

Marie Skłodowska Curie Action –Postdoctoral Fellowship 2022
(MSCA-PF-2022)

Contact Person/Scientist in charge <i>(datos del IP del grupo de investigación o responsable científico)</i>	Name	Fernando
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Department /Institute /Centre <i>(datos del centro/departamento donde estaría ubicado el investigador a contratar)</i>	Name	Dep Ingeniería Electrónica DIE and Instituto de Sistemas Optoelectrónicos y Microtecnología ISOM E.T.S.I. de Telecomunicación Universidad Politécnica de Madrid
	Address	Avda. Complutense 30
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Research Area <i>(en base a las 8 áreas científicas establecidas en MSCA. Se podrán seleccionar entre una y tres áreas científicas por EOI)</i>		Information Science and Engineering (ENG) Physics (PHY)
Brief description of the Centre/Research Group <i>(Max. 1600 caracteres con espacio: información sobre el centro / grupo de investigación / personal científico, destacando los aspectos más relevantes de los mismos. Incluir URL si es posible.)</i>		<p>The Research Group is devoted to Graphene & 2D crystals, and works on three research lines devoted to ICT, Energy and Health. The group also develops its own technology: growth of 2D graphene layers and 3D graphene foams by CVD, as well as laser reduced graphene oxide; and automatic transfer for device processing. As part of the ISOM, the group members have direct access to the facilities of the ISOM clean room.</p> <p>Group's Know how:</p> <ul style="list-style-type: none"> - CVD growth -4" cold-wall chamber Aixtron Black Magic Pro for thermal and PE growth - LRGO on flexible substrates - Automatic transfer to arbitrary substrates - Material characterization: microscopy, microPL; Raman, AFM, SEM, electrical, etc. - Device processing: e-beam and photolithography; nanofrazor; etching; deposition, etc. - Device assessment <p>TOPIC: Graphene-based Interconnectors</p>



Graphene based Interconnectors – F. Calle

Project description

(Max. 1800 caracteres con espacio: breve descripción sobre el proyecto /línea de investigación en el que se acogería al investigador/a Marie S.Curie.)

Graphene shows high potential for next-generation CMOS interconnects. Graphene nano-ribbons (GNR) are used in VLSI and ULSI chips in the form of multi layer GNR [Haz18]. Graphene is expected to outperform Cu conductance in nm-wide channels of the same aspect ratio. A detailed evaluation methodology was developed for high-frequency impedance of graphene structures for on-chip interconnect and inductor applications [Sar11].

Our experience includes growth of electronic grade, monoatomic graphene sheets [Bos22] and laser reduced graphene oxide [Lad19]; automatic transfer [Bos13,16]; processing and assesment of electrodes [Bos15] [Fer19]. The availability of e-beam and nanofrazor techniques allows the development of GNR of multiple-transferred layers to improve CMOS interconnects.

[Bos13] *Method for transferring nanolayers and apparatus for carrying out said method*, WO2015075292A1.

[Bos15] *Method for extracting relevant electrical parameters from GFET using a physical model*, J Appl Phys 117 (2015) 044504; [10.1063/1.4906972](https://doi.org/10.1063/1.4906972)

[Bos16] *Automatic graphene transfer system for improved material quality and efficiency*, Sci. Rep. 6 (2016) 21676; [10.1038/srep21676](https://doi.org/10.1038/srep21676).

[Bos22] *Parameter space for graphene CVD in cold-wall reactors*, in progress.

[Fer19] *Advanced Graphene-Based Transparent Conductive Electrodes for Photovoltaic Applications*, Micromachines 10, 402 (2019); [10.3390/mi10060402](https://doi.org/10.3390/mi10060402)

[Haz18] *Graphene Nanoribbon as Potential On-Chip Interconnect Material—A Review*, J. Carbon Res. C 2018, 4, 49; [10.3390/c4030049](https://doi.org/10.3390/c4030049)

[Lad19] *Reduced graphene oxide/polyaniline electrochemical supercapacitors fabricated by laser*, App Surf Sci 467 (2019) 691; [10.1016/j.apsusc.2018.10.194](https://doi.org/10.1016/j.apsusc.2018.10.194)

[Sar11] *High-Frequency Behavior of Graphene-Based Interconnects*, IEEE Trans Electr Dev 58 (2011) 843; [10.1109/TED.2010.2102031](https://doi.org/10.1109/TED.2010.2102031)

Applications: documents to be submitted and deadlines

(Indicar qué documentación deberá remitir el /la investigador/a interesado/a al centro para establecer el contacto: CV, letter of motivation, letter of references, etc., así como la fecha límite para el envío de la misma. Recomendado: Hasta finales de abril 2022)

CV
Letter of motivation
At least one letter of reference
Deadline 30 April 2022