs/1811.10263]
- **R. Delabays**, P. Jacquod, and F. Dörfler, *The Kuramoto Model on Oriented and Signed Graphs*, SIAM J. Appl. Dyn. Syst. **18**, 458 (2019). [doi.org/10.1137/18M1203055], [arxiv.org/abs/1807.11410]
- **R. Delabays**, M. Tyloo, and P. Jacquod, *The Size of the Sync Basin Revisited*, Chaos **27**, 103109 (2017). [doi.org/10.1063/1.4986156], [http://arxiv.org/abs/1706.00344]
- T. Coletta, **R. Delabays**, and P. Jacquod, *Finite-size Scaling in the Kuramoto Model*, Phys. Rev. E **95**, 042207 (2017). [doi.org/10.1103/PhysRevE.95.042207], [arxiv.org/abs/1612.07031]
- **R. Delabays**, T. Coletta, and P. Jacquod, *Multistability of Phase-Locking in Equal-Frequency Kuramoto Models on Planar Graphs*, J. Math. Phys. **58**, 032703 (2017). [doi.org/10.1063/1.4978697], [arxiv.org/abs/1609.02359]
- T. Coletta, **R. Delabays**, I. Adagideli, and P. Jacquod, *Topologically Protected Loop Flows in High Voltage AC Power Grids*, New J. Phys. **18**, 103042 (2016). [doi.org/10.1088/1367-2630/18/10/103042], [arxiv.org/abs/1605.07925]

- **R. Delabays**, T. Coletta, and P. Jacquod, *Multistability of Phase-Locking and Topological Winding Numbers in Locally Coupled Kuramoto Models on Single-Loop Networks*, J. Math. Phys. **57**, 032701 (2016). [doi.org/10.1063/1.4943296], [arxiv.org/abs/1512.04266]

## Publications in peer-reviewed conference proceedings

- **R. Delabays** and M. Tyloo, *Network Inference using Sinusoidal Probing*, IFAC-PaperOnLine **54**, 696 (2021). [doi.org/10.1016/j.ifacol.2021.06.131], [arxiv.org/abs/2002.00490]
- T. Coletta, **R. Delabays**, L. Pagnier, and P. Jacquod, *Large Electric Load Fluctuations in Energy-efficient Buildings and how to Suppress them with Demand Side Management*, IEEE PES ISGT Conf. Europe (2016). [doi.org/10.1109/ISGTEurope.2016.7856328], [tinyurl.com/yd59ym5w]

## Softwares

- **R. Delabays**, *ADGenerator: Authors Distribution Generator (v1.0)*. Zenodo (2022). [doi.org/10.5281/zenodo.6030303]
- **R. Delabays**, *DFNSolver: Dissipative Flow Networks Solver (v1.1)*. Zenodo (2022). [doi.org/10.5281/zenodo.5899408]

## Conferences

All slides and posters can be found on www.delabaysrobin.site.

**Oct. 25 – 29, 2021** Conference on Complex Systems 2021, Lyon, France.
**Oral presentation**: *Flow Network Problems on the n-torus with Asymmetric Couplings.*

**Jul. 5 – 10, 2021** Networks 2021, Online.
**Oral presentation**: *Reconstructing Network Structures from Partial Measurements.*

**Jan. 11 – 15, 2021** Grid Science Conference, Online.
**Poster**: *Reconstructing Network Structure from Partial Measurements.*

**Nov. 4 – 8, 2019** Network Dynamics in the Social, Economic, and Financial Sciences, Torino, Italy.
**Oral presentation**: *Robustness of Elections Results Against External Influence.*

**Sep. 23 – 26, 2019** International Workshop on Complex Systems and Networks 2019, Berlin, Germany.
**Oral presentation**: *Rate of Change of Frequency under Line Contingencies.*

**Feb. 3 – 8, 2019** Future Electric Power Systems, Champéry, Switzerland.
**Poster**: *Bounding the Desynchronization Time in Electrical Grids under Fluctuating Sources.*

**Jan. 18, 2019** CCDC Seminar, UC Santa Barbara (CA), USA.
**Oral presentation**: *Bounding the Destabilization Time in Networks of Coupled Noisy Oscillators.*

**Jan. 7 – 11, 2019** Grid Science Conference, Santa Fe (NM), USA.
**Poster**: *Bounding the Desynchronization Time in Electrical Grids under Fluctuating Sources.*

**Sep. 3 – 7, 2018** Dynamics Days Europe, Loughborough, United Kingdom.
**Oral presentation**: *Multistability in Electric Power Grids on Meshed, Complex Networks.*

**Jan. 29 – 31, 2018** 661. WE-Hereaus Seminar, Bad Honnef, Germany.
**Poster**: *The Size of the Sync Basin Revisited.*

**Sep. 3 – 8, 2017** International School on Energy Systems, Kloster Seeon, Germany.
**Poster**: *Topologically Protected Loop Flows in High Voltage AC Power Grids.*

**Feb. 5 – 9, 2017** Future Electric Power Systems, Champéry, Switzerland.
**Oral presentation**: *Loop Flows and the Number of Power Flow Solutions in Meshed Electric Power Grids.*

**Jan. 8 – 13, 2017** Grid Science Conference, Santa Fe (NM), USA.
**Poster**: *Multistability of Phase-Locking and Vortices in Locally Coupled Kuramoto Models.*

**Jun. 6 – 10, 2016** Dynamics Days, Corfu, Greece.
**Oral presentation**: *Multistability of Phase-Locking and Topological Winding Numbers in Locally Coupled Kuramoto Models.*

## Outreach activities

**Apr. 4 – 5, 2019** Journées Culturelles de la Planta, Sion, Switzerland.
**Lecture course to high school students**: *Les statistiques comme outil de manipulation... Comment tricher sans mentir ?.*

**Mar. 30, 2017** Journées Culturelles de la Planta, Sion, Switzerland.
**Lecture course to high school students**: *La Transition Énergétique.*