

## CURRICULUM VITAE – DAMIEN RONTANI

### Contact Information

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### Areas of Interest

Nonlinear dynamics, complex networks, time-delayed systems, chaos theory and analysis of complexity, time series analysis, neuronal dynamics and applications, experimental physics of collective phenomena (synchronization, patterns, phase transitions), nonlinear photonics and dynamics of semiconductor lasers (quantum dots lasers, VCSELs), information theory and cryptography, random number generation, stochastic dynamics, generation of ultra-pure microwave using optoelectronic systems, nonlinear systems and advanced control strategies, nonlinear dynamics for computation (reservoir computing) and ultra-sensitive sensors, extreme events.

### Education

- 2013-2011: **Postdoctoral training** in applied Physics  
*Duke University, USA*
- 2011-2006: **PhD** in Electrical and Computer Engineering  
*Georgia Institute of Technology, USA*  
**PhD** in Applied Physics  
*Supélec (University of Paris-Saclay), France EU*
- 2006-2005: **MSc** in System and Control  
*Supélec (University of Paris-Saclay), France EU*
- 2005-2001: **MSc** in Electrical and Computer Engineering  
*Georgia Institute of Technology, France EU*
- BSc** and **MSc** in Electrical Engineering  
*Supélec (University of Paris-Saclay), France EU*

### Appointments

2013-to date: Assistant professor at Supélec (on the satellite campus in Metz)

2013-2011: Postdoctoral fellow in the physics department at Duke University. Topic: Analysis and design of large-scale complex networks on a reconfigurable microchip for novel information processing application. Mentor: Pr. Daniel J. Gauthier

2006-2011: Graduate research assistant at Georgia Institute of Technology and Supélec. Topic: Nonlinear dynamics of complex optoelectronic components with application for cryptography and multiplexing. Mentors: Pr. David S. Citrin and Pr. Marc Sciamanna.

## **Teaching**

2013 – to date: Courses taught at Supélec: Computational methods for nonlinear photonics (Graduate level). Digital signal processing (undergraduate level). Linear systems and control (undergraduate level).

2013 – to date: Laboratory teaching assistant at the undergraduate level: for digital signal processing and power engineering.

2013 – to date: Special problems in electrical and computer engineering at the graduate and undergraduate level.

## **Honors and Awards**

2006: Fellowship from Fondation Supélec

2007: Graduate Research Fellowship from Conseil Régional de Lorraine

2011: Publication award from Fondation Supélec

## **Professional Services**

Referee activity for Optics Letters, Optics Express, Journal of the Optical Society of America B, Optics Communication, IEEE Journal of Quantum Electronics, IEEE Photonic Technology letters, Europhysics Letters. Physics Letters A, IEEE Journal of Lightwave Technology, Photonics Technology Letters.

Chair for Special Session “Synchronization and Communication” at International Symposium on Nonlinear Theory and its Applications, NOLTA'12, Palma de Mallorca, Spain, 22-26 October 2012.

## Publications

- [1] **D. Rontani**, A. Locquet, M. Sciamanna, D.S. Citrin, “Loss of time-delay signature in the chaotic output of a semiconductor laser with optical feedback,” *Opt. Lett.* **32**, 2960-2962 (2007).
- [2] **D. Rontani**, A. Locquet, M. Sciamanna, D.S. Citrin and S. Ortin, “Time delay identification in the chaotic output of a semiconductor laser with optical feedback: A dynamical point of view,” *IEEE J. Quantum Electron.* **45**, 879-891 (2009).
- [3] **D. Rontani**, M. Sciamanna, A. Locquet and D.S. Citrin “Multiplexed encryption using chaotic systems with multiple stochastic-delayed feedbacks,” *Phys. Rev. E* **80**, 066209 (2009).
- [4] **D. Rontani**, A. Locquet, M. Sciamanna and D.S. Citrin. “Spectrally efficient multiplexing of chaotic light”, *Opt. Lett.* **35**, 2016-2018 (2010).
- [5] **D. Rontani**, A. Locquet, M. Sciamanna, D.S. Citrin and A. Uchida, “Generation of orthogonal codes using chaotic optical systems,” *Opt. Lett.* **36**, 2287-2289 (2011).
- [6] D. P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, “Excitability in autonomous Boolean networks,” *Europhys. Lett.* **100**, 30003 (2012)
- [7] S. D. Cohen, **D. Rontani**, and D. J. Gauthier, “Ultra-high-frequency piecewise-linear chaos using delayed feedback loops” *Chaos* **22**, 043112 (2012).
- [8] D. P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, “Control of synchronization patterns in neural-like Boolean networks,” *Phys. Rev. Lett.* **110**, 104102 (2013).
- [9] D. P. Rosin, **D. Rontani**, D. J. Gauthier, “Ultrafast physical generation of random numbers using hybrid Boolean networks,” *Phys. Rev. E* **87**, 040902(R) (2013).
- [10] D. P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, “Experiments on autonomous Boolean networks,” *Chaos* **23**, 025102 (2013).
- [11] S. D. Cohen, A. Aragonese, **D. Rontani**, M. C. Torrent, C. Masoller and D. J. Gauthier, “Multidimensional subwavelength position sensing using a semiconductor laser with optical feedback”, *Opt. Lett.* **38**, 4331 (2013)
- [12] D. P. Rosin, **D. Rontani**, and D. J. Gauthier, “Synchronization of Coupled Boolean Phase Oscillators”, *Phys. Rev. E* **89**, 042907 (2014)
- [13] D.P. Rosin, **D. Rontani**, N. Haynes, E. Schöll, and D.J. Gauthier, “Transient scaling and resurgence of chimera states in networks of Boolean phase oscillators.” *Accepted for publication in Phys. Rev. E Rapid Comm.*

## Conferences

[]\* : oral presentation - []† : invited talk

[1]\* **D. Rontani** and H. Siguerdidjane, “Robust flatness based control and motion planning of a micro-UAV,” Oral presentation at 17th IFAC Symposium on Automatic Control in Aerospace, Toulouse, France, 2007.

[2] **D. Rontani**, A. Locquet, M. Sciamanna, and D.S. Citrin, “Identification de la valeur du retard d’un laser cavité externe chaotique,” Comptes-rendus de la 11ème Rencontres du Non-linéaire, Paris, France, 2008.

[3]\* **D. Rontani**, A. Locquet, M. Sciamanna, and D.S. Citrin, “Masking the time-delay from the chaotic output of an external-cavity semiconductor laser.” Oral presentation at SPIE Photonics Europe’08 (Semiconductor Lasers and Laser Dynamics III), Strasbourg, France, 2008.

[4] **D. Rontani**, A. Locquet, M. Sciamanna, and D.S. Citrin, “Security analysis of chaotic semiconductor laser with optical feedback.” Poster presented at A Future in Light, Metz, France, 2009.

[5] **D. Rontani**, A. Locquet, M. Sciamanna, and D.S. Citrin, “Multiplexing digital information using hyperchaotic optoelectronic oscillators with nonlinear time-delayed feedback loops.” Poster presented at CLEO’09, Munich, Germany, 2009.

[6]\* **D. Rontani**, A. Locquet, M. Sciamanna, and D.S. Citrin, “Multiplexing information using chaotic oscillators with multiple feedback loops.” Oral presentation at Proceedings of CHAOS’09, Chania, Greece, 2009.

[7] **D. Rontani**, A. Locquet, M. Sciamanna, D.S. Citrin and A. Uchida, “Multiplexed chaos-based communications using stochastic time-delays.” Poster presented at Dynamics Days 2010, Evanston, IL, 4-7 January 2010.

[8]\* **D. Rontani**, A. Locquet, M. Sciamanna and D.S. Citrin, “Multiplexed synchronization of optical chaos using coupled external semiconductor lasers.” Oral presentation at SPIE Photonics Europe (Semiconductor Lasers and Laser Dynamics III), Bruxelles, Belgium, 2010.

[9] **D. Rontani**, D.S. Citrin, A. Locquet and M. Sciamanna, “Multiplexed chaos-based communications with semiconductor lasers.” Poster presented at Dynamics Days South-America, Sao-Jose des Campos, Brazil, 2010.

[10]\* **D. Rontani**, A. Locquet, M. Sciamanna, D.S. Citrin and A. Uchida, “multiple-access optical chaos-based communications using optoelectronic systems.” Oral presentation at CLEO/QELS’10, San-Jose, CA, USA, 2010.

[11]\* **D. Rontani**, A. Locquet, M. Sciamanna, D. S. Citrin and A. Uchida, “Multiplexed communications with chaotic optoelectronic devices.” Oral presentation at International

Symposium on Nonlinear Theory and its Applications NOLTA'11, Kobe, Japon, 4-7 September 2011.

[12] K. Callan, **D. Rontani**, and D. Gauthier, "Time-delay signatures in broadband chaos generated by optoelectronic oscillators." Poster presented at Dynamics Days 2012, Baltimore, MD, USA, 4-7 January 2012.

[13]\* **D. Rontani**, D. P. Rosin, E. Schöll, and D. Gauthier, "Experimental network of excitable time-delayed Boolean system." Oral presentation at Dynamics Days 2012, Baltimore, MD, USA, 4-7 January 2012.

[14]\* D.J. Gauthier, D. P. Rosin, and **D. Rontani**, "Dynamics of autonomous Boolean networks." Oral presentation at Departament de Fisica i Enginyeria Nuclear, Universitat Politecnica de Catalunya, Terrassa, Spain, 22 March 2012.

[15]† **D. Rontani**, D. P. Rosin, and D. J. Gauthier, "Scalable network physics on a chip." Invited Talk at Applied Dynamics Seminar Series, Institute for Research in Electronics and Applied Physics (IREAP), University of Maryland, College Park, MD, USA, 5 April 2012.

[16] D. P. Rosin, **D. Rontani**, D.J. Gauthier, and E. Schöll, "Experiments on large networks of excitable time-delay Boolean circuits." Poster presented at International Conference on Delayed Complex Systems, Palma de Mallorca, Spain, 4-8 June 2012.

[17]\* **D. Rontani**, D. P. Rosin, D. Gauthier, and E. Schöll, "Autonomous time-delayed Boolean networks using FPGAs." Oral presentation at International Symposium on Nonlinear Theory and its Applications NOLTA'12, Palma de Mallorca, Spain, 22-26 October 2012.

[18] K. E. Callan, **D. Rontani**, and D. Gauthier, "Detecting the position and strength of attenuating elements in a small network." Poster presented at Dynamics Days 2013, Denver, CO, USA, 3-6 January 2013.

[19]\* D. P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, "Control of synchronization patterns in neural-like Boolean networks." Oral presentation at Dynamics Days 2013, Denver, CO, USA, 3-6 January 2013.

[20] **D. Rontani**, D. P. Rosin, and D. J. Gauthier, "Experimental Boolean Kuramoto-like oscillators: The hunt for chimera states using reconfigurable chips." Poster presented at Dynamics Days 2013, Denver, CO, USA, 3-6 January 2013.

[21]† D. P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, "Control of synchronization patterns in neural-like Boolean networks." Invited talk at the Center for Complex Network Research (CCNR), Northeastern University, Boston, MA, USA, 28 March 2013.

[22]\* D.P. Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, "Control of synchronization patterns in neural-like Boolean networks," Oral presentation at Dynamics Days Europe 2013, Madrid, Spain, 3-7 May 2013.

[23]\* D.J. Gauthier, D.P. Rosin, and **D. Rontani**, "Tutorial on autonomous time-delay Boolean networks," oral presentation at WISeNet Workshop, Durham, NC, USA, 6 June 2013.

[24]\* **D. Rontani**, S. D. Cohen, A. Aragoneses, C. Masoller, M. C. Torrent, and D. J. Gauthier, "Laser-based dynamical sensor resolving two-dimensional translations at the nanoscale." Oral presentation at International Symposium on Physics and Application of Laser Dynamics IS-PALD 2013, Paris, France, 29-31 October (2013).

[25] **D. Rontani**, D. P. Rosin, and D. J. Gauthier, "Phase synchronization of weakly coupled Boolean oscillators." Poster presented at Dynamics Days 2013, Denver, CO, USA, 3-6 January 2013.

[26] N. D. Haynes, D. P. Rosin, **D. Rontani**, D. J. Gauthier, "Towards reservoir computing with autonomous Boolean networks." Poster presented at Dynamics Days 2014, Atlanta, GA, USA, 2-5 January 2014.

[27]\* D.P.Rosin, **D. Rontani**, D. J. Gauthier, and E. Schöll, "Experimental signatures of chimera states in non-locally coupled Boolean phase oscillators," oral presentation at Dynamics Days 2014, Atlanta, GA, USA, 2-5 January 2014.

[28]\* D. J. Gauthier, D. P. Rosin, **D. Rontani**, and N. D. Haynes, "Dynamics and control of time-delay Boolean networks." Oral presentation at SFB 910 Application of dynamical networks, Berlin, Germany, 20 June 2014.

[29]\* D.J. Gauthier, D.P. Rosin, **D. Rontani**, and N. D. Haynes, "Autonomous Boolean networks for experimental network science and chimera states." Oral presentation at Experimental Chaos and Complexity (ECC) Conference, Aberdeen, Scotland, 27 August, 2014.

[30]\* **D. Rontani**, D. P. Rosin, N. D. Haynes, D. J. Gauthier, and E. Schöll, "Observation of transient nature of chimera states in experimental network of Boolean phase oscillators." Oral presentation at Dynamics Days Europe 2014, Bayreuth, Germany, 4-8 September 2014.

[31]\* **D. Rontani**, S.D. Cohen, A. Aragoneses, C. Masoller, M.C. Torrent, and D.J. Gauthier, "Nanoscale-resolution sensing of two-dimensional translation using complex dynamics of a laser diode," Oral presentation at International Symposium on Nonlinear Theory and its Applications NOLTA'14, Luzern, Switzerland, 14-18 September, 2014.