

Andrea Blanco-Redondo, Ph.D.

1612/3 Carlton St
Chippendale 2008, NSW, Australia

+61 412 332 380
andrea.blancoredondo@sydney.edu.au

Education

- Ph.D. in Optical Physics, *University of Basque Country*, Bilbao, Spain, 2014.
 - Thesis title: “Linear and nonlinear devices in silicon photonic waveguides” – Magna Cum Laude.
 - Developed in *Tecnalia* as part of a joint programme with the *University of the Basque Country*.
 - Secured *Marie Curie Fellowship* for one-year research visit at *The University of Sydney*.
- M.Sc. Telecommunications / Electrical Engineering, *University of Valladolid* (Spain) + *Aston University* (UK), 2007.
 - 5 years degree at *University of Valladolid* + 1 year Master Research Thesis at *Aston University*.

Experience in Academic and Industrial Research

School of Physics, University of Sydney, Sydney, Australia

October 2016 - Present

Professor Harry Messel Research Fellow (B4) at the School of Physics

- Highly competitive 3-year research Fellowship to investigate on *pure-quartic solitons*.
- Lecturing two Physics courses and supervising 3 students.

February 2015 - October 2016

Research Fellow/Lecturer (B2) at *CUDOS (Centre for Ultrahigh bandwidth Devices for Optical Systems)*

- Discovered a new class of temporal optical soliton: *pure-quartic soliton*.
 - Experimental demonstration of *pure-quartic solitons* in a silicon chip.
 - Physical description and approximate analytic solutions of *pure-quartic solitons*.
- Demonstrated the first nanophotonic topological system.
- Performed the first experiments with quantum light in a topological photonic system, demonstrating photon-pair generation in silicon protected by topology.
- Managed collaborative project between *University of Sydney* and *Technion* (Haifa, Israel).
- Visiting researcher at *Technion* (Prof. Mordechai Segev’s group) in July 2015.
- Supervised five students (one Ph.D., one 3rd year, and three Talented Student Program).
- Lectured 2 courses at *U. Sydney* (PHYSICS 1001 & PHYSICS BRIDGING COURSE) and Guest Lecturer in another course (PHYS 3012/3912).

January 2013 - February 2014

Marie Curie Fellow at CUDOS (Guest organisation)- Affiliated with Tecnalia (Host organisation)

- Conducted the experiments, simulations, and analysis that led to the first observation of soliton compression in silicon, a long-standing goal in the photonics community.

Tecnalia Research and Innovation, Bilbao, Spain

March 2014 – February 2015

Specialist Researcher in Photonics at the Aerospace Unit.

- Managed collaborative project between Tecnalia, Donostia International Physics Centre (DIPC) and University of the Basque Country on plasmonic enhanced nanophotonic sensors.
- Fabrication of nanopatterned functional surfaces, including:
 - Hydrophobic surfaces with anti-fog purposes for Decathlon (www.decathlon.com).
 - “Super-black” (all-absorbing) material for Antolin (www.grupoantolin.com/en).
- Clean room experience: thermal and UV nanoimprint lithography (NIL), spinner sprayer, etc.

June 2007 – March 2014

Project Manager and Researcher in Photonics at the Telecom Unit.

- Conception and coordination of 6 European research proposals in photonics (8-11 organisations)
- PhD thesis scientific achievements:
 - First observation of soliton compression in silicon.

- Experimental discovery of novel nonlinear temporal broadening effect.
- First time-of-flight measurements of free-carrier pulse self-acceleration in silicon.
- Proposed the use of dispersion engineering to control the free-carrier effects in silicon.
- Demonstrated coupling between photonic and plasmonic waveguides in the mid-infrared.
- Managed and carried out research projects in photonics for private companies, including:
 - All-optical switching routers for Telefonica (www.telefonica.com/en).
 - In-home optical fiber communications for Ikusi (www.ikusi.com/en).
 - Gigabit capable optical network (GPON) analyser for Telnet (www.telnet-ri.es/en).
- Participated in product development phase of first GPON analyser (www.gpondoctor.com).

European Commission, Brussels, Belgium.

May 2014 – June 2014

Expert in photonics for the evaluation of research projects

- Evaluated European research project proposals submitted to the *Photonics KET* topic at the first Call of *Horizon 2020* (individual remote evaluations, consensus meetings, panel discussions).

Aston University, Birmingham, United Kingdom.

September 2006 – March 2007

Research Master Student at the Photonics Group

- Experimental, theoretical, and numerical investigations on Raman distributed amplification for long-haul optical communications systems.

Telefonica Research and Development, Valladolid, Spain.

April 2006 – September 2006

Research Internship at Telefonica (one of the largest telecommunication companies in the world)

- Worked on image processing and recognition, and image search engines.
- Collaborated in European project proposals writing.

Awards

- The **Australian Optical Society Early Career Researcher Prize** - Geoff Opat Prize 2016
- **Professor Harry Messel Fellowship** awarded in October 2016.
- Nominated by the Australia Academy of Science to represent Australia as a Talented Young Researcher in the 66th **Lindau Nobel Laureates Meeting** (October 2015).
- **Ada Byron Award to Women in Technology** 2014, National level Spanish Award that recognises outstanding contributions to science and technology (runner-up).
- **Marie Curie Fellowship** (TIFER PCOFUND-GA- 2010-267200) awarded in 2012.
- **Best Poster Award** at CUDOS Workshop 2014, Phillip Island, Australia.
- **Best Paper Award** of IEEE Mediterranean Microwave Symposium 2009, Tangiers, Morocco.
- **Best Paper Award** of IEEE 13th International Symposium NETWORKS 2008, Budapest, Hungary.

Teaching and Supervising Experience

- **PHYS4AOP: Advanced Optical Physics** - Modules 1-7 (2017): Optical Waveguides, School of Physics, University of Sydney.
- **PHYSICS BRIDGING COURSE** – Modules 7-10: Oscillations and Waves, Atomic Theory and Electromagnetism, Electric Charge, Current and Circuits (2016, 2017), School of Physics, University of Sydney.
- **PHYS 1001** – Module 3: Oscillations and Waves (2015), School of Physics, University of Sydney.
- **PHYS 3012/3912** - Guest Lecturer on Nonlinear Photonics and Optical Solitons (2016).
- Currently supervising five students:
 - (1) Mr. Imanol Andonegui - Ph.D. student working on topological photonics in integrated platforms.
 - (2) Mr. Chih-Wei (Sam) Lo - Graduate Diploma student working on photonic crystal fiber design for the demonstration of pure-quartic solitons.

- (3) Mr. Aleksa Sarai - 2nd year TSP (Talented Student Program) working on numerical solutions to the biharmonic nonlinear Schrödinger Equation, i.e. finding the exact shape of pure-quartic solitons.
- (4) Ms. Cheryl Chan - 1st year TSP working on a feasibility study of fabricating topological metawaveguides.
- (5) Mr. Angad Singh Bedi - 1st year TSP working on a feasibility study of fabricating topological metawaveguides.

Publications

- **Refereed journal articles in order of relevance to this position:**

- A. Blanco-Redondo, I. Andonegui, M. J. Collins, G. Harari, Y. Lumer, M. Rechtsman, B. J. Eggleton, and M. Segev, Topologically optical waveguiding in silicon and the transition between topological and trivial defect states, *Physical Review Letters* 116, 163901 (2016).
- A. Blanco-Redondo, C. Martijn de Sterke, J. E. Sipe, T. F. Krauss, B. J. Eggleton, and C. Husko, Pure-quartic solitons, *Nature Communications* 7, 10427 (2016).
- A. Blanco-Redondo, C. Husko, D. S. Eades, Y. Zhang, J. Li, T. Krauss, B. Eggleton, Observation of Soliton Compression in Silicon Photonic Crystals, *Nature Communications* 5, 3160 (2014).
- A. Blanco-Redondo, D. S. Eades, J. Li, S. Lefrancois, T. F. Krauss, B. J. Eggleton, C. Husko, Controlling free-carrier temporal effects in silicon by dispersion engineering, *Optica* 1 (5), 299-306 (2014).
- A. Blanco-Redondo, P. Sarriugarte, A. Garcia-Adeva, J. Zubia, & R. Hillenbrand, Coupling mid-IR light from a photonic crystal waveguide to transmission lines, *Applied Physics Letters* 104, 011105 (2014).
- A. Blanco-Redondo, P. Sarriugarte, A. Garcia-Adeva, J. Zubia, & R. Hillenbrand, Local field enhancement of mid-infrared light in a photonic-plasmonic structure, *Journal of Lightwave Technology* 33, 368-371 (2015).
- S. Lefrancois, C. Husko, A. Blanco-Redondo, B. J. Eggleton, Nonlinear silicon photonics analyzed with the moment method, *Journal of the Optical Society of America (JOSA) B* 32 (2), 218-226 (2015).
- (Invited) A. Blanco-Redondo, E. Areizaga, J. Zubia, All-optical networks and switching technologies for a 3D videoconference system with the feeling of presence, *Infocommunications Journal*, vol. LXV, 20-26, (2010).

- **Scholarly book chapters**

- (Invited) A. Blanco-Redondo and J. Zubia, Photonic Band Gap Engineered Materials for Controlling the Group Velocity of Light, *Advanced Photonic Sciences*, Dr. Mohamed Fadhali (Ed.), ISBN: 978-953-51-0153-6, InTech (2012).

- **Refereed conference papers**

- (Invited) C. M. de Sterke, A. Blanco-Redondo, A. Sarai, C.-W. Lo, B. J. Eggleton, and M. J. Steel, "Shape and properties of pure quartic solitons," (Invited) CLEO Pacific Rim, Singapore, Singapore, 31 July - 4 August 2017 (Accepted).
- A. Blanco-Redondo, B. Bell, M. C. Rechtsman, M. Segev, and B. J. Eggleton, "The effect of topology on quantum photonic states in silicon," (Invited) META 2017, Seoul, South Korea, 24-27 July 2017. (Accepted).
- (Invited) A. Blanco-Redondo, "Nonlinear and Topological Silicon Photonics," in the Nano-optical Systems Exploiting Nonlinear Effects Topical Workshop, Schloss Oppurg, Germany, 26 September 2016.
- (Postdeadline) A. Blanco-Redondo, B. Bell, M. J. Collins, M. Rechtsman, M. Segev, and B. J. Eggleton, Topological protection of quantum states in silicon, CLEO/QELS (paper JTh4A.1), San José, USA, 5-10 Jun 2016.
- A. Blanco-Redondo, I. Andonegui, M. J. Collins, G. Harari, Y. Lumer, M. Rechtsman, B. J. Eggleton, and M. Segev, Topologically optical waveguiding in silicon and the transition between topological and trivial defect states, CLEO/QELS (paper FM3A.5), San José, USA, 5-10 Jun 2016.
- (Invited) C. A. Husko, A. Blanco-Redondo, S. Lefrancois, B. Eggleton, T. Krauss, M. Wulf, L. Kuipers, C. W. Wong, P. Colman, S. Combrie, and A. De Rossi, Solitary pulses in nanophotonic waveguides, Photonics and Fiber Technology 2016 (paper NTh2B.1), Sydney, Australia, 5-8 September.

- **(Invited)** B. Bell*, A. Blanco-Redondo*, M. J. Collins, M. Rechtsman, M. Segev, and B. Eggleton, "Photon pair generation in silicon protected by topology," Photonics and Fiber Technology 2016 (paper NTh2A.1), Sydney, Australia, 5-8 September.
 - **(Invited)** C.A. Husko, A. Blanco-Redondo, S. Lefrancois, B. J. Eggleton, T. F. Krauss, M. Wulf, L.K. Kuipers, C.W. Wong, S. Combrié, A. De Rossi, P. Colman, "Soliton dynamics in semiconductor photonic crystals," SPIE Photonics Europe, 98850I-98850I-7, Brussels, 18 April, 2016.
 - A. Blanco-Redondo, I. Andonegui, M.J. Collins, G. Harari, Y. Lumer, M.C. Rechtsman, B.J. Eggleton, M. Segev, "Observation of waveguiding by topological defects in a silicon photonic platform," Australian Conference on Optical Fibre Technology (ACOFT), Adelaide, Australia, 30 Nov.- 3 Dec. 2015.
 - A. Blanco-Redondo, T.F. Krauss, B. Eggleton, C. Husko, "Pure-quartic solitons: the interaction of fourth-order dispersion and self-phase modulation," OSA Nonlinear Optics (NLO) (paper NTu1A. 5), Kauai, USA, 26-31 Jul. 2015.
 - **(Postdeadline)** A. Blanco-Redondo, T.F. Krauss, B. Eggleton, C. Husko, "Pure-quartic solitons", CLEO/Europe-EQEC (paper PD-B.6), Munich, Germany, 20-25 June 2015.
 - C. Husko, A. Blanco-Redondo, D. Eades, Y. Zhang, J. Li, T. Krauss, and B. J. Eggleton, "Interplay of nonlinear dynamics in silicon photonic crystal waveguides," CLEO/QELS (paper FW3D.6), San José, USA, 8-13 Jun 2014.
 - A. Blanco-Redondo, C. Husko, D. Eades, Y. Zhang, J. Li, T. Krauss and B. J. Eggleton, "First Observation of Soliton Compression in Silicon Photonic Crystals," Australia and New Zealand Conference on Optics and Photonics (ANZCOP) Conference 2013, Perth, Australia, 8 - 11 Dec. 2013.
 - C. Husko, D. Eades, A. Blanco-Redondo, Y. Zhang, J. Li, T. Krauss, and B. J. Eggleton, "Phase-resolved soliton dynamics in silicon photonic crystals," CLEO/QELS (paper CM4F.3), San José, USA, 8-13 Jun 2013.
 - **(Invited)** I. Andonegui, I. Calvo, A. Blanco-Redondo, A.J. Garcia-Adeva, "Inverse design of novel nanophotonic structures," International Conference on Transparent Optical Networks (ICTON), Cartagena, Spain, 23-27 Aug. 2013.
 - **(Invited)** A. Blanco-Redondo, I. Andonegui, J.A. Zubía, "Optical buffers based on photonic crystals," in Proc. of The International Conference on Micro- and Nano-photonics materials and Devices (MINAP), Trento, Italy, 16-18 Jan. 2012.
 - **(Invited)** A. Blanco-Redondo, "Optical Buffers: an enabling technology for optical packet switching," in The XXX URSI General Assembly & Scientific Symposium the International Union of Radio Science, Istanbul, Turkey, 13-20 Aug. 2011.
 - **(Best Paper Award)** A. Blanco-Redondo, E. Areizaga, J. Zubía, Slow light for microwave photonics applications, Proc. of IEEE Mediterranean Microwave Symposium (MMS 2009), 15-17 Nov. 2009, Tangiers, Morocco.
 - A. Blanco-Redondo, P. Beltrán, J. Zubía, "Enabling technologies for future all-optical packet switched networks," IEEE International Conference on Ultra Modern Communications (ICUMT'09), Saint Petersburg, Russia, 12-14 Oct. 2009.
 - P. Beltrán, A. Blanco-Redondo, F. J. Cortés, A. Pozo, "All-optical transport layer and GPON access for immersive communications," IEEE International Conference on Ultra Modern Communications (ICUMT'09), Saint Petersburg, Russia, 12-14 Oct. 2009.
 - **(Best Paper Award)** A. Blanco-Redondo, E. Areizaga, J. Zubia, All-optical networks and switching technologies for a 3D videoconference system with the feeling of presence, IEEE International Telecommunications Network Strategy and Planning Symposium (NETWORKS2008), 28 Sep.–2 Oct., Budapest, Hungary.
- **Posters in conferences**
- **(Best Poster Award)** I. Andonegui, A. Blanco-Redondo, M.J. Collins, G. Harari, Y. Lumer, M.C. Rechtsman, B.J. Eggleton, M. Segev, Topological waveguiding in silicon and beating between topological and trivial defect states, The 15th annual CUDOS Workshop, Wyong, Australia, 1-4 Feb. 2016.
 - **(Best Poster Award)** A. Blanco-Redondo, C. Husko, D. Eades, Y. Zhang , J. Li , T. Krauss , B. Eggleton, Observation of Soliton Compression in Silicon Photonic Crystals, CUDOS Workshop 2014, 10-13 Feb. 2014, Philip Island, Melbourne.

- [A. Blanco-Redondo](#), Optical Buffers for all-optical packet networks, Souther European Cluster in Photonics and Optics (SECPHO) Conference and Exhibition, June 2011, Barcelona, Spain.
- I. Andonegui, [A. Blanco-Redondo](#), A. García-Adeva, Characterization of slow-light regime in photonic crystal waveguides, ImagineNano:Photonics, Plasmonics & Magneto-optics, Bilbao, Spain, 11-14 Feb. 2011.

- **Invited seminars in research institutions (selected list)**

- Seminar: “Nonlinear and Topological Photonics in Silicon” at University of York, UK, 30 Sept. 2016 (confirmed).
- Seminar: “Nonlinear and Topological Photonics in Silicon” at ICFO, Barcelona, Spain, 5 Oct. 2016 (confirmed).
- Colloquium: “Spatial and temporal control of light in silicon” at the School of Physics, University of Sydney, 29 August 2016.
- Seminar: “Nonlinear effects and solitons in silicon” at Technion Israel Institute of Technology, Haifa, Israel, July 2015.
- Seminar: “Solitons in silicon” at The University of Sydney, Sydney, Australia, January 2014.
- Seminar: “Propagation of light pulses in photonic crystal waveguides” at Quantum Optics Group, Universidad Autónoma Barcelona, Spain, October 2012.
- Opening Invited Talk: “Optical buffers based on photonic crystals” in MINAP 2012, Trento, Italy, Jan. 2012.
- Invited oral presentation: “Optical buffering: the enabling technology for optical packet switching” at URSI General Assembly, Istanbul, Turkey, Aug. 2011.
- Invited speaker at the 2012 General Assembly of the Southern European Cluster in Photonics & Optics.
- Seminar: “R&D lines in photonics and optical communications at Tecnalia” at the Institute of Applied Physics of the Spanish national Research Council (CSIC), Madrid, March 2011.
- Invited speaker at round table of photonics science and technology, Institute of Optics of the Spanish national Research Council (CSIC), Madrid, November 2009.

Popular press and media

- The work in *Nat. Comm.* **7**, 10427 (2016) has been featured in specialized and popular press including:
 - Interview for *NovusLight today* – Available [here](#).
 - *Laser Focus World* – Available [here](#).
 - *Optics.org* – Available [here](#).
- Resulting from the Ada Byron Award (May 2014):
 - Interview for the most read Spanish national newspaper – Electronic version available [here](#).
 - Live interview in a Spanish national television channel (30 min) - Video available [here](#).
 - Live interview in a Spanish national radio station (10 min) – Podcast available [here](#).
- The work in *Nat. Comm.* **5**, 3160 (2014) was featured in specialized and popular press including:
 - Interview for *NovusLight today* – Available [here](#).
 - *Laser Focus World* – Available [here](#).
 - *Phys.Org* – Available [here](#).
 - *The Register* – Available [here](#).
 - *The Conversation* – Available [here](#).
- Interview and video for [Tecnalia’s campaign](#) to bring science and research closer to the public.

Chairing and Organizing Activities

- Member of the Esther Hoffman Beller Medal selection committee, the OSA Award to outstanding contributions to optical science and engineering education. (Serving from May 2016 to September 2017).
- Organizer of topical workshop in Topological Photonics (to be held at AINST, Sydney, Australia, 9-10 Nov. 2016).

- Member of the organising committee of the Quantum Photonics Connections Conference (to be held in the Sydney Nanoscience Hub, 24-25 November).
- Co-chair of the “Nanophotonics and smart optical nanostructures” session at 15th International Conference on Transparent Optical Networks (ICTON 2013).
- Main organizer of the General Assembly and Symposium of the Southern European Cluster in Photonics & Optics (SECPhO) celebrated at Tecnalia’s facilities in San Sebastian, Spain.

Outreach, Service and Professional Associations

- Public Speaker at the Sydney Science Forum, Westmead Education and Conference Centre Auditorium, 26 April 2017.
- Guest speaker at the Nanoscience event organized by the AIP (Australian Institute of Physics) and the RACI (Royal Australian Chemical Institute), Sydney Nanoscience Hub, 2 August 2016.
- Since my Ada Byron Award I have been invited to speak at major publication events for the reinforcement of science in society and women in science, including [Opening of Science Week Bilbao 2014](#), [Forum for Equality 2014](#), and [Cross Border Doctoral Program 2014](#)
- Given seminar to the students within the Talented Student Program (TSP) (March 2016) and to the 3rd year Optics Class at the School of Physics (August 2016).
- Panel member in three rounds of Student Progress Review Interviews at the School of Physics (2015 - 2016).
- Reviewer for: Optica, Advanced Materials, Optics Letters, Optics Express, JOSA B, Applied Optics, etc.
- Professional Associations: Marie Curie Alumni Association (MCAA), Optical Society of America (OSA), Australian Optical Society (AOS), Southern European Cluster in Photonics and Optics (SECPhO), Photonics 21.

Referees

- (1) Prof. Mordechai (Moti) Segev from Technion Israel Institute of Technology (Haifa, Israel)
 email: msegev@tx.technion.ac.il
 phone: +972 4 829 3926
- (2) Prof. Benjamin Eggleton from the University of Sydney (Sydney, Australia)
 email: benjamin.eggleton@sydney.edu.au
 phone: +61 2 9351 3604
- (3) Prof. Joseba Zubia from the University of the Basque Country (Bilbao, Spain)
 email: joseba.zubia@ehu.eus
 phone: +34 946 014 138