CV

Alejandro M. YACOMOTTI

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I. General Information

Last Name: YACOMOTTI (scientific); GIACOMOTTI (administration: on ID)
First Name: Alejandro M.
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E-mail: alejandro.giacomotti@c2n.upsaclay.fr
Place and date of birth: Buenos Aires, Argentina; 11/21/1972
Nationality: Argentine.
Marital status: married (two children, Adela and Emilio).

II. University degrees

- **Habilitation à Diriger des Recherches (HDR), Université Paris-Sud, September 2017.** Title: "Non-linear dynamics in active photonic crystals".
- **PhD in Physics, Universidad de Buenos Aires, December 2002**. Title of the thesis: "Optical Excitable Systems". Supervisor: Gabriel Mindlin.
- ***Licenciado en Ciencias Fisicas* (Masters Equivalent)**, Universidad de Buenos Aires, Argentina, August 1998 (Average mark: 9.78 over 10).

III. Professional experience

Research Experience after the PhD thesis

1. **Researcher (*Chargé de Recherche CNRS 1ère classe*), LPN** (since 2011).
2. **Researcher (*Chargé de Recherche CNRS 2ème classe*), LPN** (since November 2006, tenured in November 2007).
3. **Associate Professor (*Maître de conférences*), Université de Rennes 1** (September 2006-October 2006).
4. **Postdoctorate at PHOTONIQ group, Laboratory of Photonics and Nanostructures** –LPN– (Mars 2004-August 2006). « Nonlinear Dyanmics in 2D Photonic Crystals »
5. **Postdoctorate at the Laboratory of Plasma Physics and Technology**, Ecole Polytechnique, (January 2003-Fevruary 2004). «Dynamics of density fluctuations in turbulent flows »

Teaching and Supervision Experience

1. **Supervision of A. Gortari's thesis (2016-)**
2. **Supervision of S. Haddadi's (2011-2014) and M. Brunstein's thesis (2008-2011).**

3. **Co-supervision of Mlle. Moreau's postdoctorate (2008-2010).**
4. **Supervision of Mlle. Sanchez's internship (2010).**
5. **Invited Professor, Physics Department, University of Buenos Aires (Buenos Aires, Argentina)**: "Introduction to Nanophotonics". Level= Marster/PhD. Hours= 50 (November 2014, October 2016).
6. **Teaching Assistant at ENSTA (Paris),** *Introduction to Statistical Physics* (2011 - 2016). Hours = 16 per year.
7. **Teaching Assistant at the Physics Department of the University of Buenos Aires, 1999-2002 (*ayudante de 1a clase*).** Hours= 288. Courses: Waves and Optics (*Fisica 2*), Waves and Optics Laboratory (*Laboratorio 2*), Quantum Physics Laboratory (*Laboratorio 5*).
8. **Teaching Assistant at the Physics Department of the University of Buenos Aires, 1997-1999 (*ayudante de 2a clase*).** Hours= 288 in Thermodynamics and Introduction to Quantum Physics (*Fisica 4*).
9. **Teaching Assistant at the *Ciclo Basico Comun* of the University of Buenos Aires, 1994-1997.** Hours: 800 in Math.

IV. Research contributions

My field of research is **nanophotonics**, with special emphasis in **nonlinear dynamics in active photonic systems**. I have developed strong skills in the realization and analysis of nonlinear dynamical phenomena and ultrafast dynamics in complex optical systems, from lasers (semiconductor, solid state) to nanophotonic devices such as photonic crystals. My research in the last years has focused on fundamental aspects of the nonlinear interaction between light and matter in micro-and nano optical resonators mainly [1,2,4,5], but also on applications in the field of nano bio-photonics such as fluorescence microscopy [3]. My work is currently devoted to the study of nonlinear and quantum phenomena in nanocavity arrays, from small sets of coupled cavities –or photonic molecules– to large cavity networks.

An important contribution of my research is the **first demonstration of excitable neuron-like spiking in a band edge Photonic Crystal** micro-resonator in 2006 [4], and subsequently in a nanocavity in 2011 [2]. This has opened a new avenue to study nonlinear dynamics in nanophotonics on the basis of neuron-like responses of active micro and nano-optical resonators.

In 2014, we demonstrated for the first time **spontaneus symmetry breaking in a nanophotonic molecule**, and the results have been recently published in Nature Photonics [1]. For the first time bifurcation and flip-flop switching has been reported in two coupled nanolasers, with only 100 photons at the symmetry breaking transition.

- **Papers in peer reviewed international journals=43.**
- **Oral presentations in international conferences=62 (29/54 invited).**
- **Selection of five most representative papers in the last 10 years:**

1. M. Marconi, J. Javaloyes, P. Hamel, F. Raineri, G. Beaudoin, I. Sagnes, I., J. A. Levenson and A. M. Yacomotti, *Far-from-equilibrium route to superthermal light in bimodal nanolasers*, Phys. Rev. X **8**, 011013 (2018).
2. M. Marconi, J. Javaloyes, F. Raineri, J. A. Levenson, and A. M. Yacomotti, *Asymmetric mode scattering in strongly coupled photonic crystal nanolasers*, Opt. Lett. **41**, 5628-5631 (2016)

3. P. Hamel, S. Haddadi, F. Raineri, P. Monnier, G. Beaudoin, I. Sagnes, A. Levenson and A. M. Yacomotti, *Spontaneous mirror-symmetry breaking in coupled photonic-crystal nanolasers*, Nature Photon. **9**, 311–315 (2015).
4. M. Brunstein, A. M. Yacomotti, I. Sagnes, F. Raineri, L. Bigot, and J. A. Levenson, *Excitability and self-pulsing in a photonic crystal nanocavity*, Phys. Rev. A **85**, 031803(R) (2012).
5. L. C. Estrada, O. E. Martinez, M. Brunstein, S. Bouchoule, L. Le-Gratiet, A. Talneau, I. Sagnes, P. Monnier, J. A. Levenson, and A. M. Yacomotti, *Small volume excitation and enhancement of dye fluorescence on a 2D photonic crystal surface*, Opt. Express **18**, 3693- 3699 (2010).

V. Collective responsibilities and research management

- **Reviewer for international journals (19):** Laser & Photonics Reviews (1), Nat. Materials (1), Scientific Reports (1), Optics Express (10), Applied Physics Letters (1), The European Physical Journal (2), Journal of Luminescence –Elsevier– (1), Optics Communications –Elsevier– (1), Journal of the Optical Society of America A (1).
- **Reviewer for national journals (1):** Comtes Rendus Physique, Académie des sciences, numéro spécial: Slow-light: Fascinating physics or potential applications? (1).
- **Conference organization and technical committees (6):** "Nonequilibrium systems, active and driven nonlinear photonic structures", in OSA Nonlinear Photonics 2018 (Zurich); "EF - Nonlinear Phenomena, Dynamics and Self-Organization", in CLEO-EQEC 2017 (Munich); "Photonic Crystal Materials and Devices", in SPIE Europe 12, 16-19 Avril 2012 (Bruxelles); "Fifth Rio de la Plata Workshop on Laser Dynamics and Nonlinear Photonics", Colonia, Uruguay (December 6-9, 2011) ; "Sixth Rio de la Plata Workshop on Laser Dynamics and Nonlinear Photonics", Montevideo, Uruguay (December 9-12, 2013); "Photonic Crystal Materials and Devices" section in SPIE Europe 08, 7−11 April 2008 (Strasbourg).
- **Participation in evaluation committees (3)** MCF : MCF557 (Université Paris 11) et MCF10 (Ecole Centrale de Lyon) en 2010; MCF4158 (Université de Nice-Sophia Antipolis) en 2013.
- **Participation in jury of thesis (6):** T. Wang, Université de Sophia-Antipolis (2016); T. Amaral Sorrentino, Universitat Politéctinca de Catalunya (2015); T. Van Vaerenbergh, Ghent University (2014); M. Tucconi, Institut Non-Linéaire de Nice (2013); O. Sanchez, Universidad de Sevilla, Séville, Espagne (2011); N. Marsal, Université de Metz et Supélec, Metz (2010).
- **Funding (national contracts) during 2009-2018 (8, 1 as PI):**
  - Program ANR PRC (2016). Applicant: A. M. Giacomotti, Project: UNIC. Partners: LKB (Paris), MPQ (Paris).
  - Program ANR Blanc (2012). Applicant: G. Millot, Project: OptiRoc. Partners: ICB (Dijon), Femto-ST (Besancon), PhLAM (Lille), INLN (Nice).
  - Program *ANR Blanc* (2010). Applicant: K. Bencheikh. Project: CALIN. Partners: Lab. Charles Fabry (Institut d'Optique), Institut Langevin, Laboratoire FOTON (Lannion).
  - Program *ANR Blanc* (2010). Applicant: A. Fischer et A. Boudrioua (Equipe LUMEN, Laboratoire de physique des lasers LPL, Université de Villetaneuse). Project: OLED. Partners: LPN, LPICM (Ecole Polytechnique).

- Investing Funding 2010 CNANO Ile−de−France. Project: ConPhocal. Applicant: A. Giacomotti. Partners: Groupe de Complexes Moléculaires en Cellules Vivantes, Institut Jacques Monod.
- Investing Funding 2009 CNANO Ile−de−France. Project: LUMINCP. Applicant: K. Bencheik. Partners: Lab. Charles Fabry (Institut d'Optique), Institut Langevin.

- **Funding (international contracts) during 2009-2018 (4):**

  - European Project (ICT) "FunCOMP" (2017)
  - Marie Skłodowska-Curie International Training Network (ITN) "Be-Optical" (2015).
  - Convention of Exchange Project CNRS-CONICET –Argentine– (2009-2010). Project N°: 2282. Applicant: A. Giacomotti. Partners: Laboratory of Quantum Electronics, LEC-UBA (Argentina).
  - Small or medium−scale focused research project –STREP– (2008-2011). Project: HISTORIC (N°: 223876).

VI. Language skills

- English. TOEFL (Test of English as a Foreign Language), score: 260 Computer Adaptive (equivalent to 620 paper-based).
- French (understand/speak/read).
- Spanish (native).