MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE

Fecha del CVA	25/06/2026

Part A. PERSONAL DETAILS

First name	Jarosław			
Sunrame	Serafin			
Gender (*)	Male	Date of brith (dd/mm/yyyy)		23/03/1989
ID, NIE, pasaporte	-		Y6166249D	FK8463431
Email address	jaroslawserafin23@gmail.com		URL Web	
Open Researcher and Contributor ID (ORCID) (*)	https://orcid.org/0000-0003-3719-8762			
Country	Spain		Telephone	+34641419758
Keywords	MXenes, MBenes, MXene-based hybrid materials, solar hydrogen production, photocatalysis, electrocatalysis, CO_2 capture and storage, activated carbon			

A.1. Professional status

Period	**Position / Institution / Country / Reason for interruption**
08/07/2024	Postdoc, University of Barcelona, Spain
09/2023-07/2024	associate professor/ University of Barcelona, Barcelona, Spain/ Interruption due to obtaining a postdoctoral position
07/2023-07/2024	Higher Technician / University of Barcelona, Barcelona, Spain
01/2021-12/2023	Remote Research Associate/Al Farabi Kazakh National University, Alamaty/Kazakhstan
01/2020-10/2023	Remote associate researcher /University of Los Andes, Bogota, Colombia
05/2016-03/2017	Researcher/ West Pomeranian University of Technology, Szczecin, Poland

A.2. Academic Background

Degree/Master's/Thesis	**University/Country**	**Year**
Ph.D.	Polytechnic University of Catalonia, Barcelona, Spain	2022
Ph.D.	West Pomeranian University of Technology, Szczecin, Poland	2019
Postgraduate Studies	West Pomeranian University of Technology, Szczecin, Poland	2017
Master's Degree	University of Szczecin, Szczecin, Poland	2014
Bachelor's Degree	University of Szczecin, Szczecin, Poland	2011

Parte B. RESUMEN DEL CV

My name is Jarosław Serafin. I hold a master's degree in biotechnology and two PhD degrees: one in Materials Engineering (2019, cum laude) and another in Chemical Engineering (2022, cum laude). My career is characterized by scientific excellence, steadily growing independence, and international leadership in the development of advanced materials for energy applications. My research spans biofuels, catalysis, solar hydrogen, CO_2 capture, carbon materials, and, in recent years, MXenes and their advanced modifications, which currently constitute my main and fully independent area of scientific interest. My independent research line, developed after my PhD studies, focuses on the design and advanced functionalization of MXenes and hybrid materials for energy processes, clearly differentiated from the research lines of my former supervisors.

My scientific career began with the preparation of biofuels (Master's studies, 2014) and evolved toward the transformation of biomass into high-performance activated carbons for CO_2 capture during my first PhD in Poland under the supervision of Prof. Beata Michalkiewicz. There, I developed original methodologies for the activation and characterization of carbon materials derived from residual biomass, which laid the foundation for subsequent collaborations with institutions in Israel, India, Colombia, Brazil, and Morocco. In 2022, I completed my second PhD at the Universitat Politècnica de Catalunya

under the supervision of Prof. Jordi Llorca, specializing in solar hydrogen production and catalytic processes. During my postdoctoral research, I stood out by independently building a continuous-flow photocatalytic reactor, entirely designed and assembled by me to study H_2 evolution under solar irradiation. This instrumental development represents a key milestone in my scientific independence and technical capabilities. These contributions constitute original achievements that have shaped my scientific identity and innovative capacity.

I am the author or co-author of more than **95 scientific articles, including 65 as first or corresponding author, 4 monographs, one book chapter, and 23 patents (22 Polish and 1 European). My publications have received more than 4,383 citations, with an h-index of 32, placing me among the top 2% of the most influential scientists worldwide in 2024 and 2025 according to the Stanford ranking. I have participated in 32 national and international conferences** (Poland, Spain, Italy, Moldova, Brazil, Canada, Slovakia, Colombia, Brazil), delivered invited plenary lectures, and actively contributed to knowledge dissemination as an editor of Materials Communications Today, South African Chemical Engineering Journal, Journal of the Energy Institute, American Journal of Engineering and Applied Sciences, Green Science and Next Research, as well as guest editor for Molecules, Processes, Frontiers in Chemistry, and Results in Chemistry. **I have also reviewed more than 250 manuscripts** for high-impact journals such as Chemical Engineering Journal, Carbon, Fuel, and Journal of Cleaner Production, demonstrating my international recognition as an expert in functional materials.

My career includes research stays main one: at the University of Alicante (Spain), where I worked on electrochemistry and activated carbons; the University of Los Andes (Colombia), where I conducted calorimetric and adsorption studies; the Universitat Politècnica de Catalunya, where I worked on photocatalytic H_2 production; and the Federal University of Santa Catarina (Brazil), as a visiting professor within the CAPES PRINT program, where I taught courses on carbon materials and CO_2 adsorption and H_2 production processes. These stays strengthened my independence and consolidated an active international network that currently supports my own research line. I have established scientific collaborations with 16 institutions in 13 countries, including the United States, France, India, Brazil, Morocco, Norway, Sweden, Algeria, Kazakhstan, and Spain. Particularly noteworthy are my strategic collaborations with Prof. Klas Andersson (Chalmers University), Prof. Teresa Bandosz (CUNY, USA) and Prof. Vanessa Fierro (France), focused on the modification and functionalization of MXenes, which have consolidated this family of materials as my independent and priority research area. I have participated in 10 national and international projects, including those funded by AEI-MCIN (Spain), Horizon Europe, AGAUR, and agencies from Brazil, Kazakhstan, Colombia, and Norway. I served as the main coordinator of the project “3D recycled masks with activated carbon and silver-coated cerium oxide filters” and was a finalist in the Recircula Challenge 2021. Although the temporary nature of my contracts did not allow me to be officially listed as principal investigator (PI), I actively contributed to proposal writing and, as a team member, performed equivalent roles in experimental design, synthesis, characterization, technical coordination, and results integration, thereby reinforcing my scientific independence.

In the teaching domain, between 2023/24, 2024/25, 2025/26, I was an associate professor at the University of Barcelona, where I taught General Chemistry, Inorganic Chemistry, and the Chemical Engineering laboratory. I have supervised master’s theses (Spain and Brazil), mentored Erasmus+ students, and currently co-supervise four international PhD theses (Colombia and Brazil). I have served on doctoral examination committees in Morocco and Colombia, evaluating work on advanced materials, adsorption, and photocatalysis. In addition, I have evaluated research projects at the request of agencies in Chile, Colombia, Uruguay and Kazakhstan. My career has been recognized through invitations to deliver courses and specialized training on MXenes and carbon materials in 2026 at Chalmers University (Sweden) and the University of Hull (United Kingdom). These activities reflect my growing leadership and international projection in the field of advanced materials.

Currently, my work focuses on the development of functionalized MXenes, MBenes and MXene/Mbenes-based hybrid materials for hydrogen catalysis, CO_2 capture, and photo(electro)catalytic processes aimed at the energy transition. My objective is to establish in Spain a competitive research line integrating rational materials design, instrumental innovation initiated with my photocatalytic reactor, and international collaboration, advancing toward the consolidation of a leading research group in the field of novel materials. **In 09/2026 I was awarded a prestigious Ramón y Cajal Fellowship.**

Part C. List of the Most Relevant Contributions

C.1. Most Important / Relevant Publications (* = corresponding author) full list:
https://scholar.google.com/citations?user=4tW_6TcAAAAJ&hl=pl&oi=ao

1. Serafin, J.*, Chaitoglou, S., Farid, G., Ma, Y., Dziejarski, B., Sanchez, A., ... & Amade, R. (2025). MXenes: Multifunctional 2D materials for hydrogen evolution, energy storage, and carbon capture applications. Chemical Engineering Journal, (IF=13.2), 168650. https://doi.org/10.1016/j.cej.2025.168650

2. Serafin, J.*, Bujaldón, R., Sreńscek-Nazzal, J., Kałamaga, A., Gomez, E., Vendrell, X., & Serra, A. (2025). Transition metal-doped TiO_2 and CeO_2 photocatalysts modified with Ti_3C_2 MXene for PMS-driven advanced oxidation of pharmaceutical pollutants. Chemical Engineering Journal, (IF=13.2), 169005. https://doi.org/10.1016/j.cej.2025.169005

3. Serafin, J.*, Farid, G., Chaitoglou, S., Majumdar, S., Ma, Y., Vendrell, X., ... & Amade-Rovira, R. (2025). Hierarchical graphene nanowalls/Ti, Mo-MXene nano compounds for enhanced electrocatalytic hydrogen evolution. International Journal of Hydrogen Energy, (IF=8.3) *165*, 150886. https://doi.org/10.1016/j.ijhydene.2025.150886

4. Kumar, A. M., Amade-Rovira, R., Bertran-Serra, E., **Serafin, J.*,** & Chaitoglou, S. (2025). Binder-free integration of Ti3C2 MXene on graphene nanowalls-coated carbon felt for hydrogen evolution catalysis. International Journal of Hydrogen Energy (IF=8.3), *138*, 409-414. https://doi.org/10.1016/j.ijhydene.2025.05.192

5. Sánchez, A., Escolano-Casado, G., Bania, M., Koning, M., **Serafin, J.,** de la Piscina, P. R., ... & Homs, N. (2025). Coupling TiO2 with Nb carbide-based materials for H2 photoproduction: From 3D carbides to 2D MXenes. Chemical Engineering Journal (If=13.2), 163797. https://doi.org/10.1016/j.cej.2025.163797

6. Dziejarski, B., **Serafin, J.***, Hernández-Barreto, D. F., Naumovska, E., Sreńscek-Nazzal, J., Klomkliang, N., ... & Knutsson, P. (2025). Tailoring highly surface and microporous activated carbons (ACs) from biomass via KOH, $K_2C_2O_4$ and KOH/$K_2C_2O_4$ activation for efficient CO_2 capture and CO2/N2 selectivity: characterization, experimental and molecular simulation insights. Chemical Engineering Journal (IF=13.2), 169677. https://doi.org/10.1016/j.cej.2025.169677

7. **Serafin, J*.,** Dziejarski, B., Fonseca-Bermúdez, O. J., Giraldo, L., Sierra-Ramírez, R., Bonillo, M. G., ... & Moreno-Piraján, J. C. (2024). Bioorganic activated carbon from cashew nut shells for H2 adsorption and H2/CO2, H2/CH4, CO2/CH4, H2/CO2/CH4 selectivity in industrial applications. International Journal of Hydrogen Energy, (IF=8.1) 86, 662-676. https://doi.org/10.1016/j.ijhydene.2024.08.417

8. **Serafin, J.***, Dziejarski, B., Achieng, G. O., Vendrell, X., Chaitoglou, S., & Amade-Rovira, R. (2024). Comprehensive analysis of MAX phase and MXene materials for advanced photocatalysis, electrocatalysis and adsorption in hydrogen evolution and storage. Journal of Industrial and Engineering Chemistry (IF=5.9). https://doi.org/10.1016/j.jiec.2024.07.023

9. Wang Y., Pajares A., **Serafin J.***, Alcobé X., Güell F., Homs N., Ramírez de la Piscina P. (2024). MoxC heterostructures as efficient co-catalysts in robust MoxC/g-C3N4 nanocomposites for photocatalytic H2 production from ethanol. ACS Sustainable Chemistry & Engineering (IF=8.4), 12, 11, 4365–4374. https://doi.org/10.1021/acssuschemeng.3c06261

10. **Serafin, J.***, Dziejarski, B., Junior, O. F. C., & Sreńscek-Nazzal, J. (2023). Design of highly microporous activated carbons based on walnut shell biomass for H2 and CO2 storage. Carbon (IF=11.307), 201, 633-647. https://doi.org/10.1016/j.carbon.2022.09.013

C.2. Conferences (Most Relevant 2024/2025)

1. **19-21.11.2025** V Workshop on Adsorption, Catalysis and Porous Materials, Bogota, Colombia; From MAX to MXene: Tailoring 2D conductive materials for catalysis, hydrogen generation and environmental remediation, *where I delivered an invited plenary lecture*
2. **7-11.09. 2025** Twelfth International Symposium Effects of Surface Heterogeneity in Adsorption, Catalysis and related Phenomena, Lublin, Poland Photocatalytic hydrogen evolution boosted by Ni doped TiO_2-MXene composite *- where I delivered an invited oral presentation*
3. **28.05.2025** SustainableNano Workshop ¨Innovative Nanomaterials for Energy and Sustainability¨ chairman

4. **14-15.11.2024** International Conference on Materials Science and Engineering, Rome, Italy; "Bioorganic activated carbons for effective hydrogen adsorption and gas separation in H_2/CO_2, H_2/CH_4, CO_2/CH_4 and $H_2/CO_2/CH_4$ mixtures". *- where I delivered an invited oral presentation*
5. **6-8.11.2024** *IV Simposio de Bioenergía*, UNICENTRO, Paraná, Brasil, donde impartí una *where I delivered an invited plenary lecture*
6. **11-13.11.2024** 2nd International Conference on Renewable Energy (REN-2024), Barcelona, Spain; Ti_3C_2 MXenes: Synthesis and multifunctional applications in energy and environmental technologies". *- where I delivered an invited oral presentation*

C.3. Research Projects or Research Lines Participated In

07/2024-31/01/2026- Postdoctoral researcher in the project "Exploring new value chains for the sustainable development of the rural world: transformation of forest waste into products with high added value (BOSC2VAL)" (2023CLIMA00009), funded by the Agency for Management of University and Research Grants (AGAUR) of the Government of Catalonia, under the supervision of Prof. **Albert Serrà Ramos**. **Responsibilities:** Preparation of composite materials for hydrogen production and CO_2 reduction, physicochemical characterization, application studies, and preparation of scientific publications.

07/2023-12/2024- External researcher in the project "Conversion of plant biomass waste into microporous activated carbons to successfully capture and separate CO_2, N_2 and CH_4", Physical-Chemical Methods of Research and Analysis Center, Al-Farabi Kazakh National University, Almaty, Kazakhstan. Project No. AP19679878, funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan, supervised by Dr. **Kanagat Kishibayev** **Responsibilities:** Preparation of composite materials, physicochemical characterization, application studies, and preparation of scientific publications.

07/2023-07/2024- Senior Technician in the project "New materials for the electrocatalytic evolution of hydrogen", Department of Applied Physics, University of Barcelona, Barcelona, Spain. Prof. **Roger Amade Rovira** funded by MCIN/AEI/10.13039/501100011033 and the European Union (NextGenerationEU/PRTR). **Responsibilities:** Project consultancy, preparation of MAX phases and MXene materials, physicochemical characterization, electrochemical hydrogen production measurements, and support in the preparation and writing of scientific articles.

05/2022-09/2024- Team member in the project "2D carbide-based catalysts (MXenes) for H_2 production processes and CO_2 reduction", PID2020-116031RB-I00 (budget: €108,900). Prof. **Narcís Homs**. MCIN/AEI/ PID2020-116031RB-I00 **Responsibilities:** Preparation of composite materials, physicochemical characterization and application studies, and preparation of scientific articles.

01/2021-12/2023- external researcher in the project "Obtaining and research of activated carbons based on plant raw material waste and their use in noble and heavy metal sorption", funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan.IP: Dr. **Kanagat Kishibayev**. (Universidad Nacional Kazaja Al-Farabi, Almaty, Kazajstán). 01/04/2021-31/12/2023. 98.925,3 €. **Responsibilities:** Project consultancy, physicochemical characterization of activated carbons, CO_2 adsorption, sorption of heavy metals from aqueous media, and assistance in the preparation and writing of scientific articles.

01/2020-10/2023- Researcher in the project "Production of graphene-based materials from the valorization of coal and residual biomass through sustainable biorefinery processes". IP: Prof. **Juan Carlos Moreno Pirajan**. (Universidad de Los Andes, Bogotá, Colombia). 02/01/2020- 30/10/2023. 112.000 €. **Responsibilities:** Development and planning of new projects in the field, physicochemical characterization, application of samples for metal and gas adsorption, and preparation of scientific publications.

04/2014- 03/2017 Researcher in the project "Post-Combustion CO_2 Capture on New Solid Sorbents and Application in a Moving Bed Reactor", Polish–Norwegian research cooperation. IP: Prof. **Urszula Narkiewicz**. (West Pomeranian University of Technology in Szczecin, Poland). 01/04/2014-31/03/2017. 4.804.390 €, Responsibilities: Preparation of activated carbon samples, physicochemical characterization, and gas adsorption studies (CO_2, H_2, CH_4, N_2).

C.4. Participation in Technology / Knowledge Transfer Activities and Exploitation of Results Most Relevant Patents (23 total):

1. Michalkiewicz B., Serafin J., Kamińska A., Sreńscek-Nazzal J., Method for disposing of disposable protective masks. PL 437932, 09/10/2023, Poland
2. Michalkiewicz B., Serafin J., Morawski A., Narkiewicz U., Wróbel R., Method of preparation of activated carbon from fungi. EP 3095514A1, 23/11/2016, Germany