MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

**CURRICULUM VITAE (CVA)**

*IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.*

| **CV date** | 05/09/ 2022 |
|---|---|

## Part A. PERSONAL INFORMATION

| | | | |
|---|---|---|---|
| First name | Ignacio | | |
| Family name | Esquivias Moscardó | | |
| Gender (*) | Male | Birth date (dd/mm/yyyy) | |
| Social Security, Passport, ID number | | | |
| e-mail | | URL Web: www.cemdatic.upm.es | |
| Open Researcher and Contributor ID (ORCID) (*) | | 0000-0001-7298-8271 | |

*(*) Mandatory*

### A.1. Current position

| | | | |
|---|---|---|---|
| Position | Full Professor | | |
| Initial date | 12-11-2001 | | |
| Institution | Universidad Politécnica de Madrid | | |
| Department/Center | Centro de Materiales y Dispositivos Avanzados para las TICs (CEMDATIC | | |
| Country | Spain | Teleph. number | |
| Key words | Photonics, Semiconductors, Optoelectronics, Laser diodes, Optical Communications, LIDAR | | |

### A.2. Previous positions (research activity interruptions, art. 14.2.b))

| Period | Position/Institution/Country/Interruption cause |
|---|---|
| 1/10/92- 11/11/01 | Prof. Titular Universidad, Universidad Politécnica de Madrid, Spain |
| 11/1/91-30/9/92 | Invited Scientist (Científico Invitado) Fraunhofer IAF (Freiburg, Germany) |
| 1/ 10/77- 24/2/86 | Asisstant Professor UNIVERSIDAD POLITÉCNICA DE MADRID, Spain |
| 1/10/75-30/9/77 | Research training UNIVERSIDAD POLITÉCNICA DE MADRID, Spain |

### A.3. Education

| PhD, Licensed, Graduate | University/Country | Year |
|---|---|---|
| Telecommunication Engineer (MoS) | Universidad Politécnica de Madrid | 1977 |
| PhD | Universidad Politécnica de Madrid | 1983 |

## Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Between 1977 and 1983 he developed his doctoral thesis at the Universidad Politécnica de Madrid (UPM) in the Semiconductor Laboratory of the ETSI Telecommunication, in thin-film solar cells. From 1984 to 1990 he worked in HgCdTe infrared detectors and in 1986 he obtained a position as Associated Professor in the Department of Electronic Technology of the ETSIT-UPM. Between 1990 and 1992 he was with the Fraunhofer Institute of Applied Solid State Physics of Freiburg (Germany), working on high-speed quantum well lasers. He rejoined the UPM, at the Department of Photonic Technology, and since 1993 he started a research line focused on semiconductor lasers. He reached the category of Full Professor in 2001. He is a member of the Applied Photonics Group and of the CEMDATIC of the UPM.

In the field of laser diodes, he has been Principal Investigator (PI) in 15 projects (5 of the European Commission and 8 of the Spanish National Plan or equivalent) and coordinator of the European FP7-

SPACE STREP Project "BRITESPACE". He has participated as PI or researcher in five ESA ITTs in collaboration with the company ALTER TECHNOLOGY. He has published more than hundred articles in indexed journals or international congress proceedings with reviewer, he has participated in more than hundred conferences, he has directed 9 PhD theses, and he has registered a laser diode simulation program in commercial exploitation.

He has had different academic responsibilities: Vice-director for academic matters E.T.S.I. Telecomunicación-U.P.M., from 1.11.2002 to 31.3.2004; Head of "Departamento de Tecnología Fotónica" ETSIT-UPM from 1.11.2006 to 31.10.08; Vicedirector of "Departamento de Tecnología Fotónica" from 1.11.2008 to 20.12.2010, and from 12.07.2019 until today; Commitee member of "Comisión de Acreditación C11- ANECA" from 2016 to 2021. From 2018 he is Director of "Cátedra Alter Technology Desarrollo e Innovacion en Fotónica".

7 recognized research tracks (sexenios) Last one: Dec/31/2019.
1 recognized technology transfer track (sexenio). Dec/31/2019
Sum of Times Cited: 1136 h-Index: 18 (Web of Science 05/09/22)
Sum of Times Cited: 1910; h-index 22 (Google Scholar 05/09/22)
Profile: https://scholar.google.es/citations?user=IBlnWMcAAAAJ&hl=es

## Part C. RELEVANT MERITS *(sorted by typology)*

### C.1. Publications *(see instructions)*

Rosado, Alejandro, et al. "High-density and broad band optical frequency combs generated by pseudo-random phase modulation of optically injected gain-switched semiconductor lasers." *Optics & Laser Technology* 163 (2023): 109312.

1. Scientific paper. Pérez-Serrano, A., Quevedo-Galán, C., Aguilera-Sánchez, V. R., Tijero, J. M. G., & Esquivias, I. (2022). Differential Absorption Lidar Transmitter Based on an Indium Phosphide Photonic Integrated Circuit for Carbon Dioxide Sensing. IEEE Journal of Selected Topics in Quantum Electronics, 28(5), 1-8.
2. Scientific paper. C. Quevedo-Galán, A. Pérez-Serrano, I. E. López-Delgado, J. M. G. Tijero and I. Esquivias. “Dual-comb spectrometer based on gain-switched semiconductor lasers and a low-cost software-defined radio” IEEE Access 9, pp. 92367-92373 (2021).
3. Scientific paper. C. Quevedo-Galán, V. Durán, A. Rosado, A. Pérez-Serrano, J. M. G. Tijero and I. Esquivias. “Gain-switched semiconductor lasers with pulsed excitation and optical injection for dual-comb spectroscopy” Optics Express 28(22), pp. 33307-333 17 (2020).
4. Scientific paper. A. Quirce, A. Rosado, J. Díez, A. Valle, A. Pérez-Serrano, J. M. G. Tijero, L. Pesquera and I. Esquivias, "Nonlinear dynamics induced by optical injection in optical frequency combs generated by gain-switching of laser diodes", IEEE Photon. J., vol. 12, no 4 1503314 (2020).
5. Scientific paper. A. Rosado; E. P. Martin; A. Pérez-Serrano; J. M. G. Tijero; I. Esquivias, and P. M. Anandarajah "Optical frequency comb generation via pulsed gain-switching in externally injected semiconductor lasers using step-recovery diodes", Optics and Laser Technology 131 (2020) 106392.
6. Scientific paper. A. Perez-Serrano, J. G. Tijero, S. Balle and I. Esquivias, (2019), "Numerical Analysis of the Modulation Dynamics in an Integrated Three-Section MOPA using a Voltage Driven Traveling-Wave Model," in IEEE Journal of Selected Topics in Quantum Electronics 25(6), 1-10,
7. Scientific paper. Rosado, A., Pérez-Serrano, A., Tijero, J. M. G., Valle, Á., Pesquera, L., & Esquivias, I. (2019). Enhanced optical frequency comb generation by pulsed gain-switching of optically injected semiconductor lasers. Optics Express, 27(6), 9155-9163.
8. Scientific paper. A. Rosado; A. Pérez-Serrano; J. M. G. Tijero; A. Valle; L. Pesquera; I. Esquivias. 2018. Experimental study of optical frequency comb generation in gain-switched semiconductor lasers. Optics and Laser Technology, vol. 108, pp. 542-550.
9. Scientific paper. A. Pérez-Serrano; M. Vilera; J. M. G. Tijero; S. Balle; I. Esquivias. 2018. A voltage driven traveling-wave model for the simulation of an integrated three-section MOPA under static and modulated operation. IEEE Journal of Quantum Electronics, vol. 54, no. 2, 1100210.
10. Scientific paper M. Quatrevalet, X. Ai, A. Pérez-Serrano, P. Adamiec, J. Barbero, A. Fix, J. M. G. Tijero, I. Esquivias, J. G. Rarity and G. Ehret, “Atmospheric CO2 Sensing with a Random Modulation

Continuous Wave Integrated Path Differential Absorption Lidar," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 23, no. 2, 5300311 (2017).

## C.2. Congress

1. Oral contribution. A. Pérez-Serrano; C. Quevedo-Galán; V.R. Aguilera; P. Castera; J.M.G.Tijero; I. Esquivias. 2021. "Differential absorption lidar transmitter based on a photonic integrated circuit for carbon dioxide sensing," Frontiers in Optics + Laser Science (FiO+LS) 2021, Online, FM1B.4. 01/11/21-05/11/21.
2. Oral contribution. C. Quevedo-Galán; A. Rosado; V. Duran; A. Pérez-Serrano; J.M.G. Tijero: I. Esquivias. 2020. "100-MHz dual-comb spectroscopy by pulsed gain-switching of externally injected semiconductor lasers," Frontiers in Optics + Laser Science (FiO+LS) 2020, Online, LM5F.2. 14/09/20-17/09/20.
3. Oral contribution. A. Rosado; J. Diez; A. Quirce; A. Perez-Serrano; J.M.G. Tijero; A. Valle; L. Pesquera; I. Esquivias. 2020. "Experimental and numerical analysis of optical frequency comb generation in gain-switched semiconductor lasers subject to optical injection," SPIE Photonics Europe 2020, Online. Proc. of SPIE. 11356 - 4, 113560E. 06/04/2020-10/04/2020.
4. Oral contribution. A. Rosado; A. Perez-Serrano; J.M.G. Tijero; A. Valle; L. Pesquera; I. Esquivias. 2019. "Optical frequency comb generation from semiconductor lasers using optical injection and pulsed gain switching," CLEO/Europe – EQEC 2019, Munich (Germany). 23/06/19-27/06/19.
5. Oral contribution. A.Rosado, A.Perez-Serrano, J.M.G.Tijero, A.Valle, L.Pesquera and I.Esquivias, "Analysis of Optical Frequency Comb Generation in Gain-Switched Semiconductor Lasers, CLEO/Europe – EQEC 2019. Munich, Alemania. 23/06/19-27/06/19.
6. Oral contribution. A. Perez-Serrano, M. Vilera, J.M.G. Tijero, S. Balle, I. Esquivias, "A Voltage Driven Dynamic Traveling-Wave Model for Active Integrated Photonic Device", European Conference on Integrated Optics ECIO 2018, Valencia (Spain), May 30 - June 1, 2018.
7. Oral contribution. A. Rosado, A. Pérez-Serrano, J.M. G. Tijero, A. Valle, L. Pesquera, I. Esquivias "Optical Frequency Comb Generation in Gain Switched DFB and Discrete Mode Lasers: Comparison and Optical Injection Effects", 44th European Conference on Optical Communication (ECOC), Bari (Italy), 23-27 – September 2018.
8. Oral contribution. M. Vilera; M. Faugeron; A. Pérez-Serrano; J.M.G. Tijero; M. Krakowski; F. van Dijk; I. Esquivias. 2016. "Three-section master oscillator power amplifier at 1.57 um for LIDAR measurements of atmospheric carbon dioxide," SPIE Photonics West 2016, San Francisco CA, (USA). Proc. of SPIE. 9767, 97671K. 13/02/16-18/02/16.
9. Oral contribution. A. Pérez-Serrano; M. Vilera; I. Esquivias; …; G.Ehret. 2015. "Atmospheric CO2 remote sensing system based on high brightness semiconductor lasers and single photon counting detection," SPIE Remote Sensing 2015, Toulouse (France). Proc. of SPIE. 9645, 964503. 21/09/15-25/09/15.
10. Oral contribution. M. Vilera; A. Pérez-Serrano; J. Javaloyes; J.M.G. Tijero; I. Esquivias; S. Balle. 2015. "Longitudinal multimode dynamics in monolithically integrated master oscillator power amplifiers," CLEO/Europe - EQEC 2015, Munich (Germany). 21/06/15-25/06/15.

## C.3. Research projects

1. Reference: RTI2018-094118-B-C21. LIDERA: Sistemas lidar avanzados basados en peines de frecuencia ópticos, tecnologías coherentes y señales caóticas
   PIs: José Manuel García Tijero and Ignacio Esquivias
   Funded by: Ministerio Ciencia, Innovación y Universidades
   Duration: 1/1/2019 - 31/12/2021
2. Reference S2018/NMT-4326
   Title: "SINFOTON2-CM: (Sensores y sistemas de instrumentación basados en tecnologías fotónicas). Programa de Actividades de I+D para consorcios de Grupos de Investigación de la Comunidad de Madrid).
   Funded by Comunidad Autónoma de Madrid,
   Coordinated project (5 partners).

Starting date: 1/1/2019, four years.
Principal Investigator (UPM): Xabier Quintana Arregui. Project coordinator: Carmen Vázquez (Universidad Carlos III de Madrid).

3. Reference: ESA ITT AO/1-8427/15NL/RA/ZK
   Title: "Optical Switch for Space Applications with no Moving Parts"
   PI: José Manuel García Tijero
   Funded by: European Space Agency (ESA)
   Duration: 4/2016 – 11/2017
4. Reference: TEC2015-65212-C3-2-P. COMBINA (Peines de frecuencia generados por láseres de Semiconductor)
   PI: José Manuel García Tijero
   Funded by: Ministerio de Economía, Industria y Competitividad
   Duration: 1/1/2016 - 30/6/2019
5. Reference S2013/MIT-2790
   Title: "SINFOTON-CM: (Sensores y sistemas de instrumentación basados en tecnologías fotónicas). Programa de Actividades de I+D para consorcios de Grupos de Investigación de la Comunidad de Madrid).
   Funded by Comunidad Autónoma de Madrid,
   Coordinated project (5 partners).
   Starting date: 1/10/2014, four years. Principal Investigator (UPM): J.M. Otón Sánchez. Project coordinator: Carmen Vázquez (Universidad Carlos III de Madrid).
6. Reference: TEC2012-38864-C03-02. Técnicas de medición de distancias basadas en láseres de semiconductor avanzados (RANGER)
   PI: José Manuel García Tijero
   Funded by:Ministerio de Ciencia e Innovación
   Duration: 1/1/2013 a 31/12/2015
7. Reference: EU 7th FWP SPA. 2012.2.2-01 FP7-SPACE (313200).
   BRITESPACE (High brightness semiconductor laser sources for space applications in Earth observation).
   PI: Ignacio Esquivias (Coordinator). (Universidad Politécnica de Madrid).
   Coordinated project (6 partners).
   Duration 1/12/2012 – 28/02/2016.
8. Reference: TEC2009-14581-C02-01
   Title: Láseres de semiconductor avanzados para procesado todo-óptico de señal y generación de pulsos cortos. (ALAS)
   PI: Ignacio Esquivias Moscardó
   Funded by: Ministerio de Ciencia e Innovación
   Duration:1/1/2010 - 30/06/2013
9. "FACTOTEM2: Fotónica Aplicada para la Creación de Tecnologías Ópticas y su Transferencia a Empresas Madrileñas" (Programa de Actividades de I+D para consorcios de Grupos de Investigación de la Comunidad de Madrid)
   Comunidad Autónoma de Madrid Ref: S2009/ESP-1781, Coordinated project (5 partners).1/1/2010: 31/12/2013
   Principal Investigator (UPM) and Project coordinator: J.M. Otón Sánchez
10. Reference: ESA-2005 ITT 4862
    Title: "Multi-Gigahertz Optical Modulator of Very Low Driving Power"
    PI: Ignacio Esquivias
    Funded by: European Space Agency (ESA)
    Duration: 09/2006 – 04/2015

## C.4. Contracts, technological or transfer merits

IPR (registered program)
I. Esquivias, G. Batko, J. Arias, B. Romero
Computer Program HAROLD 3.0, for the simulation of High Power Laser Diodes
September 1999
Under commercial exploitation by Photon Design (UK), from 1.11.1999 to present (annual royalties)