

Personal

Full Professor and head of the “Photonic Nanosystems” group.

Physics Department & Fribourg Center for Nanomaterials, Fribourg University, CH-1700, Switzerland.

Tel: +41 26 300 90 30

Email: guillermo.acuna@unifr.ch

Researcher Identifier: L-8169-2016 (Research ID), 23484337600 (Scopus AuthorID), Guillermo P. Acuna (Google Scholar)

Nationality: Argentinean and Italian citizenship, born 08.05.1980 in Buenos Aires (Argentina), married.

Education

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| 05/10 | PhD in Physics, Ludwig-Maximilians-Universität, München. Thesis: Far field and near field THz spectroscopy on parabolic quantum wells. PhD advisor: Prof. Dr. Roland Kersting |
| 10/05 | Diploma in Physics, Universidad de Buenos Aires, Buenos Aires, Argentina. Overall average 8.81/10. Thesis: Calculation of factors that affect the production and trajectory of convoy electrons. Thesis advisor: Prof. Dr. Jorge Miraglia. |
| 03/00 –10/05 | Studies in Physics, Universidad de Buenos Aires, Buenos Aires, Argentina. |

Employment history

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| since 09/18 | Full Professor in Experimental Physics, Chair “Photonic Nanosystems”, Department of Physics, University of Fribourg, Switzerland. |
| 06/18-08/18 | Full Professor (W3), Institute of Physics, Faculty of Mathematics and Natural Sciences, University of Rostock, Rostock, Germany. |
| 01/17-05/18 | Bioapplications Group Leader at LENA (Laboratory for Emerging Nanometrology). Quanomet, a research alliance between the Technische Universität Braunschweig and the Leibniz Universität Hannover, Germany. |
| 07/16-08/16 | Visiting Scholar, University of California, Los Angeles, USA. |
| 09/14-11/16 | Visiting Scholar, University of Buenos Aires, Buenos Aires, Argentina. |
| 01/11-12/16 | Junior Research Group Leader. Institute of physical and theoretical chemistry, associated to the chair of NanoBioSciences (Prof. Philip Tinnefeld), Technical University of Braunschweig, Germany. |
| 03/10-12/10 | Research Assistant (Postdoc). Chair for biophysics and molecular materials (Prof. Herman Gaub and Prof. Philip Tinnefeld) , Ludwig-Maximilians-Universität München (LMU), Germany. |

Approved Research Projects

- “Single molecule fluorescence enhancement with self-assembled nanoantennas”, G.P. Acuna and P. Tinnefeld, funded by the DFG (German Science Foundation) (2015). Duration 3 years, 0.2 M€.
- “Towards the development of next generation cellphone-based point-of-care diagnostic platforms”, G. P. Acuna, funded by the DFG (German Science Foundation) (2015). Duration 2 Months, 20 k€
- “Milstein Research Fellow” to establish and develop cooperations with Prof. Dr. Fernando Stefani, Buenos Aires, Argentina, funded by the CONICET (Argentinean Science Foundation (2014). Duration 3 Months, 10 k€.

Supervision of junior researchers

Research stays Ms. Pellegrotti and Ms. Zaza (both DAAD exchange program for PhD students)

Post-doc	Dr. Vietz and Dr. Pibiri
PhD	Co-supervision with Prof. Tinnefeld of Ms. Wünsch, Ms. Puchkova, Ms. Vietz, Mr. Pibiri, Mr. Bohlen and Ms. Hübner
Diploma	Mr. Pibiri, Mr. Nitsche, Mr. Kuchler, Mr. Handloser and Ms. Bucher
Masters	Ms. Möller winner of the attocube Research Award for the best master thesis in 2013 and Ms Sanz

Teaching activities

10/17	Visiting Professor , Buenos Aires University. Buenos Aires, Argentina. Lecture: Self-assembled structures for plasmonic applications.
01/11-03/18	Teaching assistant (Habilitation) , Technical University of Braunschweig. Braunschweig, Germany. Lecture: Physical Chemistry I (Thermodynamics), shared with Prof. Tinnefeld. Lecture: Advanced Physical Chemistry - NanoBioSciences (advance lecture for master students), shared with Prof. Tinnefeld.

Individual Scientific Reviewing Activities

Since 2010 Reviewer for several journals including Nanoletters, ACS Nano, ACS Photonics, Angewandte Chemie, Nanoscale, Nanotechnology, Langmuir, The Journal of Physical Chemistry. Reviewer of grant applications for several science foundations (Germany, The Netherlands, Poland).

Organization of Conferences

"2nd International Symposium on Integration of Molecular Components in Functional Macroscopic Systems", financed by the Volkswagen Stiftung, Hannover, Germany. Beca

Prizes, awards and fellowships

- Bio-Gründer Competition (2015), G.P. Acuna, P. Tinnefeld, B. Lalkens, C. Vietz and S. Roussel. Second Prize for the "The Nano-lab" project awarded by Bio-Security Management GmbH.
- CENS publication award (2012) for G.P. Acuna, M. Bucher, I.H. Stein, C. Steinhauer, A. Kuzyk, P. Holzmeister, R. Schreiber, A. Moroz, F.D. Stefani, T. Liedl, F.C. Simmel, P. Tinnefeld, "Distance dependence of Single-Fluorophore Quenching by Gold Nanoparticles studied on DNA Origami", ACS Nano, 6, pp. 3189-3195 (2012).
- CENS publication award (2013), S. F. Heucke, F. Baumann, G.P. Acuna, P. M. Severin, S. W. Stahl, M. Strackharn, I. Stein, P. Altpeter, P. Tinnefeld, H. E. Gaub, "Placing individual molecules in the center of nanoapertures", Nano Letters, 14, pp. 391-395 (2013).
- Fellowship "Beca Estímulo", Awarded by the "Universidad de Buenos Aires", Argentina, for the most outstanding students of the class of 2004, (2004).

Oral contributions to international conferences

The following list only includes *keynote* and *invited* contributions.

- "Optical antennas for the development of smartphone based point of care devices with single molecule sensitivity." **EnFI 2018: 11th International Workshop on Engineering of Functional Interfaces**, Lutherstadt Wittenberg, Germany (2018).
- "DNA Origami Nanophotonics: broadband fluorescence enhancement, plasmonic assisted FRET and tailoring the emission pattern of dyes." **DINAMO: Discussions on Nano and Mesoscopic Optics**, Siglufjörður, Iceland (2017).

- “Building nanolenses and plasmonic applications with DNA Origami: how to fold DNA into nanostructures.” *Nano 2016*, Buenos Aires, Argentina (2016).
- “DNA Origami for plasmonics and fluorescence applications.” *Quantum Materials Seminar Series*, New York City, USA (2016).
- “Bottlenecks of Superresolution: Photobleaching, Brightness, and Switching.” *Novel Probes for Fluorescence Microscopy*, Göttingen, Germany (2015).
- “Manipulating molecular fluorescence with DNA origami based optical antennas.” *EMN Meeting on DNA & RNA*, Istanbul, Turkey (2015).
- “DNA Origami for plasmonics and fluorescence applications.” *Trends in Nanotechnology*, Toulouse, France (2015).
- “Plasmonics for single molecule fluorescence enhancement.” *DNA Nanotechnology meets Plasmonics*, Bad Honnef, Germany (2015).
- “DNA Origami Nanophotonics: Plasmonics and fluorescence enhancement.”, *DINAMO: Discussions on Nano and Mesoscopic Optics*, El Chalten, Argentina (2015).
- “Self-assembled fabrication of nano-antennas based on metallic nanoparticles placed on DNA-origami structures for enhancing the fluorescence intensity and photostability.”, *Topics in DNA Nanotechnology*, Leipzig, Germany (2014).
- “Super resolution microscopy meets DNA-origami technology.”, *Workshop on the Advances of Optical Nanoscopy*, Buenos Aires, Argentina (2013).

Publications in international peer-reviewed scientific journals

- [36] A. Kuzyk, R. Jungmann, **G. P. Acuna***, N. Liu, “DNA origami route for nanophotonics”, *ACS Photonics*, **5** pp. 1151-1163 (2018).
- [35] I. Kaminska, J. Bohlen, S. Mackowski, P. Tinnefeld, **G. P. Acuna***, “Strong plasmonic enhancement of single peridinin-chlorophyll a-protein complex on DNA origami-based optical antennas”, *ACS Nano*, **12** pp. 1650-1655 (2018).
- [34] I. Kaminska, C. Vietz, A. Cuarteto-González, P. Tinnefeld, A. I. Fernández-Domínguez, **G. P. Acuna***, “Strong Plasmonic Enhancement of Single Molecule Photostability in Silver Dimer Nanoantennas”, *Nanophotonics*, **7** pp. 643-649 (2018).
- [33] M. Pilo-Pais, **G. P. Acuna***, P. Tinnefeld, T. Liedl, “Sculpting Light by Arranging Optical Components with DNA Nanostructures”, *MRS Bulletin*, **42** pp. 936-942 (2017).
- [32] S. Ochmann, C. Vietz, K. Trofymchuk, **G. P. Acuna**, B. Lalkens, P. Tinnefeld, “An Optical Nanoantenna for Single Molecule-Based Detection of Zika Virus Nucleic Acids without Molecular Multiplication”, *Anal. Chem.*, **89** pp. 13000-13007 (2017).
- [31] **G. P. Acuna**, P. Tinnefeld, “Molecule detection with sunlight”, *Nat. Photonics*, **11** pp. 616-618 (2017).
- [30] C. Vietz, B. Lalkens, **G. P. Acuna**, P. Tinnefeld, “Synergistic Combination of Unquenching and Plasmonic Fluorescence Enhancement in Fluorogenic Nucleic Acid Hybridization Probes”, *Nano Letters*, **17** pp. 6496-6500 (2017).
- [29] D. Wang, T. Schröder, C. Vietz, **G. P. Acuna**, B. Lalkens, P. Tinnefeld, “A DNA walker as fluorescence signal amplifier”, *Nano Letters*, **17** pp. 5368-5374 (2017).
- [28] C. Vietz, I. Kaminska, M. Sanz Paz, P. Tinnefeld, **G. P. Acuna***, “Broadband Fluorescence Enhancement with Self-Assembled Silver Nanoparticle Optical Antennas”, *ACS Nano*, **11** pp. 4969 (2017).
- [27] Q. Wei, **G. P. Acuna**, S. Kim, C. Vietz, D. Tseng, J. Chae, D. Shir, W. Luo, P. Tinnefeld, A. Ozcan “Plasmonics Enhanced Smartphone Fluorescence Microscopy”, *Scientific Reports*, **7** pp. 2124 (2017).
- [26] M. Raab, C. Vietz, F. Stefani, **G. P. Acuna***, P. Tinnefeld, “Single-Molecule Mirage: shifted molecular coupling in a single molecule-mirage”, *Nat. Comm.*, **8** pp. 13966 (2017)
- [25] C. Vietz, B. Lalkens, **G. P. Acuna***, P. Tinnefeld, “Functionalizing large nanoparticles for small gaps in dimer nanoantennas”, *New Journal of Physics*, **18** pp. 45012 (2016).

- [24] A. Puchkova, C. Vietz, E. Pibiri, B. Wünsch, M. Sanz Paz, **G. P. Acuna***, P. Tinnefeld, "DNA Origami Nanoantennas with over 5000fold Fluorescence Enhancement and Single-Molecule Detection at 25 μ M", *Nano Letters*, **15** pp. 8354 (2015).
- [23] P. Holzmeister, **G. P. Acuna***, J. J. Schmied, T. Sen, P. Tinnefeld, "Photophysical Rate Determination of Single Fluorescent Dyes next to Metallic Nanostructures", *Nat. Comm.*, **5** pp. 5356 (2014).
- [22] **G. P. Acuna***, D. Grohmann and P. Tinnefeld, "Enhancing single-molecule fluorescence with nanophotonics", *FEBS Letters*, **588** pp. 3547-3552 (2014).
- [21] E. Pibiri, P. Holzmeister, B. Lalkens, **G. P. Acuna*** and P. Tinnefeld, "Single-Molecule Positioning in Zeromode Waveguides by DNA Origami Nano-Adapters", *Nano Letters*, **14**, pp. 3499-3503 (2014).
- [20] J. Pellegrotti, **G. P. Acuna***, A. Puchkova, P. Holzmeister, A. Gietl, B. Lalkens, F. Stefani and P. Tinnefeld, "Systematic Purcell enhancement of photostability of single fluorophores in DNA origami – gold nanoparticle hybrids", *Nano Letters*, **14**, pp. 2831-2836 (2014).
- [19] P. Holzmeister, **G. P. Acuna**, D. Grohmann and P. Tinnefeld, "Breaking the concentration barrier/limit of optical single molecule detection", *Chemical Society Reviews*, **43**, pp. 1014-1028 (2014).
- [18] S. F. Heucke, F. Baumann, **G. P. Acuna**, P. M. Severin, S. W. Stahl, M. Strackharn, I. Stein, P. Altpeter, P. Tinnefeld, H. E. Gaub, "Placing individual molecules in the center of nanoapertures", *Nano Letters*, **14**, pp. 391-392 (2014).
- [17] X. Yu, D. Y. Lei, F. Amin, R. Hartmann, **G. P. Acuna**, A. Guerrero-Martínez, S. A. Maier, P. Tinnefeld, S. Carregal-Romero, W. J. Parak, "Distance control in-between plasmonic nanoparticles via biological and polymeric spacers", *Nano Today*, **8**, pp. 480-493 (2013).
- [16] F. M. Möller, P. Holzmeister, T. Sen, **G. P. Acuna*** and P. Tinnefeld, "Polarization Dependent Fluorescence of a Single Dye near a Gold Nanoparticle Arranged on DNA Origami", *Nanophotonics*, **2**, pp. 167-172 (2013).
- [15] **G. P. Acuna***, P. Holzmeister, F.M. Möller, S. Beater, B. Lalkens and P. Tinnefeld, "DNA-templated nanoantennas for single-molecule detection at elevated concentrations", *Journal of Biomedical Optics*, **18**, pp. 065001-5 (2013).
- [14] **G. P. Acuna***, F.M. Möller, P. Holzmeister, S. Beater, B. Lalkens and P. Tinnefeld, "Fluorescence Enhancement at Docking Sites of DNA-Directed Self-Assembled Nanoantennas", *Science*, **338**, pp. 506-510 (2012).
This work was highlighted in *Nature Methods*, "Dye shines bright", *Nature Chemistry*, "Assembling nanoantennas" and *Physik Journal*, "Fokussieren mit Gold". Selected for the **Faculty of 1000**.
- [13] T. Cordes, J. Vogelsang, C. Steinhauer, I. H. Stein, C. Forthmann, A. Gietl, J. J. Schmied, **G. P. Acuna**, S. Laurien, B. Lalkens, P. Tinnefeld, "Far-Field Nanoscopy with Conventional Fluorophores: Photostability, Photophysics, and Transient Binding", *Far-Field Optical Nanoscopy - Springer Berlin Heidelberg*, pp. 215-242 (2012)
- [12] **G. P. Acuna***, M. Bucher, I.H. Stein, C. Steinhauer, A. Kuzyk, P. Holzmeister, R. Schreiber, A. Moroz, F.D. Stefani, T. Liedl, F.C. Simmel, P. Tinnefeld, "Distance dependence of Single-Fluorophore Quenching by Gold Nanoparticles studied on DNA Origami", *ACS Nano*, **6**, pp. 3189-3195 (2012).
- [11] S. Funk, **G. P. Acuna**, M. Handloser and R. Kersting, "Probing the momentum relaxation time of charge carriers in ultrathin layers with terahertz radiation", *Optics Express* **17**, pp. 17450-17456 (2009).
- [10] **G. P. Acuna**, S. Heucke, F. Kuchler, H-T Chen, A. Taylor and R. Kersting, "Surface plasmons in terahertz metamaterials", *Optics Express* **16**, pp. 18745-18751 (2008).
- [9] R. Kersting, F. Biersgens and **G. P. Acuna**, "Mapping the acoustic phase with terahertz and millimeter wave techniques", *TM-TECHNISCHES MESSEN* **75**, pp. 51-57 (2008).
- [8] **G. P. Acuna**, F. Biersgens, C. Lang and R. Kersting, "Interdigitated terahertz emitters", *Elec. Lett.* **44**, pp. 203-206 (2008).
- [7] F. Biersgens, **G. P. Acuna** and R. Kersting, "Terahertz imaging of concealed objects acoustic phase detection", *Terahertz Mil. Sec. Appl. IV* **6949**, pp. 94905-9 (2008).
- [6] R. Kersting, F. Biersgens, **G. P. Acuna** and G. Cho, "Terahertz Near-Field Microscopy", *Advances in Solid State Physics* **47**, pp. 203 (2008).
- [5] F. Biersgens, **G. P. Acuna**, C. Lang, S. Potrebic, S. Manus and R. Kersting, "Shear force control for a terahertz near field microscope", *Rev. Sci. Instrum.* **78**, pp. 113701-6 (2007).
- [4] F. Biersgens, **G. P. Acuna** and R. Kersting, "Millimeter wave probing of the acoustic phase for concealed object detection", *Optics Express* **15**, pp. 8838-8843 (2007).

- [3] F. Buergens, **G. P. Acuna** and R. Kersting, "Acoustic phase imaging with terahertz radiation", *Optics Express* **15**, pp. 4427-4434 (2007).
- [2] **G. P. Acuna** and J. Miraglia, "Time-dependent induced potentials in convoy electron emission", *Surface Science* **600**, pp. 4961-4965 (2006).
- [1] A. Medus, **G. P. Acuna** and C. Dorso, "Detection of community structures in networks via global optimization", *Physica A* **358**, pp. 593-604 (2005).

***Co-corresponding author**