

Parte A. DATOS PERSONALES

Fecha del CVA	07/06/2024
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Nombre y Apellidos	Alejandro Carballar	
Núm. de identificación del investigador	ORCID**	0000-0003-2807-3511
	SCOPUS Author ID (*)	6602749365
	WoS Researcher ID (*)	A-6731-2012

A.1. Situación profesional actual

Organismo	Universidad de Sevilla		
Dpto./Centro	Departamento de Ingeniería Electrónica		
Dirección	E.T.S. de Ingeniería; C/ Camino de los Descubrimientos, s/n		
Teléfono	correo electrónico	<a href="mailto:carballar@us.es">carballar@us.es</a>	
Categoría profesional	Catedrático Universidad	Fecha inicio	12/01/2018
Espec. cód. UNESCO	3307		
Palabras clave	optical networks; fiber-optic communication systems; all-optical signal processing; all-optical computing; ultrafast photonics; measurement and characterization of ultrafast optical signals and photonic components; all-fiber and integrated waveguide components and devices; light pulse interferometry; optical sensors; thermal solar energy.		

A.2. Formación académica (*título, institución, fecha*)

Licenciatura/Grado/Doctorado	Universidad	Año
Ingeniero de Telecomunicación	Universidad Politécnica de Madrid	1995
Doctor Ingeniero de Telecomunicación	Universidad Politécnica de Madrid	1999

A.3. Indicadores generales de calidad de la producción científica (*véanse instrucciones*)

- 4 Sexenios de investigación (1996-2001, 2002-2007, 2008-2013, 2014-2019)
- 3 Tesis Doctorales (Luis Miguel Rivas – 2012 - codirigida con el Dr. José Azaña) (María R. Fernández-Ruiz – 2016 – codirigida con el Dr. Azaña) (Ovidio González de Uña – 2018)
- Estadísticas de referencias cruzadas (**Web of Science**):
  - Nº de publicaciones en WoS: 35;                      - Nº total de citas: 634
  - h-index: 11;    - Artículos en Q1: 17

Otros indicadores:

- Scopus – A. Carballar: Nº total de citas: 802; h-index: 12
- Google Scholar – A. Carballar: Nº total de citas: 1029; h-index: 13
- Research Gate (RG): Citas: 812; h-index: 12; Research interest score: 403.6

Parte B. RESUMEN LIBRE DEL CURRÍCULUM

Alejandro Carballar nació en Santa Olalla del Cala (Huelva) el 13 de noviembre de 1970. Se formó como Ingeniero de Telecomunicación (1995), y posteriormente disfrutando de una beca FPU, como Dr. Ingeniero de Telecomunicación (1999) en la E.T.S.I.T. de la Universidad Politécnica de Madrid. En ese año 1999, se incorpora al Departamento de Ingeniería Electrónica de la E.T.S. de Ingeniería de la Universidad de Sevilla, en el cual desarrolla actualmente su labor docente e investigadora.

Entre sus líneas de investigación básica se encuentran las redes de comunicaciones ópticas de muy alta velocidad, así como los componentes fotónicos necesarios que permiten llevar a cabo el Procesado Óptico de Señal para el desarrollo de las Redes Todo-Ópticas Transparentes (Transparent All-Optical Networks). Sus líneas de trabajo más recientes se centran en la propagación de ondas a través de estructuras periódicas (en particular, Bragg Gratings integradas y en fibra); diseño, caracterización y síntesis de componentes ópticos;

caracterización de pulsos y señales ultracortas; sensores y redes de sensores ópticos; y aplicaciones de técnicas de procesamiento de señal avanzado para el desarrollo de la denominada Fotónica de Comunicaciones. Entre sus líneas de trabajo en innovación y transferencia de tecnología ha centrado su interés en las nuevas comunicaciones móviles, en el desarrollo de aplicaciones y servicios en movilidad, y actualmente en el desarrollo de sensores ópticos para la optimización de procesos de producción de energía.

Ha publicado más de cincuenta artículos de investigación del más alto nivel, informes técnicos y contribuciones a congresos. Ha participado y dirigido varios proyectos de investigación, tanto del Plan Nacional de Investigación como colaboraciones con empresas. Igualmente, actúa regularmente como revisor de diversas revistas científico-técnicas y publicaciones de prestigio en el campo de la opto-electrónica y las comunicaciones ópticas. El solicitante es miembro del IEEE (Institute of Electrical and Electronics Engineers) y OPTICA (antes OSA - Optical Society of America). Ha recibido en el año 2000, el Premio Lucent Technologies a la Mejor Tesis Doctoral en Redes de Datos en la XX edición de los Premios COIT/AEIT; en el año 2001 el Premio Extraordinario de Doctorado de la UPM; y en el año 2008 el Premio de la Fundación Universidad Empresa al Proyecto Minerva: "Plataforma de Servicios en Movilidad – Cartuja'93", del que ha sido Director Técnico. Ha sido Subdirector de Planificación y Recursos Comunes y Subdirector de Digitalización y Comunicaciones de la E.T.S de Ingeniería de la Universidad de Sevilla. Ha dirigido el Curso de Experto Universitario "Comunicaciones en Movilidad: Tecnologías, Servicios y Nuevos Modelos de Negocio" del Centro de Formación Permanente de la Universidad de Sevilla, y ha sido Vicedecano del Colegio Oficial de Ingenieros de Telecomunicación de Andalucía Occidental y Ceuta.

## Parte C. MÉRITOS MÁS RELEVANTES (ordenados por tipología)

### C.1. Lista detallada de Publicaciones

#### A.- Artículos publicados en revistas científico-técnicas

- [A.24] A. Carballar, R. Rodríguez-Garrido, M. Jerez, J. Vera, and J. Granado, "Measuring DNI with a new Radiometer based on an Optical Fiber and Photodiode," SENSORS, vol. 24 pp. 3674 (2024).
- [A.23] J.A. Praena, and A. Carballar, "Chirped Integrated Bragg Grating Design," PHOTONICS, vol. 11 pp. 476 (2024).
- [A.22] M.R. Fernández-Ruiz, A. Carballar, "Fiber Bragg Grating-based optical signal processing: Review and Survey," APPLIED SCIENCES, vol. 11 pp. 8189 (2021).
- [A.21] R. Rodríguez-Garrido, A. Carballar, J. Vera, J. González-Aguilar, A. Altamirano, A. Loureiro, D. Pereira, "High-Temperature Monitoring in Central Receiver Concentrated Solar Power Plants with Femtosecond-laser inscribed FBG," SENSORS, vol. 21 pp. 3762 (2021).
- [A.20] O. J. González de Uña, F. J. López Narbona, J. Ferrero Álvarez-Rentería, A. Carballar, "Open innovation challenge as a strategy for developing new mobile health solutions," MEDICINA CLÍNICA, vol. 150 pp. 361 – 365 (2018).
- [A.19] M. R. Fernández-Ruiz, L. X. Wang, A. Carballar, M. Burla, J. Azaña, S. LaRochelle, "THz-bandwidth photonic Hilbert transformers based on fiber Bragg gratings in transmission," OPTICS LETTERS, vol. 40 pp. 41 – 44 (2015).
- [A.18] M. R. Fernández-Ruiz, A. Carballar, J. Azaña, "Arbitrary Time-Limited Optical Pulse Processors based on Transmission Bragg Gratings," IEEE PHOTONICS TECHNOLOGY LETTERS, vol. 26 pp. 1754 – 1757 (2014).
- [A.17] C. L. Janer, A. Carballar, L. Navarro, J. L. Galo, R. M. Rubio, "Photosensitivity Color-Center Model for Ge-Doped Silica Preforms," IEEE PHOTONICS JOURNAL, vol. 5 pp. 6100511 (2013).
- [A.16] M. R. Fernández-Ruiz, A. Carballar, J. Azaña, "Design of ultrafast all-optical signal

- processing devices based on fiber Bragg gratings in transmission,” IEEE/OSA JOURNAL OF LIGHTWAVE TECHNOLOGY, VOL. **31** pp. 1593 – 1600 (2013).
- [A.15] M. R. Fernández-Ruiz, M. Li, M. Dastmalchi, A. Carballar, S. LaRochelle, J. Azaña, “Picosecond optical signal processing based on transmissive fiber Bragg gratings,” OPTICS LETTERS, vol. **38** pp. 1247 – 1249 (2013).
- [A.14] A. Carballar, C.L. Janer, “Complete Fiber Bragg Grating Characterization Using an Alternative Method Based on Spectral Interferometry and Minimum-Phase Reconstruction Algorithms,” IEEE/OSA JOURNAL OF LIGHTWAVE TECHNOLOGY, vol. **30** pp. 2574 – 2582 (2012).
- [A.13] L. M. Rivas, S. Boudreau, Y. Park, R. Slavík, S. LaRochelle, A. Carballar, J. Azaña, “Experimental demonstration of ultrafast all-fiber high-order photonic temporal differentiators,” OPTICS LETTERS, **34** pp. 1792 – 1794 (2009).
- [A.12] L. M. Rivas, M. J. Strain, D. Duchesne, A. Carballar, M. Sorel, R. Morandotti, J. Azaña, “Picosecond linear optical pulse shapers based on integrated waveguide Bragg gratings,” OPTICS LETTERS, vol. **33** pp. 2425 – 2427 (2008)
- [A.11] L.M. Rivas, K. Singh, A. Carballar, J. Azaña, “Arbitrary-Order Ultrabroadband All-Optical Differentiators based on Fiber Bragg Gratings,” IEEE PHOTONICS TECHNOLOGY LETTERS, vol. **19** pp. 1209 – 1211 (2007)
- [A.10] A. Carballar, M. A. Muriel, “Growth modelling of Fiber Gratings: A numerical investigation,” FIBER & INTEGRATED OPTICS, vol. **21** pp. 451 – 463 (2002).
- [A.9] J. Azaña, M. A. Muriel, A. Carballar, “Real-time Fourier transformer system using transmissive Fiber Gratings,” FIBER & INTEGRATED OPTICS, vol. **19** pp. 439 – 453 (2000).
- [A.8] A. Carballar, M. A. Muriel, J. Azaña, “Fiber Grating Filter for WDM Systems: An improved design,” IEEE PHOTONICS TECHNOLOGY LETTERS, vol. **11** pp. 694 – 696 (1999).
- [A.7] M. A. Muriel, A. Carballar, J. Azaña, “Field distributions inside Fiber Gratings,” IEEE JOURNAL OF QUANTUM ELECTRONICS, vol. **35** pp. 548 – 558 (1999).
- [A.6] A. Carballar, M. A. Muriel, J. Azaña, “WDM selector based on transmissive chirped Moiré fibre grating,” IEE ELECTRONICS LETTERS, vol. **35** pp. 386 – 388 (1999).
- [A.5] M. A. Muriel, J. Azaña, A. Carballar, “Real-time Fourier transformer based on fiber gratings,” OPTICS LETTERS, vol. **24** pp. 1 – 3 (1999).
- [A.4] M. A. Muriel, J. Azaña, A. Carballar, “Fiber grating synthesys by use of time-frequency representations,” OPTICS LETTERS, vol. **23** pp. 1526 – 1528 (1998).
- [A.3] A. Carballar, M. A. Muriel, “Phase reconstruction from Reflectivity in Fiber Bragg Gratings,” IEEE/OSA JOURNAL OF LIGHTWAVE TECHNOLOGY, vol. **15** pp. 1314 – 1322 (1997).
- [A.2] M. A. Muriel, A. Carballar, “Internal Field Distributions in fiber Bragg gratings,” IEEE PHOTONICS TECHNOLOGY LETTERS, vol. **9** pp. 955 – 957 (1997).
- [A.1] M. A. Muriel, A. Carballar, “Phase reconstruction from reflectivity in uniform fiber Bragg gratings,” OPTICS LETTERS, vol. **22** pp. 93 – 95 (1997).

· *B.- Contribuciones en trabajos conjuntos / Capítulos de libros*

- [B.7] María R. Fernández-Ruiz, A. Carballar, R. Ashrafi, S. LaRochelle, and J. Azaña, “All-Optical Pulse Shaping in the Sub-Picosecond Regime Based on Fiber Grating Devices (Chapter 9 in Book: Shaping Light in Nonlinear Optical Fibers /edited by Sonia Boscolo, Christophe Finot), WILEY; pp. 257 – 292 (2017).
- [B.6] A. Carballar, “DVB-H: la televisión en movilidad,” *Tendencias e innovación de la producción y distribución en el audiovisual: Nuevas ventanas de explotación*, FUNDACIÓN AUDIOVISUAL DE ANDALUCÍA; pp. 108 – 118 (2009).

- [B.5] C. Janer, L. M. Rivas, R. M. Rubio, J. L. Galo, L. Navarro, A. Carballar, "Ge-doped silica fibers: modeling of photosensitivity," in *Photonic Applications in Nonlinear Optics, Nanophotonics, and Microwave Photonics* (Ed.: R. Morandotti, H. E. Ruda, and J. Yao), Proc. of SPIE (2005), Vol. 5971, 59710L-1 – 59710L-11.
- [B.4] L. M. Rivas, A. Carballar, C. Janer, "Growth of second-order fiber gratings based on a new photosensitivity model," in *Photonic Applications in Devices and Communications Systems* (Ed.: P. Mascher, A. P. Knights, J. C. Cartledge, and D. V. Plant), Proc. of SPIE (2005), Vol. 5970, 597009-1 – 597009-12.
- [B.3] K. Fukushima, T. Hirozawa, K. Kinoshita, S. Seikai, A. Matsushita, R. Kimata, T. Morimoto, O. Shimohira, A. Carballar, R. Denda, V.A. Shkaptsov, C. Trigo de Loureiro, *New Optical Access Technology*, CIGRÉ (INTERNACIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS); Ref. 241, SC WG D2.15 (2004).
- [B.2] K. Fukushima, T. Hirozawa, K. Kinoshita, S. Seikai, A. Matsushita, R. Kimata, T. Morimoto, O. Shimohira, A. Carballar, R. Denda, V.A. Shkaptsov, C. Trigo de Loureiro, *All-Optical Backbone Technology*, CIGRÉ (INTERNACIONAL COUNCIL ON LARGE ELECTRIC SYSTEMS); Ref. 241, SC WG D2.15 (2004).
- [B.1] M. A. Muriel, A. Carballar, "Sidelobes suppression in Fiber Gratings: A New Design," *Applications of Photonic Technology 3: Closing the Gap between Theory, Development and Application*, G. A. Lampropoulos, R. A. Lessard (editors), *Proceedings of SPIE*, vol. 3491, pp. 124-127 (1998).

· C.- Otros artículos publicados

- [C.5] Ovidio González de Uña, A. Carballar, "Empowering small electricity consumers to help European Member States to reach the energy efficiency targets of the European Union," THE INTERNATIONAL TECHNOLOGY, SCIENCE & SOCIETY REVIEW, 1 pp. 1 – 8 (2017).
- [C.4] José M. Rivera, Ana Madera, A. Carballar, "Hacia el "Todo IP" en Movilidad," BIT, vol. 179 pp. 59 – 62 (2010).
- [C.3] C. Romero, R. Denda, A. Carballar, "Optical Network Unit for ATM-based Passive Optical Networks," III Online Symposium for Electronics Engineers (OSEE Article), <http://www.techonline.com/showArticle.jhtml?articleID=192200440>, pp. 1 – 9 (2002).
- [C.2] C. Romero, R. Denda, A. Carballar, "Redes de acceso ópticas para FTTH: APON versus EPON," BIT, vol. 136 pp. 98 – 99 (2002).
- [C.1] A. Carballar, "Optics of Fiber Gratings: Analysis of the Internal Behavior," I Online Symposium for Electronics Engineers (OSEE'00 - Lecture), <http://www.techonline.com/learning/course/100035>, pp. 1 – 4 (2000).

· D.- Trabajos publicados o aceptados en conferencias o congresos internacionales

- [D.25] A. Carballar, M. R. Fernández-Ruiz, "FBG-based Optical Signal Processors," XXXIIND INTERNATIONAL UNION OF RADIO SCIENCE (URSI'2107), August 19-26, 2017, Montreal, QC, Canada. (Invited).
- [D.24] A. Carballar, M. R. Fernández-Ruiz, J. Azaña, "Design of Photonic Hilbert Transformers based on Impulsive Response Specifications," IEEE PHOTONICS CONFERENCE 2015 (IPC'2015), October 4-8, 2015, Reston, VA, USA. Paper WG1.4. IEEE Xplore.
- [D.23] M. R. Fernández-Ruiz, J. Azaña, A. Carballar, Lixian Wang, Sophie LaRochelle, "Hilbert Transformers based on Fiber Bragg Gratings in Transmission," PHOTONICS NORTH 2015, June 9-11, 2015, Ottawa, ON Canada. IEEE Xplore.
- [D.22] M. R. Fernández-Ruiz, A. Carballar, J. Azaña, "Ultrafast (THz-bandwidth) Photonic Hilbert Transformer Based on a Fiber Bragg Grating in Transmission," OSA TOPICAL MEETING ON BRAGG GRATINGS, PHOTSENSITIVITY AND POLING IN GLASS WAVEGUIDES (BGPP 2014), July 27-31, 2014, Barcelona, Spain. Paper BM3D.5

- [D.21] *M. R. Fernández-Ruiz, A. Carballar, J. Azaña*, “Ultrafast Arbitrary (Non-Minimum-Phase) Optical Pulse Processors Based On Bragg Gratings in Transmission,” CONFERENCE ON LASERS AND ELECTRO-OPTICS AND THE QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS’2014) - June 8 - 13, 2014, San Jose, CA, USA, Paper JW2A.42.
- [D.20] *M. R. Fernández-Ruiz, M. Li, M. Dastmalchi, A. Carballar, S. LaRochelle, J. Azaña*, “Pico-second Flat-Top Pulse-Shaper based on a Linearly-Chirped Fiber Bragg Grating in Transmission,” CONFERENCE ON LASERS AND ELECTRO-OPTICS (CLEO 2013), June 9-14, 2013, San Jose, CA, USA. Paper CF2G.6.
- [D.19] *M. R. Fernández-Ruiz, A. Carballar, J. Azaña*, “Ultra-fast all-optical Nth-order Differentiators based on Transmission Fiber Bragg Gratings,” IEEE PHOTONICS CONFERENCE (IPC 2012), Sep. 23 – 27, 2012, Burlingame, California, USA. Paper WCC-3.
- [D.18] *M. R. Fernández-Ruiz, A. Carballar, J. Azaña*, “Design of picosecond flat-top optical pulse generator using a linearly-chirped fiber Bragg grating in transmission,” OSA TOPICAL MEETING ON BRAGG GRATINGS, PHOTOSENSITIVITY AND POLING IN GLASS WAVEGUIDES (BGPP 2012), June 17-21, 2012, Colorado Springs, CO, USA. Paper BW4E.3.
- [D.17] *M. R. Fernández-Ruiz, A. Carballar, J. Azaña*, “Design of an ultra-fast all-optical first-order integrator based on waveguide Bragg Gratings,” 24<sup>th</sup> IEEE – PHOTONICS SOCIETY ANNUAL MEETING 2011, Oct. 9-13, 2011, Arlington, VA, USA. Paper ThO4.
- [D.16] *M. R. Fernández-Ruiz, A. Carballar*, “Minimum-Phase Reconstruction Method for the determination of the Specifications of FBG,” 7<sup>th</sup> INTERNATIONAL WORKSHOP ON FIBER OPTIC AND PHOTONIC COMPONENTS (WFOPC’11) – Jul. 13-15, 2011, Montreal, QC, Canada.
- [D.15] *M. R. Fernández-Ruiz, A. Carballar*, “Comprehensive and General Method for the Analysis and Synthesis of Fiber Bragg Gratings,” 7<sup>th</sup> INTERNATIONAL WORKSHOP ON FIBER OPTIC AND PHOTONIC COMPONENTS (WFOPC’11) – Jul. 13-15, 2011, Montreal, QC, Canada.
- [D.14] *L. M. Rivas, S. Boudreau, Y. Park, R. Slavík, S. LaRochelle, A. Carballar, J. Azaña*, “Ultrafast All-Fiber Third-Order Temporal Differentiator,” CONFERENCE ON LASERS AND ELECTRO-OPTICS AND THE QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS’09) - May 31- Jun. 5, 2009, Baltimore, Maryland, USA, Paper JWA32.
- [D.13] *L. M. Rivas, Y. Park, J. Azaña, S. Boudreau, S. LaRochelle, A. Carballar*, “Experimental All-Fiber Single-Device Second-Order Temporal Differentiator,” 21<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS’08) – Nov. 9-13, 2008, Newport Beach, CA, USA. Paper ThW.2.
- [D.12] *L. M. Rivas, Y. Park, J. Azaña, S. Boudreau, S. LaRochelle, A. Carballar*, “Optical Pulse Shaping for Ultrahigh-Bit-Rate Telecom Applications based on III-V Integrated Waeguide Bragg Gratings,” 34<sup>th</sup> EUROPEAN CONFERENCE ON OPTICAL COMMUNICATIONS (ECOC’08) – Sep. 21-25, 2008, Brussels, Belgium, P. 2.8.
- [D.11] *L. M. Rivas, K. Singh, A. Carballar, J. Azaña*, “First and Higher-Order All-Optical Temporal differentiators based on Fiber Bragg Gratings,” CONFERENCE ON LASERS AND ELECTRO-OPTICS AND THE QUANTUM ELECTRONICS AND LASER SCIENCE CONFERENCE (CLEO/QELS’07) – May 6-11, 2007, Baltimore, Maryland, USA, Paper CThKK3.
- [D.10] *C. Janer, L. M. Rivas, R. M. Rubio, J. L. Galo, L. Navarro, A. Carballar*, “Growth of second-order fiber gratings based on a new photosensitivity model,” SPIE - PHOTONICS NORTH 2005 – Sep. 12-14, 2005, Toronto, ON, Canada, Paper 5971A-21.
- [D.9] *L. M. Rivas, A. Carballar, C. Janer*, “Growth of second-order fiber gratings based on a new photosensitivity model,” SPIE - PHOTONICS NORTH 2005 – Sep. 12-14, 2005, Toronto, ON, Canada, Paper 5970A-10.
- [D.8] *A. Carballar, R. García-Olcina, L. M. Rivas*, “Second-order fiber gratings,” 17<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS’04) – Nov. 7-11, 2004, Rio Grande, Puerto Rico, vol. 2, Paper WDD3, pp. 719 – 720.

- [D.7] M. A. Muriel, J. Azaña, A. Carballar, "Signal processing techniques applied to fiber grating synthesis," BRAGG GRATINGS, PHOTSENSITIVITY, AND POLING IN GLASS WAVEGUIDES (OSA - BGPP'99), Sep. 23-25, 1999, Stuart, Florida, USA, Paper SaA1-1, pp. 250-251.  
**[Invited]**
- [D.6] A. Carballar, M. A. Muriel, J. Azaña, "Chanel selector for WDM systems based on transmissive chirped Moiré fiber grating," 11<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS'98) – Dec. 1-2, 1998, Orlando, Florida, USA, vol. 2 Paper FE4, pp. 325 – 326.
- [D.5] A. Carballar, M. A. Muriel, J. Azaña, "Internal Impulse Response in Fiber Gratings," 11<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS'98) – Dec. 1-2, 1998, Orlando, Florida, USA, vol. 1, Paper WO6, pp. 265 – 266.
- [D.4] M. A. Muriel, A. Carballar, J. Azaña, "Accurate and Fast Reflectivity estimation in Fiber Gratings," 11<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS'98) – Dec. 1-2, 1998, Orlando, Florida, USA, vol. 1, Paper WO5, pp. 263 – 264.
- [D.3] M. A. Muriel, J. Azaña, A. Carballar, "Time-frequency representations applied to Fiber Gratings synthesis," 24<sup>th</sup> EUROPEAN CONFERENCE ON OPTICAL COMMUNICATION (ECOC'98), Sep. 20-24, 1998, Madrid, Spain, vol. 1, Paper WdA01, pp. 383-384.
- [D.2] M. A. Muriel, A. Carballar, "Sidelobes suppression in Fiber Gratings: A New Design," INTERNATIONAL CONFERENCE ON APPLICATIONS OF PHOTONICS TECHNOLOGIES (ICAPT'98), Jul. 27 – 30, 1998, Ottawa, Ontario, Canada. Paper ICAPT98T118.
- [D.1] M. A. Muriel, A. Carballar, "Phase, Time Delay, and Impulse Response reconstruction from Reflected Poser in Uniform Fiber Bragg Gratings," 9<sup>th</sup> ANNUAL MEETING IEEE LASERS AND ELECTRO-OPTICS SOCIETY (LEOS'96) – Nov. 18-21, 1996, Boston, MA, USA, vol. 1, Paper TuCC5, pp. 380 – 381.

*· E.- Otros trabajos en conferencias nacionales, congresos y seminarios*

- [E.7] M. R. Fernández-Ruiz, A. Carballar, J. Azaña, "Design of ultrafast all-optical Nth-order differentiators based on fiber Bragg gratings operating in transmission," VIII REUNIÓN ESPAÑOLA DE OPTOELECTRÓNICA (OPTOEL'2013) – Jul. 10 - 12, 2013, Alcalá de Henares, Madrid, España, PO-SII-13.
- [E.6] A. Madera, A. Carballar, D. Jiménez, S. Borrero, F. Ferrero, M. Ortigosa, L. Pérez, E. Martín, R. Estepa, F. Varas, B. Real, J. L. Marijuán, "Proyecto MINERVA: 'Plataforma de Servicios en Movilidad – Cartuja93'," XII CONGRESO IBEROAMERICANO DE INTERNET, TELECOMUNICACIONES Y SOCIEDAD DE LA INFORMACIÓN (MUNDO INTERNET 2009) – Libro de Ponencias de Mundo Internet, Diciembre 2009, Málaga, España.
- [E.5] J. M. Rivera, A. Madera y A. Carballar, "Incógnitas de IMS y claves para su lanzamiento," XIX JORNADAS TELECOM I+D: INNOVANDO, CRECIENDO, AVANZANDO (TELECOM I+D 2009) – Nov. 24 - 26, 2009, Madrid, España.
- [E.4] A. Madera, J. M. Rivera y A. Carballar, "DVB-H: ¿Ficción o Realidad?," XIX JORNADAS TELECOM I+D: INNOVANDO, CRECIENDO, AVANZANDO (TELECOM I+D 2009) – Nov. 24 - 26, 2009, Madrid, España.
- [E.3] A. Madera, A. Carballar, "Minerva Project: On-the-Move Service Platform," VODAFONE ACADEMIC PARTNERS' SYMPOSIUM – Nov. 29 - 30, 2007, Munich, Germany.  
**[Invited]**
- [E.2] A. Madera, A. Carballar, A. García, S. Borrero, F. Ferrero, M. Ortigosa, L. Pérez, E. Martín, R. Estepa, E. Atienza, B. Real, A. Villegas, J. L. Marijuan, "Proyecto MINERVA: 'Plataforma de Servicios en Movilidad – Cartuja93'," XVII JORNADAS TELECOM I+D: EL DESAFIO DE LA SOCIEDAD DEL CONOCIMIENTO (TELECOM I+D 2007) – Oct. 29 - 31, 2007, Valencia, España.

- [E.1] A. Carballar, Luis M. Rivas, Raimundo García, “Redes de difracción de Bragg de Segundo orden,” XIX SIMPOSIUM NACIONAL DE LA UNIÓN CIENTÍFICA INTERNACIONAL DE RADIO (URSI 2004) – Sep. 8 - 10, 2004, Barcelona, España.

· F.- Notas o resúmenes publicados o aceptados

- [F.1] M. A. Muriel, A. Carballar, “Internal characterization of Fiber Bragg Gratings,” OPTICS & PHOTONICS NEWS, vol. 10 pp. 15 – 16 (1999).  
**[Selected by the OSA as one of the most relevant scientific achievements within the area of optics in the year 1999]**

## C.2. Proyectos de Investigación, Contratos y Méritos en Transferencia de Tecnología

2023 - 2027	128.75 K€	HORIZON2020 – ASTERix-CAESar (Principal Investigator-US): “Air-based solar thermal electricity for efficient renewable energy integration & compressed air energy storage”, in WP5: “Automatization and improved plant operation and monitoring via AI methods”.
2023 - 2024	27.72 K€	Contract with AERTEC – AICIA – PI-2286/33/2023 (Principal Investigator): “Four-quadrants positioning system based on high-energy semi-active pulsed laser”; inside the FOX Project.
2022 - 2024	172.5 K€	MCel – TED2021-132190B-C22 (Principal Investigator): “Control flux system for central solar fuel Tower plants using artificial intelligent and ad-hoc Optic seNsors (CATION)”.
2022 - 2025	84.7 K€	MCel – PID2021-125786OB-C22 (Principal Investigator): “Innovative control system development based in artificial intelligent and ad hoc sensors for high flux density in concentrating solar tower plants. (CHLOE)”.
2016 - 2018	80. K€	Contract with MESUREX – AICIA – PI-1652/33/2016 (Principal Investigator): “Measurement System of Concentrated Solar Flux for Solar Power Tower Receiver”; inside the FEDER ININTERCONECTA Project EFECTO.
2015 - 2016	3.0 K€	Contract with AERTEC – AICIA – PRJ201302071 (Principal Investigator): “Design of Optical Receiver for Pulsed Laser Tracking in Future Precision Strike Missile Systems”; inside the ATK4GB Project.
2013 - 2014	7.6 K€	Contract with WININERTIA – FIUS – PRJ201302071 (Principal Investigator): “Fiber optic-based sensing systems for testing and measurement of effects caused by extreme climates on high performance railway infraestructure located in arid areas”; inside the FEDER ININTERCONECTA Project ARID-LAP.
2013	31 K€	Contract with TEAMS (Testing and Engineering of Aeronautical Materials and Structures S. L.) – AICIA – PI-1094/27/2013 (Principal Investigator): “Wireless Data Acquisition System Study”; , inside the FP7 European Project WISDOM (Wing Structural Test Development Method) - JTI-CS - Joint Technology Initiatives - Clean Sky.
2011	3.9 K€	Andalusian Government CEIC – IAC10-II-7883 (Principal Investigator): “Complete characterization of fiber Bragg gratings by using spectral interferometry and phase reconstruction algorithms.

2011	4.7 K€	Contract with Payán&Lara S.L. – FIUS - PRJ201101112 (Principal Investigator): “ <i>Report on the movement of materials between a company’s aviation industry and its major customer</i> ”.
2006 - 2010	1.9 M€	Andalusian Government + VODAFONE – MINERVA Project (Principal Investigator – Project Manager): “ <i>MINERVA Project: “On-the-Move Services Platform-Cartuja93”</i> ”.
2002 - 2005	57.4 K€	MCyT – TIC2001-2969-C03-02 (Principal Investigator): “ <i>Synthesis and Design of fiber Bragg gratings for optical signal processing in DWDM and OTDM systems</i> ”.
2002	54 K€	MCyT + ENDESA Telecommunication Engineering – FIT-070100-2001-4 (Principal Investigator): “ <i>Design of a set-top box for hybrid optical fiber and powerline communication systems</i> ”, with R. Denda.
2002 - 2003	67.3 K€	MCyT – TIC2000-0344-P4-4 (Assistant Researcher): “ <i>Development of a high-precision sensor for the incident angle of a light beam by using mechatronic technology</i> ”, Principal Investigator: J. M. Quero.
1998 - 2001	21.6 K€	CICyT – TIC98-1073-C02-01 (Assistant Researcher): “ <i>Fiber Bragg gratings applied to optical signal processing</i> ”, Principal Investigator: M. A. Muriel.
1995 - 1998	85.3 K€	CICyT – TIC95-0250-C02-01 (Assistant Researcher): “ <i>Development of new photonic devices based on fiber Bragg gratings, and its applications in optical communications</i> ”, Principal Investigator: M. A. Muriel.

### C.3. Patentes de invención

- [5] “Device and Procedure of Radiometry for the Solar Irradiance Measurement” (with R. Rodríguez-Garrido), Spanish Patent Application No. P202030682. International extension application: PCT/ES2021/070482.
- [4] “Measurement Apparatus and Method based on OFDR with balanced detection and noise reduction” (with L. Romero), Spanish Patent No. P201200473, valid from May 3rd, 2012.
- [3] “Measurement Method and Apparatus for the characterization of optical and photonic devices” (with C. Janer), Spanish Patent No. P201101161, valid from Oct. 20th, 2011. International extension: PCT/ES2012/000268
- [2] “Fiber Bragg grating design method based on grating period variation for its application as optical filter” (with M. A. Muriel and J. Azaña), Spanish Patent No. P9900390, valid from Feb. 25th, 1999.
- [1] “Fourier transformer of time-domain optical signals, based on fiber Bragg gratings” (with M. A. Muriel and J. Azaña), Spanish Patent N°. P9802483, valid from Nov. 26<sup>th</sup>, 1998.

### C.4.- Becas y Premios de investigación

Jun. 2011 – Sep. 2011	<b>Visiting Professor Fellowship</b> from the Ministry of Science and Technology, Government of Spain. Researcher at <i>Institut National de la Recherche Scientifique - Énergie, Matériaux et Télécommunications (INRS-EMT)</i> , Montreal, Quebec, CANADA.
Feb. 2008	<b>2007 University-Company Collaboration Prize to the MINERVA Project</b> from the FUE Spanish Network in the ICT category.
Dec. 2000	<b>Extraordinary Prize to the Best Doctoral Thesis</b> from the <i>Universidad Politécnica de Madrid (UPM)</i> , Spain.





- Mar. 2000                    **XX National Lucent Technologies Prize to the “Best Doctoral Thesis in Telecommunication Networks”** from the Spanish National Association of Telecommunication Engineers.
- Jan. 1996 – Sep. 1999    **FPU (“Training for University Professors”) Fellowship** (providing financial support for doctoral studies) from the Spanish Government.

## **C.5.- Otras actividades, Servicios y Contribuciones**

### **Miembro de Comités**

- Valued **IEEE Senior Member** (Photonics Society Membership) and **OSA Senior Member**.
- Member of the **Technical Program Committee** of various national scientific conferences in optics and photonics, including OPTOEL and URSI.
- **Member** of the quality national assessment committee “Towards the European Higher Education Area”, Telecommunication Engineering (US).
- **Member** of the Working Group 15 of CIGRÉ (International Council on Large Electric Systems) SC35 – Optical Infrastructure and Optronics.
- **Member of various committees at University of Seville**, including (i) *Assessment Committee* for the Lifelong Learning Center; (ii) *Evaluation Committee* for the Library; and (iii) *Research Committee* at the Electronic Engineering Department.

### **Actividades de revision**

- External evaluator of several graduate (Master and PhD) thesis.
- Frequent referee of manuscripts submitted to peer-review scientific journals, including the following ISI journals: *Optics Letters*, *Optics Express*, *IEEE Photonics Technology Letters*, *IEEE/OSA Journal of Lightwave Technology*, *IEEE Journal of Quantum Electronics*, *Journal of the Optical Society of America B*, *Optics Communications*, *IEEE Photonics Journal*, *IEEE Journal of Selected Topics in Quantum Electronics*, *IEE Electronics Letters*, *Sensors*, *Applied Sciences*, etc. (**~6 reviews/year**).
- Grant reviewer for research funding agencies from Spain (CAM, ANECA, AGAE) and abroad (**European Commission H2020 and HORIZON**).
- Reviewer for research certification agencies from Spain (ACIE, FINESE).

### **Experiencia en Cursos de Postgrado**

**“VODAFONE COURSE”** (Organizer and Coordinator): This course has been sponsored and supported by Vodafone Spain Foundation and Andalusian Government.

- 1st ed. (2003): “Mobile Communications: GSM, GPRS and UMTS” (with Prof. Ramón Agustí)
- 2nd ed. (2004): “Mobile Communications and Services: GSM, GPRS and UMTS” (with Prof. J.M. Hernando)
- 3rd ed. (2005): “Mobile Technologies and Applications: GPRS and UMTS” (with Prof. J.M. Hernando)
- 4th ed. (2006): “Mobile Technologies and Applications: GPRS and UMTS” (with Prof. J.M. Hernando)
- 5th ed. (2007): “Mobile Technologies and Applications: GPRS and UMTS”
- 6th ed. (2008): “Mobile Technologies and Applications: GPRS and UMTS”
- 7th ed. (2009): “Mobile Technologies and Applications: GPRS and UMTS”
- 8th ed. (2010): “Mobility Communications: Technologies, Services and New Business Cases”
- 9th ed. (2011): “Mobility Communications: Technologies, Services and New Business Cases”
- 10th ed. (2012): “Mobility Communications: Technologies, Services and New Business Cases”
- 11th ed. (2013): “Mobility Communications: Technologies, Services and New Business Cases”