

About the author

Communications at UPV, and in 1999, he joined the

Alejandro Díaz-Morcillo received the M.S. Eng. and Ph.D. degrees in telecommunication engineering, both from the Valencia Polytechnic University (UPV), Valencia, Spain, in 1995 and 2000, respectively. From 1996 to 1999, he was a Research Assistant in the Department of

Department of Information Technologies and Communications, Technical University of Cartagena (UPCT), Spain, as a Teaching Assistant, where he is currently Professor since 2011. He leads the “Electromagnetics and Matter” Research Group at UPCT and his main research interests include numerical methods in electromagnetics, microwave engineering (communications and IMS applications) and dielectric characterization. He has been Vice-Chancellor for Research and Innovation at UPCT and President of UPCT (2016-2020).

Microwave Research at the School of Engineering University of Aberdeen

Claudia Fernandez-Martin

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The University of Aberdeen (UK) has a growing and established research group working on microwave-assisted carbon capture technologies at the school of Engineering. Led by AMPERE’s Secretary elect, Dr Claudia Fernandez-Martin (CFM), this active research group is investigating how the energy penalty associated with regeneration in any carbon capture process can be mitigated with the use of microwaves.

Their recent research outputs in which microwave technology is investigated include a PhD thesis, in which an in-depth systematic investigation on microwave-assisted post-combustion carbon capture and its comparison with the analogous conventional process is conducted (‘Feasibility study of microwave-assisted swing adsorption for post-combustion carbon capture’. Mohamud Mohamed Abdi Yassin, 2021. Main Supervisor: CFM. Part of the project titled: Intensification of post-combustion capture by using advanced regeneration technologies).

The University of Aberdeen’s microwave research group has well-established collaborations with several universities in Europe working in microwave technology, such as The University of Nottingham and Valencia Polytechnic University (UPV).

CFM’s research group is currently working in collaboration with Professor Catala’s group from the UPV on the design, and commission of a unique apparatus to carry out further investigation on the application of microwave irradiation on chemical processes, mainly hydrogen production and carbon capture. Some of CFM research group’s recent publications on the use of microwaves for carbon capture applications can be found in the following “for further reading” section.

For further reading

1. M.M. Yassin, J.A. Anderson, G.A. Dimitrakis, C.F. Martín* (2021). Effects of the heating source on the regeneration performance of different adsorbents under post-combustion carbon capture cyclic operations. A comparative analysis. *Separation and Purification Technology*, vol 276 Impact Factor: 7.312. Quartile: Q1
2. M. M. Yassin, S. Biti, W. Afzal, C. F. Martín* (2021). A systematic analysis of the dynamics of microwave- and conventionally-assisted swing adsorption on zeolite 13X and an activated carbon under post-combustion carbon capture conditions. *Journal of Environmental Chemical Engineering*. Vol 9 (6), 106835. Impact Factor: 5.909. Quartile: Q1
3. <https://www.abdn.ac.uk/engineering/people/profiles/cfmartin#publications>

About the author



Dr. Claudia Fernandez-Martin is a Lecturer in Chemical Engineering, Member of the Materials and Chemical Engineering Research Group at the School of Engineering (University of Aberdeen, UoA), Champion of the Circular Economy Theme (Centre for Energy Transition), Deputy Champion in Carbon Capture Utilisation and Storage CCUS (UoA), Deputy Environmental & Biodiversity Theme (School of Engineering), and Academic Member of the UK Carbon Capture and Storage Research Centre (UKCCSRS).

She has over 13 years' experience in: a) experimental and numerical modelling of Carbon Capture processes, b) the development of low-cost and advanced materials for CO₂ capture at post-combustion conditions (capture from gas and coal-based power plants emissions at atmospheric pressure) and pre-combustion conditions (capture from shifted syngas at elevated pressure), c) transformation of wastes, including biomass/plastic-based wastes, into porous adsorbents for gas separation applications, such as CO₂ capture and biogas upgrading, d) transformative

technologies, including microwaves, to achieve more efficient carbon capture processes.

Dr Claudia Fernández-Martín has done exhaustive research on a wide range of different materials for carbon capture applications, such as organic polymers (thermoplastic and thermoset resins, hyper-crosslinked organic polymers, and low-density organic polymers), composite polymeric and hybrid membranes, impregnated silicon-based adsorbents, and catalysts supported in carbon-based materials.

Dr Fernández-Martín has extensive experience in microwave-assisted processes (namely microwave-assisted regeneration of sorbents for gas separation including carbon capture, pre-treatment of lignocellulosic and food wastes, and microwave-assisted synthesis). She has supervised 4 Post-Doctoral Research Associates and a thesis to completion, and currently leads a research group composed by 7 PhD students. Additionally, she is mentor of new academics and PhD students in the School of Engineering, has led and currently leads several academic and industrial projects as Principal Investigator, has published in high-impact scientific journals and presented her job in national and international conferences, seminars and workshops.

More information can be found in this link:

<https://www.abdn.ac.uk/engineering/people/profiles/cfmartin>

Report on the 15th Symposium of Japan Society of Electromagnetic Wave Energy Applications

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The 15th Symposium of the Japan Society of Electromagnetic Wave Energy Applications (JEMEA) was held on-line from 13-15 October, 2021, with short courses and equipment display. The Symposium is sponsored by JEMEA. The Symposium of JEMEA is held annually from 2007, and this is the 15th time. Professor Kazutoshi Ikenaga chaired the executive committee of the 15th Symposium. Basically, the presentations were in Japanese but the International mini Symposium entitled “Microwave Technology for Green

Chemistry” on 14 October was conducted in English.

Prior to the symposium, short courses were held on the first day. The Theme of the short courses were: “-New Trends in Microwave Technology- ~AI/MI Technology & Fusion into Biotechnology~”. Basically, 4 courses were held, with 52 participants attending. The program of the short courses is uploaded on the website [1].

In the Symposium, the total number of the papers presented was 55. This includes 8 papers in special session, 2 papers in JEMEA Prize recipient