

CURRICULUM VITAE ABREVIADO (CVA) – LUIS LLANES

Part A. PERSONAL INFORMATION

First name	LUIS MIGUEL		
Family name	LLANES PITARCH		
Gender (*)	MALE		
e-mail		URL Web: https://futur.upc.edu/LuisMiguelLlanesPitarch	
Open Researcher and Contributor ID (ORCID) (*)		0000-0003-1054-1073	

(*) Mandatory

A.1. Current position

Position	PROFESSOR (Catedrático de Universidad)		
Initial date	03/03/2003		
Institution	UNIVERSITAT POLITÈCNICA DE CATALUNYA		
Department/Center	MATERIALS SCIENCE AND ENGINEERING	EEBE	
Country	BARCELONA, SPAIN		
Keywords	Mechanical integrity / hard materials/ coatings / reliability / micromechanics / advanced manufacturing ceramics		

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

Period	Position/Institution/Country/Interruption cause
1987-1992	RESEARCH FELLOW / UNIV. PENNSYLVANIA (USA)
1992-1997	RESEARCH/TECHNICAL FELLOW / UPC
1997-2003	ASS. PROFESSOR (Titular de Universidad)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
ENG. BACHELOR DEGREE	UNIVERSIDAD SIMON BOLIVAR (VZLA)	1986
M.Sc. DEGREE	UNIVERSIDAD SIMON BOLIVAR (VZLA)	1990
Ph.D. DEGREE	UNIVERSITY OF PENNSYLVANIA (USA)	1992

Part B. CV SUMMARY

Please list a maximum of 10 merits and/or milestones in your career

- (1) Recipient of 2022 European Powder Metallurgy Association (EPMA) Fellow Award, in recognition to academic and research trajectory in the field of Powder Metallurgy.
- (2) Coordinator of Doctoral Network AIM-NEXT - “Accelerate the Design and Insertion of nonCRM Hard Materials for Next Generation Extreme Applications (101119897)”, within Call HORIZON-MSCA-2022-DN-01, Action: HORIZON-TMA-MSCA-DN. AIM-NEXT started in Feb 1, 2024 and will run until January 31, 2028, under coordination of UPC and with a total budget of 2,7 M€, by a consortium constituted by a selection of some of the best European Universities (UPC, Lund Univ. INP Grenoble, RWTH Aachen, KTH, UC3 Madrid and Univ Aveiro) in the field of hard materials, together with worldwide leading Industrial organisations (Seco Tools, Element Six, Sandvik Mining, Hilti, Durit and FILMS) covering fundamental elements of the product value chain in key industrial sectors (i.e. mining, manufacturing and construction engineering).
- (3) Participation and leadership in more than 30 international and national research projects, among which it may be highlighted “Fatigue Modelling and Fast Testing Methodologies to Optimize Part Design and to Boost Lightweight Materials Deployment in Chassis Parts”, H2020-LC-GV-2020 – 101006844, SC4-Smart, green & integrated transport subprogram (European Union) / CIMNE (Coordinator) and Consortium of 13 industrial and R&D centers, 2021-2024
- (4) Director of research group “Structural Integrity, Micromechanics and Reliability of Materials” (CIEFMA), one of the six research groups acting as pillars of Barcelona Research Center in Multiscale Science and Engineering (BRCMSE), recently awarded the prestigious recognition of Spain’s Maria de Maeztu Excellence Unit (CEX2023–001300-M). CIEFMA is recognized as consolidated unit by the Generalitat de Catalunya (SGR since 1993) as well as Center of Excellence by the European Hard Materials Group (EuroHM) of EPMA. Furthermore, it is member of TECNIO - platform created by the Generalitat de Catalunya in order to bridge the gap between active research groups at public institutions and the industry.
- (5) Track-record of technology transfer and consultancy through participation and leadership in more than 45 contracts with international and national industrial entities or consortiums, from which EPMA Club Project “Simulation of Fatigue Crack Growth of Cemented Carbides – SIMUCRACK (Consortium of 9 industrial and R&D centers, running from 2011 to 2024, and a total budget of about 400k€), may be highlighted.
- (6) From a management viewpoint, as Dean of Barcelona-East School of Engineering, responsible for setting and starting new UPC’s Diagonal Besòs Campus (CDB) [www.btec.cat/en]: more than 50,000 m² of space holding about 4000 people (including teaching, research, administration and service staff, together with students), together with installation and commissioning of more than 100 laboratories, most of them focused on leading research activities in the fields of Materials Science and Engineering, Chemical Engineering, Biomedical Engineering, Energy, Physics, Electronic Engineering and Advanced Manufacturing.
- (7) Co-author of more than 200 articles published in specialized journals in the field of microstructural design optimization of hard materials on the basis of multiscale mechanical integrity assessment.
- (8) Associate Editor of Int J Refract Met Hard Mater (since October 2022), and Editorial Board member of Ceram Int and Metals periodicals. Furthermore, Co-editor of Comprehensive Hard Materials 3-volume series (Elsevier, 2014, 1043 pages ISBN: 978-0-08-096528-4],
- (9) Co-organizer of the last six International Conferences on the Science of Hard Materials (ICSHM), and guest editor of corresponding Special Issues, published at the Int J Refract Met Hard Mater journal: - ICSHM7, 19 (2001) 235-568; ICSHM8, 23 (2005) 225-398 and 24 (2005) 1-198; ICSHM9, 27 (2009) 187-519; ICSHM10, 49 (2015) 1-406; ICSHM11, (2019/2021), <https://www.sciencedirect.com/journal/international-journal-of-refractory-metals-and-hard-materials/special-issue/10K8ZQD94QB>, ICSHM12 (2024/2025), in progress.
- (10) h-index: 37 // PhD Thesis supervised: 19 // 6 six-year research merits (last one: 2018-2023)

Part C. RELEVANT MERITS

C.1. Academic supervision work

Supervised 19 PhD Thesis as well as more than 60 MSc and 100 Bachelor Final Thesis/Projects. Last five PhD Thesis supervised are:

- Dr. Junhui Zhang, "Integration of sensors on 3D-printed Zirconia Ceramics to be Used in structural applications", Universitat Politècnica de Catalunya (2023)
- Dr. Itzel Lorente, "Desarrollo de sistemas de dispersión coloidal y granulación de partículas metálicas finas", Universitat Politècnica de Catalunya (2023)
- Dr. Sandra Gordon, "Mechanical integrity of coated PcBN systems: mechanics and mechanisms involved under service-like conditions", Universitat Politècnica de Catalunya (2024)
- Dr. Laura Cabezas, "Additive manufacturing of WC-Co cemented carbides: Microstructural, length-scale and layer assemblage orientation effects on hardness, sliding contact response and fracture behavior", Universitat Politècnica de Catalunya (2025)
- Dr. Marc Serra, "Fracture toughness, finite fatigue life behavior and fatigue crack growth resistance of cemented carbides", Universitat Politècnica de Catalunya (2026)

C.2. Publications

EDITED BOOKS AND GUEST EDITOR IN JOURNALS' SPECIAL ISSUES

- Science of Hard Materials - 7, International Journal of Refractory Metals & Hard Materials 19, 4-6 (2001) 235-568, Guest Eds. L. Llanes, I.C. Grigorescu and V.K. Sarin. Elsevier Science, Oxford (2001) 233 pages
- Science of Hard Materials - 8, International Journal of Refractory Metals & Hard Materials 23, 4-6 (2005) 225-398 and 24, 1-2 (2005) 1-198, Guest Eds. L. Llanes, D. Mari and V.K. Sarin. Elsevier Science, Oxford (2005) 371 pages
- Science of Hard Materials - 9, International Journal of Refractory Metals & Hard Materials 27, 2 (2009) 187-519, Guest Eds. D. Mari, L. Llanes and V.K. Sarin. Elsevier Ltd., Oxford (2009) 333 pages
- Science of Hard Materials - 10, International Journal of Refractory Metals & Hard Materials 49 (2015) 1-406, Special Issue: Selected Papers from the 10th International Conference on the Science of Hard Materials, 10-14 March 2014, Cancún, Mexico. Guest Eds. L. Llanes, D. Mari and V.K. Sarin. Elsevier Ltd., Oxford (2015) 406 pages
- Science of Hard Materials - 11, International Journal of Refractory Metals & Hard Materials (2019/2021), Special Issue: Selected Papers from the 11th International Conference on the Science of Hard Materials, 25-29 March 2019, Khao Lak, Thailand. Guest Eds. D. Mari, E. Jiménez-Piqué, L. Llanes and V.K. Sarin. Elsevier Ltd., Oxford (<https://www.sciencedirect.com/journal/international-journal-of-refractory-metals-and-hardmaterials/special-issue/10K8ZQD94QB>)
- Comprehensive Hard Materials. Editors: V.K. Sarin (Editor in Chief), D. Mari and L. Llanes (Vol. 1 - Hardmetals and Vol. 2 - Ceramics), Elsevier Ltd. (2014) 1043 pages ISBN: 978-0-08-096528-4

RESEARCH PAPERS

More than 240 publications in peer-reviewed archival journals, from which the following 20, published in the last two years (2025-2026), are highlighted:

- S. Fooladi Mahani, C. Liu, J. Dong, X. Wen, G. Ramírez, B.L. Liu, L. Llanes, "Assessment of fracture toughness of cemented carbides by coupling introduction of artificial flaws via laser ablation with quantitative fractography", Int. J. Refract. Met. Hard Mater. 138 (2026) 107682
- M. Serra, R. Batista, L. Cabezas, N. Cinca, E. Tarrés, E. Jiménez-Piqué, L. Llanes, "Microstructural effects on the fatigue crack growth behavior of γ -phase containing WC-Co cemented carbides: Mechanics, mechanisms and fatigue sensitivity", Int. J. Refract. Met. Hard Mater. 138 (2026) 107706
- S. Fang, L. Llanes, R. Zimmer, C. Pauly, N. Salan, C. Colominas, D. Bähre, "Evaluation of mechanical and surface integrities in cemented carbides processed by femtosecond laser machining and physical vapor deposition-coating", J. Manuf. Sci. Eng. 148 (2026) 031003
- V. Collado-Ciprés, J. García, J.M. Cabrera, L. Llanes, "Influence of WC grain size on the hot deformation behaviour of cemented carbides", Int. J. Refract. Met. Hard Mater. 135 (2026)

107549

- S.A. Razavi, G. Fargas, I. Serrano, M.A. Laguna-Bercero, T. Vilella, L. Llanes, D. Rodríguez, M.P. Ginebra, J. Llorca, M. Morales, "Direct recycling of 3D-printed Co-YDZ catalysts for ethanol steam reforming", *J. Environ. Chem. Eng.* 13 (2025) 120246
- E.J. Delgado-Pujol, A. Razavi, B. Begines, L. Llanes, M. Morales, A. Alcudia, Y. Torres, G. Fargas, "Infiltrated 3D-printed zirconia scaffolds with biodegradable and bioactive polymer blend to improve their osseointegration", *J. Mater. Res. Technol.* 39 (2025) 2633-2651
- S. Fooladi Mahani, C. Liu, G. Ramírez, L.L. Lin, L. Cabezas, X. Wen, L. Llanes, "Assessment of microstructural effects on the fatigue sensitivity of WC-Co cemented carbides by using microdimples shaped by laser ablation", *J. Eur. Ceram. Soc.* 45 (2025) 117432
- L. Cabezas, L. Ortiz-Membrado, C. Berger, H. Besharatloo, A. Vornberger, E. Jiménez-Piqué, J. Pötschke, L. Llanes, "Nanoindentation mapping of cemented carbides: Microstructure-property analysis through statistical cluster extraction", *J. Eur. Ceram. Soc.* 45 (2025) 117431
- S.A. Razavi, G. Fargas, I. Serrano, M.A. Laguna-Bercero, T. Vilella, L. Llanes, D. Rodríguez, M.P. Ginebra, J. Llorca, M. Morales, "3D-printed Ni/ γ -Al₂O₃ catalysts for CO₂ methanation: Effect of Ni loading and sintering temperature", *Chem. Eng. J.* 523 (2025) 168665
- Y. Zheng, T. Huang, J. Yao, G. Fargas, E. Armelin, L. Llanes, C. Xie, D. Crespo, P. Bruna, O. Lavigne, "Electrochemical corrosion behavior of WC-Co and WC-Ni cemented carbides: Effect of chloride and sulfate ions", *Int. J. Refract. Met. Hard Mater.* 132 (2025) 107224
- M. Serra, F. García-Marro, N. Cinca, E. Tarrés, E. Jiménez-Piqué, L. Llanes, "Fracture and fatigue behavior of a γ -phase containing WC-Co cemented carbide", *J. Eur. Ceram. Soc.* 45 (2025) 117376
- H. Besharatloo, L. Cabezas, K. Taylor, S. Capp, S. Kirk, C. Chirico, L. Llanes, B. Ferrari, A.J. Sanchez-Herencia, "Exploring enhanced sintering dynamics and mechanical integrity in WC-base composites featuring ultra-low proportions of low-activation metals", *Ceram. Int.* 51 (2025) 49212-49233
- S. Fooladi Mahani, C. Liu, L.L. Lin, G. Ramírez, X. Wen, L. Llanes, "Damage tolerance and residual fatigue strength/life of WC-Co cemented carbides", *Int. J. Refract. Met. Hard Mater.* 129 (2025) 107117
- S.A. Razavi, G. Fargas, T. Vilella, I. Serrano, M.A. Laguna-Bercero, L. Llanes, D. Rodríguez, M.P. Ginebra, J. Llorca, M. Morales, "Direct Ink Writing of cobalt-zirconia monoliths for catalytic applications: A novel single-step fabrication approach", *J. Eur. Ceram. Soc.* 45 (2025) 117137
- L. Cabezas, C. Berger, S. Bridy, E. Jiménez-Piqué, P. Moreno, J. Pötschke, L. Llanes, "Fracture behavior of binder jetting 3D printed cemented carbides: Influence of printing direction and testing configuration", *Int. J. Refract. Met. Hard Mater.* 128 (2025) 107069
- S.A. Razavi, G. Fargas, I. Serrano, M.A. Laguna-Bercero, L. Llanes, J. Llorca, M. Morales, "Cobalt-Zirconia coated monoliths fabricated by Direct Ink Writing for catalytic applications", *J. Eur. Ceram. Soc.* 45 (2025) 117063
- M. Serra, F. García-Marro, N. Cinca, E. Tarrés, E. Jiménez-Piqué, L. Llanes, "Finite fatigue life behavior and fatigue crack-growth resistance of a fine-grained WC-Co cemented carbide", *Int. J. Refract. Met. Hard Mater.* 128 (2025) 107022
- M. Yarahmadi, L. Del Mazo-Barbara, J.J. Roa, L. Llanes, M.P. Ginebra, G. Fargas, "Optimizing rheological characterization for extrusion-based additive manufacturing of Zirconia ceramic inks with varied Yttria content stabilization", *J. Eur. Ceram. Soc.* 45 (2025) 116797
- S. Gordon, T. Rodríguez-Suarez, J.J. Roa, E. Jiménez-Piqué, L. Llanes, "Three-dimensional microstructural characterization of a polycrystalline cubic boron nitride composite by means of focused ion beam (FIB) tomography", *Int. J. Refract. Met. Hard Mater.* 128 (2025) 107045
- P.V. Sousa Machado, F.C. Caner, L. Llanes, E. Jimenez-Pique, "A micromechanical model for the elastoplasticity and fracture of WC-Co hardmetals at large specimens scale", *Int. J. Refract. Met. Hard Mater.* 128 (2025) 107034

C.3. Congress

CONFERENCES / INVITED TALKS

Participation in more than 100 International Conferences, including over twenty (20) invited talks. Highlighting the following 3 oral presentations in last 5 years:

“Grinding effects on the surface integrity of hardmetals”, J. Yang, M. Odén, M.P. Johansson-Jõesaar and L. Llanes, Keynote Presentation, PMAI – PM22, International Conference on Powder Metallurgy 2022 (India, 2022)

“Understanding timeless technological success of cemented carbides on the basis of materials science principles”, L. Llanes, Keynote Presentation, 21st Plansee Seminar (Austria, 2025) and Plenary Presentation, 2025 (5th) International Conference on Non-Ferrous New Materials (China, 2025)

C.4. Research and training projects

Participation and leadership in more than 30 international and national research projects, from which the following 5, conducted in the last five years, may be highlighted:

- Field emission scanning electron microscope (high resolution): SXES, EBSD, EDS, and in-situ nanoindentation unit, Science and Innovation Ministry (Spain), EQC2021-007494-P, 2021-2023
- Fatigue modelling and fast testing methodologies to optimize part design and to boost lightweight materials deployment in chassis parts, H2020-LC-GV-2020 – 101006844, SC4-Smart, green & integrated transport subprogram (European Union) / CIMNE (Coordinator) and Consortium of 13 industrial, academic and R&D centers, 2021-2024
- Exploring postprocessing opportunities for additive manufacturing of high-performance ceramics, Science and Innovation Ministry (Spain) / Instituto de Cerámica y Vidrio and Universidad Politécnica de Madrid, PID2022-137274NB-C32, 2023-2026
- AIM-NEXT - Accelerate the design and insertion of nonCRM hard materials for next generation extreme applications, HORIZON-MSCA-2022-DN-01 - 101119897, Coordinator of European Doctoral Network, Consortium of 13 industrial and R&D centers, 2024-2028
- PMEXCEL - Development of vocational education and training excellence in powder metallurgy, ERASMUS-EDU-2025-PEX-COVE- 101260546 / EPMA (Coordinator) and Consortium of 14 industrial, academic/training and R&D centers, 2026-2030

C.5. Contracts, technological or transfer merits

Track-record of technology transfer and consultancy with International and national industries. Participation and leadership in more than 45 contracts and technology transfer actions with international and national industrial entities or consortiums, from which the following ongoing 5 may be highlighted:

- Simulation of fatigue crack growth of cemented carbides - Stages I, II, III, IV and V – SIMUCRACK, EPMA Club Project / Consortium of 9 industrial and R&D centers, 2011-2024
- Mechanical response of cemented carbides at different length scales: A macro-micro-nano approach for optimizing performance and reliability of components and tools, Sandvik Hyperion UK / Hyperion Materials & Technologies Spain, 2016-2025
- Additive manufacturing of hardmetals by non-laser processes - AddiHM, EPMA Club Project / Consortium of 11 industrial and R&D centers, 2021-2023
- Hot deformation testing of hardmetals, Sandvik Coromant AB Sweden, 2021-2023
- Assessment of crack extension resistance of brittle-like composites, Xiamen Tungsten Co. Ltd. China, 2021-2028