MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE ABREVIADO (CVA)

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

Part A. PERSONAL INFORMATION

First name	Jose María		
Family name	Ulloa		
Gender (*)		Birth date	
Social Security, Passport, ID number			
e-mail	josem.ulloa@upm.es	URL Web: http://www.isom.upm.es/inicio/	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-5679-372X	

(*) Mandatory

A.1. Current position

Position	Associate Professor		
Initial date	17/10/2021		
Institution	Universidad Politécnica de Madrid		
Department/Center	Institute for Optoelectronic and Microtechnology (ISOM)		ETSIT
Country	Spain	Teleph. number	910672597
Key words	Semiconductors, nanostructures, quantum dots, molecular beam epitaxy, photonic devices		

A.2. Previous positions (research activity interuptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
10/1999 – 03/2005	PhD Student / ETSIT UPM / Spain
03/2005 – 08/2005	PostDoc / ETSIT UPM / Spain
08/2005 – 11/2007	PostDoc / Tec. Univ. Eindhoven / The Netherlands
12/2007 – 12/2009	Juan de la Cierva UPM / ISOM UPM / Spain
01/2010 – 12/2015	Ramón y Cajal / ISOM UPM / Spain
01/2016 – 10/2021	Prof. Contratado Doctor / ISOM-Ciencia Mat. UPM / Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD Physics	Universidad Politécnica de Madrid / Spain	2005
BSc Physics	Universidad Complutense de Madrid / Spain	1999

Part B. CV SUMMARY

Jose Maria Ulloa received his Degree in Physics in June 1999 by Universidad Complutense de Madrid (UCM). During the last year of the Physics Degree, he already started doing research in the Materials Physics Department of UCM with an official collaboration grant by the Science and Technology Ministry. He moved to the E.T.S.I. Telecomunicación in Universidad Politécnica de Madrid (UPM), where he did his PhD with an official FPI grant from the Comunidad de Madrid. He received his PhD from UPM in 2005 as well as the UPM's **"premio extraordinario de doctorado"**. During his PhD he made important contributions to the development of diluted nitride QW-based laser diodes and stayed abroad during 4 months at Thales Research and Technology (France) and University of Sheffield (UK).

After his PhD, he joined as a post-doc the Photonic and Semiconductor Nanophysics group at the **Technical University of Eindhoven (The Netherlands), where he stayed for 27 months**. There he worked mainly on the atomic-scale structural characterization of quantum dots (QD) by Cross-sectional Scanning Tunnelling Microscopy. The results of his work in this period lead to an important progress in the understanding of the QD formation process, revealing the crucial role of the capping process. All these results were widely recognized and led to three **invited talks** by the candidate at international conferences,

including one **at the ICPS** (Inter. Conf. on the Physics of Semiconductors) 2006, **the most important conference in the field of semiconductors**.

In November 2007 he left Eindhoven and joined the Institute for Optoelectronic Systems and Microtechnology (ISOM)-UPM, where in 2009 he received the prestigious "**Ramón y Cajal" Research Fellowship**. At ISOM-UPM he created his own research group and leads his own research line focused on the Molecular Beam Epitaxy (MBE) growth and application of novel nanostructures to photonic devices. In particular, he has been working in novel GaAs-based QD architectures involving Sb and N, demonstrating enormous strain and band structure engineering possibilities. Moreover, he combines both fundamental studies with the implementation of the nanostructures into devices (including LEDs, LDs, photodetectors, solar cells and single photon emitters). In this way **he has demonstrated significant improvements in device performance using novel nanostructure designs**. His work in this period has also been widely recognized with several invited talks and awards (see section C.7), including the **award "Margarita Salas de Investigación 2021 en ciencias básicas"** to the PhD Thesis of A. Gonzalo supervised by J.M.Ulloa (recognizes the best Thesis in science in the whole Comunidad de Madrid in the last two years). At ISOM he was responsible of the ISOM's Structural Characterization Lab (Jan. 2008 to Jan. 2012), and is now responsible of the ISOM's Optical Characterization Lab since Jan. 2012. In Dec. 2014 he became "Profesor Contratado Doctor" at UPM and started teaching at the "Departamento de Ciencia de Materiales", where he became Associate Professor in 2021. His overall research trajectory was recognized in 2016 with the **Young Researcher Medal from the Spanish Royal Engineering Academy.**

He has 3 "sexenios de investigación" granted (2000-2017). He has worked in **28 funded projects** (9 of them funded by the EU, 2 funded by the EOARD and Air Force Research Laboratory (USA)). Has been **PI of 9 projects** (including an ITN and two COST Actions). He is author or co-author of **6 book chapters** and **145 documents in WOS** (including 2 invited review papers): 76% in Q1, 18% in Q2 and 6% in Q3. His work has received 1720 / 2364 citations (WOS / Google Schoolar). H index: 21 (WOS) / 26 (Google Schoolar). He has contributed to more than **150 international conferences**, including **1 keynote talk** (50 min.), **21 invited talks** and 1 international Training School (2 h).

He has been **project evaluator for ANEP and DOE** (Department of Energy, EE.UU.) and has been member of 10 PhD Thesis panels. He is also reviewer of international high impact journals: Nanoscale, Solar Energy Materials and Solar Cells, Applied Physics Letters, Nanotechnology, Photonic Technology Letters etc. He has been involved in the organization of several international conferences (see C.6) and has participated in outreach activities, such as the Science Week 2022 or the organization as chair of an international Summer School for students (see C.6).

He has recently become **founding partner and responsible of device fabrication of the deep-tech startup g2-Zero** (NIF: B02924728), created in December 2020 and dedicated to quantum technologies. The company has obtained public and private investment for total value of 900,000€ and has **4 employees**.

Part C. RELEVANT MERITS

C.1. Publications

1) Pengfei Guo, Hongfu Zhu, Wenhao Zhao… last and CA: Hongqiang Wang, 13/15, "Interfacial Embedding of Laser Manufactured Fluorinated-Gold-Clusters Enabling Stable Perovskite Solar Cells with Efficiency Over 24%", **Advanced Materials** 2101590 (2021)

2) A.Gonzalo, A.D.Utrilla, U.Aeberhard… last and CA: JM Ulloa, 13/13, "Diluted nitride type-II superlattices: Overcoming the difficulties of bulk GaAsSbN in solar cells" Sol. Energy Mater. Sol. Cells 210, 110500 (2020)

3) A. Hierro, M. Montes Bajo, M. Ferraro… last: P.Genevet, CA: A.Hierro, 8/10, "Optical Phase Transition in Semiconductor Quantum Metamaterials", **Phys. Rev. Lett.** 123, 117401 (2019)

4) J. M. Llorens, V. Lopes-Oliveira, V. Lopez-Richard, J. M. Ulloa and B. Alen, "From dot to ring: tunable exciton topology in type-II InAs/GaAsSb quantum dots", **book chapter** in "Physics of Quantum Rings" 2nd Edition, NanoScience and Technology Series, ISBN: 978-3-319-95159-1, **Ed. Springer-Verlag** (2018)

5) Utrilla A D, Grossi D F, Reyes D F… last and CA: JM Ulloa, 11/11, "Size and shape tunability of self-assembled InAs/GaAs nanostructures through the capping rate", Appl. Surf. Sci. 444, 260 (2018)
6) A. Gonzalo, A. D. Utrilla, D. F. Reyes… last and CA: JM Ulloa, 12/12, "Strain-balanced type-II superlattices for efficient multi-junction solar cells", Scientific Reports 7, 4012 (2017)
7) J.K Garleff, J.M.Ulloa, and P.M.Koenraad, "Semiconductors studied by Cross-sectional Scanning Tunneling Microscopy", **book chapter** in "Scanning Probe Microscopy in Nanoscience and Nanotechnology" Vol. 2, NanoScience and Nanotechnology Series, ISBN: 978-3-642-10496-1, **Ed. Springer-Verlag** (2011)
8) J.M.Ulloa, P.Offermans and P.M.Koenraad, "InAs quantum dot formation studied at the atomic scale by cross-sectional scanning tunneling microscopy", **book chapter** in "Self-Assembled semiconductor Nanostructures for new Devices in photonics and Electronics" ISBN: 978-0-08-046325-4, **Ed. Elsevier** (2008)

C.2. Congress
1) A.Guzman, M.J.Milla, J.M.Ulloa, "High sensitivity to environment of InGaAs surface nanostructures", invited talk, Workshop on Frontier Photonic and Electronic Materials and Devices, Kyoto, Japan, 11-14/07/2015
2) A.Guzman, M.J.Milla, J.M.Ulloa, "Optical emission of uncapped surface quantum dots", invited talk, German-Japanese-Spanish Joint Workshop on Frontier Photonic and Electronic Materials and Devices, Berlin, Germany, 21/07/2012
3) J.M.Ulloa and P.M.Koenraad, "Capping of InAs quantum dots studied by cross-sectional scanning tunneling microscopy", **keynote talk (50 minutes)**, Epitaxial Growth and Fundamental Properties of Semiconductor Nanostructures, Bonassola, Italy, 17-22/09 2006
4) J.M.Ulloa, C.Celebi, P.M.Koenraad, A.Simon, A.Letoublon, and N.Bertru, "Effect of the capping process on the structural properties of InAs quantum dots studied by cross-sectional scanning tunneling microscopy", invited talk, International conference on the Physics of Semiconductors (ICPS), Vienna, Austria, 24-28/07 2006
5) J.M.Ulloa and P.M.Koenraad, "Quantum dot formation studied at the atomic scale by cross-sectional scanning tunneling microscopy", invited talk, International Workshop on Semiconducting Nanoparticles", Duisburg, Germany, 07-08/12 2006

C.3. Research projects
1) Next Generation Telecomm Single Photon Sources, PID2022-136626OB-C32, MICINN, Duration: 01/01/2024 - 31/12/2026. Funding: 189.750,00 € **+ FPI, PI: Jose María Ulloa** (UPM)
2) Proyecto coordinado de comunicaciones cuánticas: Comunidad de Madrid, M220920B050PRTR, Comunidad de Madrid/Next Generation, Duration: 2022 – 2025. Funding: **1.811.000 €,** type of participation: researcher, PI: Zarko Gacevic (ISOM-UPM), Coordinator: Vicente Martín (UPM)
3) QUANTUM SEMICONDUCTOR TECHNOLOGIES EXPLOITING ANTIMONY, GA-956548, European Comisión, **H2020-MSCA-ITN-2020**, Duration: 01/12/2020 - 30/11/2024. Funding: 250.904,88 €, **PI: Jose María Ulloa** (ISOM-UPM)
4) Quantum Antimonides for Quantum Photonics and Photovoltaics (QUANTIMONICS), PID2019-106088RB-C32, Ministerio de Ciencia e Innovación, Duration: 01/06/2020 - 31/05/2023. Funding: 82.280,00 €, **PI: Jose María Ulloa** (ISOM-UPM)
5) Zinc Oxide For TeraHertz Cascade Devices (ZOTERAC), FET 665107, European Comisión, **Horizon 2020, FET**, Duration: 01/9/2015 - 31/08/2019. Funding: 698.871,00 €, type of participation: researcher, PI: Adrián Hierro (ISOM-UPM)
6) MultiscaleSolar - Multiscale in modelling and validation for solar photovoltaics, **COST Action** MP-1406, European Comisión, Horizon 2020, Duration: 01/05/2015 - 01/05/2019. Funding: 515.000 €**, PI: Jose María Ulloa** (ISOM-UPM)
7) Novel Sb-containing nanostructure architectures for high efficiency photovoltaic applications, MAT2016-77491-C2-1-R, MINECO, Duration: 01/01/2017 - 31/12/2019. Funding: 90.750,00 €**, PI: Jose María Ulloa** (ISOM-UPM)
8) Aleaciones emergentes de nitruros diluidos III-V y nanoestructuras relacionadas para aplicaciones fotovoltaicas y de fotodetección de alta eficiencia, MAT2013-47102-C2-2-R, MICINN, Duration: 01/1/2014 - 31/12/2016. Funding: 103.220,41 € **+ FPI, PI: Jose María Ulloa** (ISOM-UPM)

C.4. Contracts, technological or transfer merits

* **Founding partner of the deep-tech company** g2-Zero (NIF: B02924728), created in December 2020.
* Training: 18-month program on entrepreneurship and creation of start-up COMTE-EBT (*Competencias para la Transferencia de Empresas de Base Tecnológica*) promoted by "*Fundación General CSIC*" (January 2020- June 2021).
* "Microfabricación de dispositivos optoelectrónicos en GaAs", contract with CSIC. Duration: 09/2020 - 09/2021. Funding: 10,000€. **PI: Jose María Ulloa**.
* "Sistema de Aterrizaje de precisión para aviones no tripulados (SAPANT)", Contract with INDRA. Duration 01/01/2012 - 31/12/2012. Funding: 175,000 €. PI-ISOM: Álvaro de Guzmán.

C.5. Supervisions

* 3 PhD Thesis supervised and 3 in course.
* Supervisor of external technological services acting as a "tutor" in the framework of the ICTS "Central de Tecnología del ISOM" for a total period of 12 weeks between 2008-2012.
* Supervisor of 8 Degree Projects at UPM (2010-2019).
* Supervisor of 12 UPM collaboration grant for company practices equivalent to 9-18 ECTS
* Supervision of two Master projects at Technical University of Eindhoven (2006-2007)
* Supervisor of two "4th year internship" stays at Technical University of Eindhoven (The Netherlands) in collaboration with INSA-Rennes (France) (2006-2007)

C.6. Membership of International Committees

* Organizer and chairman of the International Summer School on III-Sb applications: Solar Cells, 11-15/07/2022, Madrid, Spain
* Member of the Program Committee of SPIE Optics+Photonics, San diego, EE.UU. Symp.: Optical Sensing, Imaging, and Photon Counting: From X-Rays to THz. 2017-2021
* Member of the Internat. Scientific Advisory Committee of Nano-TR, Antalya, Turkey. 2018
* Member of the organizing committee of international conferences:

1) "Characterization and Modelling of Self-Assembled Nanostructures", 24-25/11/2005, Eindhoven, The Netherlands
2) "Workshop on Compound Semiconductor Devices and Integrated Circuits (WOCSDICE)", 17-20/05/2009, Malaga, Spain
3) CMD2020GEFES, Mini-colloquium "Quantum Semiconductor Materials and Devices exploiting Antimony" September 2020, Madrid, Spain.

* Member of the International Management Committee of FP7 COST Action MP-0805 "Novel gain materials and devices based on III-V-N compounds" (2008-2013)

C.7. Awards

*** Award Margarita Salas de Investigación 2021 en ciencias básicas** to the PhD Thesis of Alicia Gonzalo Martín, "Estructuras basadas en aleaciones semiconductoras de GaAs(Sb)(N) para células solares multi-unión de alta eficiencia", supervised by J.M.Ulloa.
*** 2019 UPM award for international research.**
* **Young Researcher Medal from the Spanish Royal Engineering Academy 2016**
* **"Premio Extraordinario de Doctorado" UPM in 2005 to his PhD Thesis.**
* **2 "Premio Extraordinario de Doctorado" UPM** to the PhD Thesis of Antonio Utrilla and A. Gonzalo, **supervised by J.M.Ulloa**
*** "Premio Caja Ingenieros 2016" of the Spanish Materials Research Society** to the degree project of Alberto Arruebo, **supervised by J.M. Ulloa**
***** A. Gallego, **Best Student Paper Award in WOCSDICE EXMATEC 2022** (Azores, Portugal, 3-6/05/2022). Work supervised by J.M.Ulloa.
*** 2nd Poster Prize winner in the 20th Microscopy of Semi Conducting Materials conference** (Oxford, UK, 9-13/04/2017), symposium "Strained Layers and Quantum Wells".
***** A. Utrilla, **winner of the 2016 European Photovoltaic Solar Energy Conference and Exhibition Student Award for "the most outstanding student research work in the field of New Materials and Concepts for Cells**", European Photovoltaic Solar Energy Conference 2016, Munich (Germany), June 20-24, 2016. **Work supervised by J.M.Ulloa.**
*** Best Student Paper Award in European Materials Research Society Spring Meeting in 2009** (Strasbourg, France, 8-12/06/2009) **and 2016** (Lille, France, 2-6/05/2016)**.**