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	Miguel		
Family name	Morales Furió		
Gender (*)	Male	Birth date (dd/mm/yyyy)	
Social Security, Passport, ID number			
e-mail	miguel.morales@upm.es	URL Web www.upmlaser.upm.es	
Open Researcher and Contributor ID (ORCID) (*)		0000-0001-7425-9742	

(*) Mandatory

A.1. Current position

Position	Catedrático de Universidad / Full Professor		
Initial date	21/07/2023		
Institution	Universidad Politécnica de Madrid (UPM)		
Department/Center	Física Aplicada e Ingeniería de Materiales	E.T.S.I. Industriales	
Country	SPAIN	Teleph. number	910 677 009
Key words	laser processing, simulation, modelling, shock waves, photovoltaic, laser ablation, LIFT		

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

Period	Position/Institution/Country/Interruption cause
10/2012 – 07/2023	Profesor Titular de Universidad / Associate Professor
10/2009 – 10/2012	Prof. Contratado Doctor/Assistant Professor – UPM Spain
12/2004 – 10/2009	Prof. Colaborador/Lecturer – UPM Spain
10/2001 – 12/2004	Prof. Asociado (Tiempo Completo)/Lecturer – UPM Spain
09/1999 – 10/2001	Beca FPU /Research Grant - UPM
12/1998 – 09/1999	Prof. Asociado (Tiempo Completo)/Lecturer - Departamento Física Teórica / Univ. Autónoma de Madrid Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctorado Ciencias Físicas	Universidad Politécnica de Madrid	2004
Licenciado Ciencias Físicas	Universidad Complutense de Madrid	1996

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

Dr Miguel Morales is Professor (Catedrático de Universidad, since July 2023) in the Department of Applied Physics and Materials Engineering (ETSII) at the Universidad Politécnica de Madrid (UPM) and Associate Director (since June 2016) and researcher at Centro Láser, an R&D center belonging to UPM.

His area of expertise is mechanical engineering. In particular, he has developed his scientific and technical career in the field of laser technology, both in fundamental research (including modelling of laser-matter interaction) and in industrial and commercial applications of lasers.

He is currently part of the Advanced Laser Manufacturing research group. He has co-authored more than 25 invited talks, more than 100 contributions to international conferences and 52 JCR publications, including 22 high impact articles (JCR Q1) with more than 1467 citations and an H-index of 19.

He obtained a degree in Physics from the Universidad Complutense de Madrid in 1996.
He started his research in high power laser applications at Centro Láser UPM. In 1998 he was a lecturer (Profesor Asociado a Tiempo Completo) at the Department of Theoretical Physics, Universidad Autónoma de Madrid, Spain. In 1999 he received a research grant (Beca FPU). In 2001, he started working as a lecturer at UPM, where he continues to teach today. In 2004, he obtained his PhD in Physics from the Universidad Politécnica de Madrid, with a distinction, after completing a doctoral programme in Industrial Applications of Lasers and defending his thesis entitled "Development of a numerical model for the study of laser shock processing of metallic materials". This thesis was awarded a special thesis prize 2003/2004 Grade by UPM.

The study of Laser Shock Processing (LSP) to induce residual stresses has allowed him to publish 4 papers in which simulation is an essential component (3 of them as first author) and 9 papers focused on the experimental study, 6 of them in collaboration with groups in Mexico (Universidad de Guadalajara and CIDESI). This collaboration continues to this day. This knowledge allowed the development of laser shock microforming (3 papers). The LSP line has been funded over time with different projects (4 national projects and 2 regional projects (IP in the last one)). More recently, a variation of the LSP process using ultrashort laser pulses has been studied for the treatment of parts produced by additive manufacturing (regional project ADITIMAT-CM, IP). 2 papers have already been published and 2 co-directed PhD theses have started.

He has been working in laser micromachining since 2006, and it soon became clear that laser micromachining could be very useful in photovoltaics. To work on these complex devices, it was necessary to work with groups with different skills, and so a collaboration was established with the University of Barcelona, CIEMAT and the Polytechnic University of Catalonia, which continues today (4 national projects, the latest of which is IP, and 2 technology transfer projects). The initial work focused on ablation processes for the monolithic interconnection of thin-film photovoltaic devices, but soon extended to back-contact processes, laser doping, laser crystallisation of amorphous silicon, laser metallization of cells by laser printing (LIFT) and laser sintering of metal pastes. In order to better understand the processes, a simulation line was set up (2 national projects as IP), which was the beginning of the collaboration with Prof. Arnold's group at Princeton University (4 short stays, 8 months).
Laser photovoltaic processes (not including the LIFT line) have led to 7 experimental papers, 4 simulation papers, several Art. 83 projects and a patent with Abengoa Solar for monolithic interconnection of CIGS cells, and a co-directed PhD theses (FPI) has started.
LIFT studies have led to 5 experimental papers, 3 simulation papers, a book chapter, 2 Ph.D. Thesis (as sole director), several Art 83 (IP) projects with Abengoa Solar and Ghenova Ingeniería, and a metallization patent with Abengoa Solar.

The knowledge gained from the LIFT process and the implementation of the ultra-fast imaging technique has enabled the development of laser bioprinting processes, resulting in a patent, 2 Q1 articles and a spin-off company, Innofluence.

He was a researcher on the FP7 APPOLO project, which aimed to establish and coordinate links between end users who have a demand for laser technologies for manufacturing, the knowledge accumulated in the application laboratories of research institutes and universities, and the laser equipment manufacturers. As a result of the project, a hub for testing new laser micromachining technologies for industry has been created, which is still active and offers its services to European industry.

Additional merits:
Web of Science - 67 Verified peer reviews - 26 Verified editor records
Committee member of the International Conference on Laser Peening (2011, 2013)
Member of SPIE/LASE/LAMON committee since 2021

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

C.1. Publications *(see instructions)*

1. Molpeceres, C. et al. Laser transfer for circulating tumor cell isolation in liquid biopsy. International journal of bioprinting 9, 720 (2023)
2. Munoz-Garcia, C., Canteli, D., Lauzurica, S., Morales, M., Molpeceres, C., Ros, E., Ortega, P., López-González, J.M., Voz, C., Influence of wavelength and pulse duration on the selective laser ablation of WOx, VOx and MoOx thin films., Surfaces and Interfaces 2022, 28, 101613,
3. Moreno-Labella, J.J.; Munoz-Martin, D.; Vallejo, G.; Molpeceres, C.; Morales, M. Influence of the Gap between Substrates in the Laser-Induced Transference of High-Viscosity Pastes. Materials 2021, 14, 5567.
4. Moreno-Labella, J; Munoz-Martin, D; Márquez, A; Morales, M; Molpeceres, C. Numerical study of water-glycerol BA-LIFT: Analysis and simulation of secondary effects, Optics & Laser Technology, 135, 106695, 2021
5. Moreno-Labella, J; Munoz-Martin, D; Morales, M; Molpeceres, C. Cavitation bubble evidence in BA-LIFT processes, Results in Physics, 22, 103955, 2021
6. A Marquez, M Gómez-Fontela, S Lauzurica, R Candorcio-Simón, D Munoz-Martin, M Morales, M Ubago, C Toledo, P Lauzurica and C Molpeceres. Fluorescence enhanced BA-LIFT for single cell detection and isolation Biofabrication 12 (2) (2020).
7. Munoz-Martin, D.; Chen, Y.; Morales, M.; Molpeceres, C. Overlapping Limitations for ps-Pulsed LIFT Printing of High Viscosity Metallic Pastes. Metals, *10*, 168 (2020).
8. Canteli, D.; Muñoz-García, C.; Morales, M.; Márquez, A.; Lauzurica, S.; Arregui, J.; Lazkoz, A.; Molpeceres, C. Thermal Effects in the Ablation of Bovine Cortical Bone with Pulsed Laser Sources, Materials. MDPI. 12, 2916 (2019)
9. Canteli, D.; Torres, I.; Fernández, S.; Santos, J.D.; Morales, M.; Molpeceres, C.; Photon-collection improvement from laser-textured AZO front-contact in thin-film solar cells. Applied Surface Science 463, 775–780 (2019)
10. Turkoz, E.; Morales, M.; Kang SY; Perazzo, A. ; Stone, H.A.; Molpeceres, C; Arnold C.B.. Laser-induced forward transfer from healing silver paste films. Applied Physics Letters. 113, pp. 221601 (2018)

C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

1. 5º Simposio en Ciencia e Ingeniería de Materiales, Univ. de Guadalajara, México November 2022 Invited conference: Procesos de transferencia directa inducidos por láser
2. 12th CIRP Conference on Photonic Technologies LANE 2022, Fürth, Germany, September 2022 Oral presentation: Patterning of WOx, Vox, and MoOx thin-films with picosecond and nanosecond laser sources
3. SPIE Photonics West 2022 San Francisco, USA March 2021 Online Oral presentation: Study of LIFT front-contact metallization of silicon solar cells using different conductive materials, Proc. SPIE 11988, Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXVII, 119880B (2022)
4. SPIE Photonics West 2021 San Francisco, USA March 2021 Invited conference: Simulation of transference regimes in BA-LIFT of water-glycerol and LIFT of high-viscosity silver pastes,Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXVI,11673, 1167315,2021, SPIE
5. 4º Simposio en Ciencia e Ingeniería de Materiales, Univ. de Guadalajara, México October 2020 Online Invited conference: Simulación de procesos de transferencia directa inducidos por láser.
6. THERMEC 2018 Paris, France July 2018 Invited conference: Laser Induced Forward Transfer, applications and modelling
7. SPIE Photonics West 2018 San Francisco, USA Feb 2018 Invited conference: Laser direct writing of biocompatible hydrogels using a blister assisted approach with thick polyimide layers

8. FiMPART 2017 Bordeaux, France July 2017 Invited conference: Laser Induced Forward Transfer of High Viscosity Fluids. Application To Solar Cell Metallization and Bio-Printing
9. SPIE Optics & Photonics 2016, San Diego, USA August 2016 Invited conference: Laser based processes for product customization in Building Integrated Photovoltaics (PV)
10. SPIE Photonics West 2014, San Francisco, USA February 2014 Invited Talk: Study of a-Si crystallization dependence on power and irradiation time using a CW green laser

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. SCALED Selective Contacts and Active Layes for Energy Devices (PID2019-109215RB-C44) 2020-2022 Ministerio de Ciencia e Innovación
   PI: Miguel Morales and Carlos Molpeceres Total Direct Cost: 158 000 €
2. ADITIMAT-CM Additive Manufacturing: from Material to Application (P2018/NMT-4411) Comunidad de Madrid 2019-2021 PI: Miguel Morales Total Direct Cost: 50 000 €
3. Simulación de nuevos procesos de metalización de células fotovoltaicas con láser ENE2014-58454-R Ministerio de Ciencia e Innovación 2015-2017 PI: Miguel Morales Total Direct Cost: 55 000 €
4. Simulación de procesos laser en la industria fotovoltaica ENE2011-23359 Ministerio de Ciencia e Innovación 2012-2014 PI: Miguel Morales Total Direct Cost: 79 860 €
5. APPOLO Hub of Application Laboratories for Equipment Assessment in Laser Based Manufacturing European Project FP7-2013-NMP-ICT-FOF 2013-2016 Coordinator: G. Raciukaitis (FTMC – Lituania) PI: Carlos Molpeceres Total Direct Cost: 491 807 €
6. INNDISOL Proyecto INNPACTO IPT-420000-2010-6 2010-2013 PI: Carlos Molpeceres Total Direct Cost: 593 627 €

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

1. Funtionalized Surface Layers-FSL Cosentino Research and Development, S.L.U. 2019-2020 PI: Miguel Morales Total Direct Cost: 24 430 €
2. Desarrollo de procesos de LIFT solido para transferencia de láminas delgadas de Cu NAITEC 2018-2019 PI: Miguel Morales Total Direct Cost: 35 000 €
3. Tecnología fotovoltaica de Thin Films CIGS Ghenova Ingeniería S.L.U. (Proyecto CDTI) 2011-2014 PI: Miguel Morales Total Direct Cost: 318 000€
4. Desarrollo de procesos láser para ejecutar procesos de metalización con láser en dispositivos fotovoltaicos basados en tecnología CIGS: Parte II Abengoa Solar 2012-2013 PI: Miguel Morales Total Direct Cost: 55 000 €
5. Desarrollo de procesos láser para ejecutar procesos de metalización con láser en dispositivos fotovoltaicos basados en tecnología CIGS Abengoa Solar 2011-2012 PI: Miguel Morales Total Direct Cost: 106 200 €
6. Co-founder of INNOFLUENCE, a UPM start up developing laser machines for tissue engineering and bioprinting applications, incorporated in 2015. Winner of XII Competition Actúa UPM.
7. Co-founder of BIOD, a UPM start up developing optical interrogated biosensors. Incorporated in 2009. Winner of 2nd Award in VI Competition Actúa UPM.
8. Método Para Seleccionar, Manipular y Aislar Células Tumorales Circulantes en Líquidos Corporales. Publication info: PCT / ES2018 / 070064 Patent ownership (UPM/HGU Gregorio Marañón), date: 01/2018
9. Method for creating electrical contacts and contacts created in this way. Publication info: US2015294872 (A1), 2015. Priority date: 2012. Applicant: Abengoa Solar
10. Method for edge isolation in solar cells and for the third step of a monolithic integration process. Publication info: ES2510815 (A1), 2014 Priority date: 2012. Applicant: Abengoa Solar