

Johann Berthelot

Curriculum Vitae

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Current Position: Marie Curie Fellow at Institut Fresnel, Marseille (France)

Research Experience

- Nov 2015 **Postdoctoral Researcher**, *Institut Fresnel*,
- –Aug 2018 **Research advisors:** *Dr. J. Wenger and Dr. N. Bonod*, Marseille (France).
Research projects :- Fluorescence in Plasmonic Nanotraps
- Marie Curie Project: SMART LANLIGHT
- Nov 2011 **Postdoctoral Researcher**, *ICFO – The Institute of Photonic Sciences*,
- –Oct 2015 **Research advisor:** *Prof. Romain Quidant*, Castelldefels (Spain).
Research projects :- Molecular Nano-tweezers (Nov 11-Jun 13)
- Optomechanics with levitated nanoparticles (Jun 13-Oct 2015)
- Oct 2008 **PhD student**, *Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB)*,
- –Oct 2011 **Thesis advisor:** *Dr. Alexandre Bouhelier*, Dijon.
PhD title: "Control of optical antennas with an electrical command: Plasmonic tuner and transduction."

Research Grant(s), Prizes and Awards

- Sept 2016 **Marie Curie Fellowship**, *Institut Fresnel*, Marseille (France).
- –Aug 2018 Project: SMART LANLIGHT
- 2016 **Young Researcher Award of Marseille city**, Marseille (France).

Academic Qualification

- 2008–2011 **Doctorat mention physique**, *Université de Bourgogne*, Dijon.
- 2006–2008 **Master Nanosciences**, *Université Paul Sabatier*, Toulouse.
- 2003–2006 **Licence Physique fondamentale**, *Université Paul Sabatier*, Toulouse.
- Jun 2003 **Baccalauréat générale, série scientifique**, *Lycée Clément Marot*, Cahors.

Patents

- submitted 30/10/2017 "Dispositif de dépôt de particules chargées"

Experimental and Computational Skills

- **Characterizations:** Conception and development of home made complex optical setups, *Optical characterizations (confocal, fluorescence, dark-field spectroscopy, non-linear optics, leakage radiation)*, Scanning probes microscopies (AFM, STM, PSTM, Shear force), Electrical measurements of nanocomponents (tunnel current, first and second differential conductance), Optical trapping in all environments (air, liquid, vacuum), Conception and development of radio-frequency traps (Paul traps) in air and vacuum, Acoustic trapping in air.
- **Nano/microfabrication:** Clean room experience, Electron beam lithography, Focused Ion beam, Reactive ion etching, UV lithography, Laser writer, Thin film deposition (plasma, electron beam, thermal, ion assisted), atomic layer deposition (ALD), Microfluidics, 3D printing, 3D scanning.
- **Programmation:** Matlab, C, Comsol, Python, Labview, Arduino, Redpitaya, 3D imaging (Cinema 4D, Povray).

Other

- Supervision of 3 PhD students and 3 master students
- Reviewer for Applied Physics Letters, Scientific Reports, ACS photonics and Optics Express
- Expert for The French National Research Agency (ANR) in 2015 and 2016.
- Member of the Laboratory Council of Institut Fresnel(2017-Now)
- Volunteer fireman since 11 years, grade Sergeant chief

References

- Dr. Alexandre Bouhelier (Thesis Supervisor)
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- Prof. Romain Quidant
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- Dr. Jérôme Wenger
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Journal Publications

21. Valeria Rodriguez-Fajardo, Vanesa Sanz, Ignacio de Miguel, *Johann Berthelot*, Srdjan S. Acimovic, Rafael Porcar-Guezenc, and Romain Quidant, “*Two-Color Dark-Field (TCDF) microscopy for metal nanoparticles imaging inside cells*”, *Nanoscale*, **10**, 4019-4027 (2018).
Contribution: Supervision in the development development and alignment of the optical setup. Fabrication of microfluidic cells. SEM observations.
20. Martin Sozet, Stéphane Bouillet, *Johann Berthelot*, Jérôme Neauport, Laurent Lamaignère, and Laurent Gallais, “*Picosecond laser damage growth on high reflective coatings for high power applications.*”, *Optics Express*, **25**(21), 25767-25781 (2017)
Contribution: Fabrication of Engineered structured on multilayers films with FIB.
19. Ana Luisa Neves, Nicolas Cochinaire, Thibaut Letertre, Redha Abdeddaïm, Stefan Enoch, Jérôme Wenger, *Johann Berthelot*, Anne-Lise Adenot-Engelvin, Nicolas Malléjac, Franck Mauconduit, Lisa Leroi, Alexandre Vignaud, and Pierre Sabouroux, “*Compressed perovskite aqueous mixtures near their phase transitions show unprecedented maximized permittivities: new prospects for high field mri dielectric shimming.*”, *Magnetic Resonance in Medicine*, **76**,1951 (2017)
Contribution: Fabrication and design of 3D plastic structures.
18. Thomas Wood, Meher Naffouti, *Johann Berthelot*, Thomas David, Jean-Benoît Claude, Léo Métayer, Anne Delobbe, Luc Favre, Antoine Ronda, Isabelle Berbezier, Nicolas Bonod, and Marco Abbarchia , “*All-dielectric colour filters using sige-based mie resonator arrays.*”, *ACS Photonics*, **4**, 873-883 (2017)
Contribution: Development of the optical setup for the measurements.
17. Irene Alda, *Johann Berthelot*, Raul A. Rica and Romain Quidant, “*Manipulation of a single nanoparticle with a Point Paul trap*”, *Applied Physics Letter*, **109**, 163105 (2016) .
16. Raju Regmi, *Johann Berthelot*, Pamina M. Winkler, Mathieu Mivelle, Julien Proust, Frédéric Bedu, Igor Ozerov, Thomas Begou, Julien Lumeau, Hervé Rigneault, María F. García-Parajó, Sébastien Bidault, Jérôme Wenger and Nicolas Bonod, “*All-dielectric silicon nanogap antennas to enhance the fluorescence of single molecules*”, *Nano letters*, **16** (8), 5143–5151 (2016).
15. Pau Mestres, *Johann Berthelot*, Srdjan S. Acimovic and Romain Quidant, “*Unravelling the optomechanical nature of plasmonic trapping*”, *Light science and applications*, **5**:e16092 (2016).
14. Pau Mestres, *Johann Berthelot*, Marko Spasenović, Jan Gieseler, Lukas Novotny and Romain Quidant, “*Cooling and Manipulation of a levitated nanoparticle with an optical fiber trap*”, *Applied Physics Letter*, **107**, 189901 (2015).
13. Mickael Buret, Jean Dellinger, Alexander V. Uskov, Nicolas Cazier, Marie-Maxime Mennemanteuil, *Johann Berthelot*, Igor V. Smetanin, Igor E. Protsenko, Gérard Colas-des-Francis, and Alexandre Bouhelier, “*Spontaneous hot-electron light emission from electron-fed optical antennas*”, *Nano Letters*, **14** (5), 2330-2338 (2014).
Contribution: Started the experiment during my PhD and obtained the preliminary results.
12. S. S. Acimovic, M. A. Ortega, V. Sanz, *J. Berthelot*, J. L. Garcia-Cordero, J. Renger, S. J. Maerkl, M. P. Kreuzer and R. Quidant, “*Multiplexed LSPR Chip for Rapid and Sensitive Detection of Cancer Markers in Serum*”, *Nano Letters*, **14** (5), 636-2641 (2014)
Contribution: Development of the optical setup and programming of the labview acquisition interface.
11. Arnaud Stolz, *Johann Berthelot*, Marie-Maxime Mennemanteuil, Gérard Colas des Francis, Laurent Markey, Vincent Meunier and Alexandre Bouhelier, “*Nonlinear Photon-Assisted Tunneling Transport in Optical Gap Antennas*”, *Nano Letters*, **14** (5), 2330-2338 (2014).
10. *J. Berthelot*, S. S. Acimovic, M. L. Juan, M. P. Kreuzer, J. Renger and R. Quidant, “*Three-dimensional manipulation with scanning near-field optical nanotweezers*”, *Nature Nanotechnology* **9**, 295-299 (2014).
[Highlights in News and Views Nature Nanotechnology 9, 252-253\(2014\)](#)/ [Highlights in Scientific American june 2014](#)/
[Highlights in Investigación y Ciencia june 2014](#)

9. Padmnabh Rai, Nicolai Hartmann, *Johann Berthelot*, Juan-Miguel Arocas, Gérard Colas des Francs, Achim Hartschuh, and Alexandre Bouhelier, "*Electrically Generated Surface Plasmons by Electroluminescent Carbon Nanotube Field Effect Transistor*", Physical Review Letters **111**, 026804 (2013).
Contribution: Collaborative work.
8. Mingxia Song, Aniket Thete, *Johann Berthelot*, Qiang Fu, Douguo Zhang, Gérard Colas des Francs, Erik Dujardin and Alexandre Bouhelier, "*Limits of plasmonic circuitry: Synchronous recording of electron transport and plasmon propagation in crystalline metal nanowires*", Nanotechnology **24**, 095201 (2013).
Contribution: Collaborative work.
7. Padmnabh Rai, Nicolai Hartmann, *Johann Berthelot*, Gérard Colas des Francs, Achim Hartschuh and Alexandre Bouhelier, "*In-plane remote optical excitation of semiconducting single-walled carbon nanotube by propagating surface plasmon*", Optics letters **37**, 4711-4713 (2012).
Contribution: Collaborative work.
6. *Johann Berthelot*, Guillaume Bachelier, Mingxia Song, Padmnabh Rai, Gérard Colas des Francs, Alain Dereux and Alexandre Bouhelier, "*Tailored second harmonic generation in strongly coupled optical gap antennas*", Optics Express **20**, 10498(2012).
5. *J. Berthelot*, F. Tantussi, P. Rai, G. Colas des Francs, J.-C. Weeber, A. Dereux, F. Fuso, M. Allegrini and A. Bouhelier, "*Determinant role of the edges in defining surface plasmon propagation in stripe waveguides and tapered concentrators*", Journal of the Optical Society of America B **29**, 226(2012).
4. Nicolai Hartmann, Giovanni Piredda, *Johann Berthelot*, Gérard Colas des Francs, Alexandre Bouhelier, and Achim Hartschuh, "*Launching Propagating Surface Plasmon Polaritons by a Single Carbon Nanotube Dipolar Emitter*", Nano Letters **12**, 177 (2012)
Contribution: Sample fabrication.
3. *Johann Berthelot*, Alexandre Bouhelier, Gérard Colas des Francs, Jean-Claude Weeber and Alain Dereux, "*Excitation of a one-dimensional evanescent wave by conical edge diffraction of surface plasmon*", Optics Express **19**, 5303 (2011)
2. C. Huang, A. Bouhelier, *J. Berthelot*, G. Colas des Francs, E. Finot, J.-C. Weeber, A. Dereux, S. Kostcheev, A.-L. Baudrion, J. Plain, R. Bachelot, P. Royer, and G. P. Wiederrecht, "*External control of the scattering properties of a single optical nanoantenna*", Applied Physics Letters **96**, 143116 (2010)
Contributions: Measurements and data analysis.
1. *Johann Berthelot*, Alexandre Bouhelier, Caijin Huang, Jérémie Margueritat, Gérard Colas des Francs, Eric Finot, Jean-Claude Weeber, Alain Dereux, Sergei Kostcheev, Hicham Ibn El Ahrach, Anne-Laure Baudrion, Jérôme Plain, Renaud Bachelot, Pascal Royer, Gary P. Wiederrecht, "*Tuning of an Optical Dimer Nanoantenna by Electrically Controlling Its Load Impedance*", Nano Letters **9**, 3914-3921 (2009)
[Highlights in Nature Photonics 4, 6-7 \(2010\)](#)

Conference Proceedings

6. L. Gallais, A. Ollé, M. Sozet, *J. Berthelot*, S. Monneret, J. Néauport, L. Lamaignère, "*Time-resolved microscopy studies of laser damage dynamics at 0.5-1ps 1030nm*", SPIE Laser Damage, 12/2016
5. Pau Mestres Junque, *Johann Berthelot*, Romain Quidant, Srdjan Acimovic, "*Optomechanical Plasmonic Trapping*", CLEO QELS Fundamental Science, 01/2016
4. M.L. Juan, C. Bradac, Benjamin Besga, *J. Berthelot*, R. Quidant, G. Molina-Terriza, and T. Volz, "*Ultra Manipulation: Taking Advantage of Both Conventional Tweezers and Atom Optical Manipulation*", European Quantum Electronics Conference, 2015
3. *Johann Berthelot*, Srdjan Acimovic, Mathieu Juan, Mark Kreuzer, Jan Renger, Romain Quidant, "*3D Optical Manipulation of a single 50 nm particle with a scanning evanescent nano-tweezers*", CLEO QELS Fundamental Science, 06/2014
2. N. Hartmann, P. Vasanthakumar, A. Bouhelier, M. Cortelezzi, *J. Berthelot*, F. Fuso, M. Allegrini, F. Tantussi, A. Hartschuh, "*Launching Surface Plasmons by Carbon Nanotube Photoluminescence*", The 5th International Conference on Surface Plasmon Photonics ,2011

1. Francesco Tantussi, Michele Cortellezzi, Francesco Fuso, Maria Allegrini, *Johann Berthelot*, Alexandre Bouhelier, "Mapping surface plasmon propagation by collection-mode near-field microscopy", *Frontiers in Optics 2011/Laser Science XXVII*, 01/2011

Scientific communications

Conferences (Invited)

5. **JMC 15, mini colloque Optomechanics**, "Optomechanics with plasmonic trapping", 22-25 Aug. 2016, Bordeaux (France).
4. **Optique Bretagne 2015**, "Plasmonics tweezers", 06-09 Jul. 2015, Rennes (France).
3. **Journées thématiques GT2-GT5**, "Plasmonic optical nano-tweezers", 12-13 Jan. 2015, Dijon (France).
2. **Workshop Optical Manipulation of Nano-Objects (OMNO 2014)**, "3D optical manipulation with plasmonic nanotweezers", 15 Dec. 2014, Paris (France).
1. **CLEO:2014**, "3D Optical Manipulation of a single 50 nm particle with a scanning evanescent nano-tweezers", 8 Jun. - 13 Jun. 2014, San Jose (USA).

Conferences (Contributed)

10. **META16**, "Unravelling the optomechanical nature of plasmonic trapping", 25-28 Jul. 2016, Malaga (Spain).
9. **META15**, "3D manipulation with plasmonic nanotweezers", 04-07 Aug. 2015, New-York (USA).
8. **Forum des microscopies à sonde locale**, "Manipulation 3D avec des nanopinces plasmoniques", 16-20 Mar. 2015, Troyes (France).
7. **Thirteen International Conference in Near-Field Optics (NFO-13)**, "Optical trapping and 3D manipulation with nanotweezers", 31 Aug. - 4 Sept. 2014, Salt Lake city (USA).
6. **Condensed matter in Paris 2014**, "Optical trapping and 3D manipulation with nanotweezers", 24 Aug. - 29 Aug. 2014, Paris (France).
5. **Twelve International Conference in Near-Field Optics (NFO-12)**, "Silencing second harmonic in coupled nano antennas", 3 Sept. - 7 Sept. 2012, San Sebastian (Spain).
4. **Eleven International Conference in Near-Field Optics (NFO-11)**, "Conical diffraction of surface plasmon: one dimensional evanescent wave", 29 Aug. - 2 Sept. 2010, Beijing (China).
3. **Eleven International Conference in Near-Field Optics (NFO-11)**, "External control of individual optical antenna: the optical tuner", 29 Aug. - 2 Sept. 2010, Beijing (China).
2. **Meeting Micro, Nano-structures and Devices for optical micro-waves GT2**, "Contrôle électrique d'une antenne optique", 11-12 Mai 2010, Lille (France).
1. **Gold/Nano Meeting GDR**, "Contrôle électrique d'une antenne optique unique", 3-5 Nov. 2009, Dijon (France).

Invited Seminars

- **Institut Lumière Matière (ILM)**, "Contrôle électrique d'une antenne optique et Nano-pinces plasmoniques", 20 Mar. 2015, Lyon (France).
- **Macquarie University**, "Electrical control of optical antenna and optical nanotweezers", 27 Nov. 2014, Sydney (Australia).
- **Chalmers institute of Technology**, "Electrical control of optical antenna and optical nanotweezers", 13 Aug. 2014, Göteborg (Sweden).
- **MacDiarmid Institute: Plasmonics Meeting**, "Electrical Control of optical antennas", 19 Mai 2011, Wellington (New-Zealand).