MINISTERIO DE CIENCIA E INNOVACIÓN
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Plan de Recuperación, Transformación y Resiliencia
AGENCIA ESTATAL DE INVESTIGACIÓN

Part A. PERSONAL INFORMATION

CV date	27/01/2024

First name	Jose Antonio		
Family name	Garrido Ariza		
Gender (*)	Male	Date of Birth (dd/mm/yyyy)	31/07/1972
Social Security, Passport, ID number	30541514K		
e-mail	joseantonio.garrido@icn2.cat	URL Web	https://icn2.cat/en/advanced-electronic-materials-and-devices-group
Open Researcher and Contributor ID (ORCID) (*)		0000-0001-5621-1067	

(*) Mandatory

A.1. Current position

Position	ICREA Research Professor		
Initial date	September 2015		
Institution	Catalan Institute of Nanoscience and Nanotechnology (ICN2)		
Department/Centre	Advanced Electronic Materials and Devices Group		
Country	Spain	Phone number	+34 937374648
Keywords	electronic materials, electronic devices, nanotechnology, 2D materials, neural interfaces, bioelectronics		

A.2. Previous positions (research activity interruptions)

Period	Position/Institution/Country/Cause of the interruption
2012-2015	Permanent Senior Researcher, Physics Department, Technische Universität München (Germany). Walter Schottky Institut, Munich (Germany)
2011-2015	Lecturer (Privatdozent), Technische Universität München (Germany)
2005-2010	Senior Researcher, Department of Physics of the Technische Universität München (Germany). Walter Schottky Institut, Munich (Germany)
2003-2005	Scientific staff. Team leader, Diamond and Advanced Carbon group - Walter Schottky Institut, Munich (Germany)
2000-2003	Postdoc at the Walter Schottky Institute, Technische Universität München (Germany)
Jul. -Sept. 1999	Interim researcher, School of Electrical Engineering, Cornell University (U.S.)
Jul- Sept 1998	Interim researcher, Solid-State Electronics Lab, University of Michigan (U.S.),
Jun- Nov 1995	Scholar researcher, IBM Almaden Research Center, California (U.S.)

A.3. Education

Academic degree	University/Country	Year
Habilitation degree	Technische Universität München/Germany	2011
PhD Telecommunication Engineering	Universidad Politécnica de Madrid/Spain	2000
Telecommunication Engineer degree	Universidad Politécnica de Madrid/Spain	1996

Part B. CV SUMMARY

Since 2015, Jose A. Garrido is an ICREA Research Professor and leader of the ICN2 Advanced Electronic Materials and Devices (AEMD), group currently with 17 members. Prior to this position, from 2011 to 2015, Jose A. Garrido held a lecturer position at the Technical University of Munich (Physics).

Since 2017 he is the vice-director of ICN2, contributing to the Strategic Development Office (of which he was the Head from 2017 to 2020), and the Business and Innovation Department. He also serves as president of the ICN2 Spin-off Committee and the ICN2 Ethics Committee, and participates in other committees (PhD recruitment programme, Investment Committee)

His research activity focuses on aspects of materials science and technology related to novel electronic materials, with a strong emphasis on 2D materials, such as graphene, as well as TMDs such as MoS_2. An important area of development of his group is the application of technologies based on these materials to fields like neural/brain interfaces, bioelectronics and biosensing, as well as to energy storage. His work covers a variety of disciplines and areas of research, fitting very well to the topical diversity associated to nanotechnology in general.

He has 159 publications, over 100 invited presentations (including keynotes), 6 patents (5 of them licensed), one trade secret and has participated in 27 projects as Principal investigator, attracting more than 8,5M€ to his group from competitive funding (only considering his current position at ICN2, 2016 to 2023).

Jose A. Garrido is coordinator of the MINIGRAPH project (EIC pathfinder, 4 M€, 2022-2025), in which 7 institutions from 5 countries participate to develop and validate innovative brain implants with closed-loop neuromodulation capabilities, controlled by implanted electronics units and miniature arrays of graphene microelectrodes. He was also coordinator of the EU FET-proactive BrainCom project (8.3 M€, 2016-2022), in which 10 institutions from 6 countries participate to develop brain implants for patients with aphasia. He is also coordinator of the i-VISION project (2019-2022), a project financed by LaCaixa Foundation (1M€) aiming to develop retinal implants that restores vision to blind patients. Furthermore, from 2016 to 2020 he has been co-leader of the Biomedical Applications work package of the Graphene Flagship, coordinating 14 teams from different countries to develop a new generation of neural interfaces based on graphene technologies. He is principal investigator in the project Gph-T BCI (EIC Transition, 2.5M€, 2023-2025), where ICN2 and the company INBRAIN Neuroelectronics will develop a new generation of brain-computer interfaces for medical applications.

Since 2017, he has participated as PI in 8 EU projects and 20 National projects (see details at: https://icn2.cat/en/advanced-electronic-materials-and-devices-group?projects). He is one of the "Garantes" (guarantor) of the past Severo Ochoa project of ICN2 (SEV-2017-0706), and is the PI of the ongoing Severo Ochoa project (CEX2021-001214-S).

From 2008 he has been the director of 30 PhD Thesis (10 ongoing), and 42 Master/Diploma Thesis (2 ongoing), and has been evaluator for DFG, FET-Open projects in H2020 and ERC grants (Synergy, Advanced and Consolidator). From 2012 to 2016 he was Editor for the journal Diamond and Related Materials and from 2018 to 2022 he was also in the Editorial Board of the IOP journal 2D Materials.

Jose A. Garrido has an extensive network of international collaborators: Prof. Mauricio Terrones, Penn State University (USA) on materials synthesis; Prof. K. Kostarelos, Univ. of Manchester (UK) on 2D materials for preclinical science; Dr. med. D. Coope, NHS Trust Hospital (UK) on human brain surgery; Prof. A. Sirota, LMU (Germany) on cortical brain recordings; Dr. R. Wykes (UK), on epilepsy research; Prof. S. Picaud, Institute de la Vision (France) on retinal implants; Prof. G. Malliaras, Univ Cambridge (UK) on bioelectronics; Prof. T. Palacios, MIT (US) on flexible electronics.

Jose A Garrido is founder, Chief Scientific Officer, and member of Board of Directors of INBRAIN Neuroelectronics, an ICN2 spin-off that aims at the commercialization of graphene-based neural devices for medical applications. Since Dec. 2019, INBRAIN has raised over 30M€ in private capital and has incorporated over 50 employees; as CSO of INBRAIN, Jose A Garrido has led the company to obtain the three levels of EIC awards (Pathfinder, Transition, and Accelerator), with a total of 6M. In July 2021, INBRAIN signed a long-term partnership with the pharma Merck (Germany), creating a subsidiary (INNERVIA bioelectronics) to explore bioelectronic vagus nerve therapies for severe chronic diseases.

Part C. RELEVANT MERITS

C.1. Publications

Jose A. Garrido (ORCID CODE: 0000-0001-5621-1067) is co-author of 159 articles, with 9698 citations and h-index of 47 (data from Scopus), highlighting the following 10 ones (starting from 2017):

Viana D, Walston S, Masvidal-Codina E,…, Garrido JA **(31st position/ out of 31 authors)** "Nanoporous graphene-based thin-film microelectrodes for in vivo high-resolution neural recording and stimulation", ***Nature Nanotechnology*** (2024), https://doi.org/10.1038/s41565-023-01570-5.

Calia, AB, Masvidal-Codina E, Smith TM,…, Garrido JA **(28/28).** "Full bandwidth electrophysiology of seizures and epileptiform activity enabled by flexible graphene micro-transistor depth neural probes", ***Nature Nanotechnology*** 17, 301-309 (2022)

Garcia-Cortadella R., Schwesig, G.; Jeschke, C.;...Garrido, JA **(13/13)**," Graphene active sensor arrays for long-term and wireless mapping of wide frequency band epicortical brain activity", ***Nature Communication***, 12 (1), 211 (2021)

Schaefer CM, Caicedo Roque JM,…, Garrido JA (**10/10**) "Carbon Incorporation in MOCVD of MoS2 Thin Films Grown from an Organosulfide Precursor", **Chemistry of Materials**; 33 (12): 4474 – 4487 (2021)

Garcia-Cortadella, R.; Schäfer, N.; Cisneros-fernandez, J.;...Garrido, JA, Guimerà Brunet, A, **(13/14)** Switchless Multiplexing of Graphene Active Sensor Arrays for Brain Mapping, ***Nano Letters***, 20 (5): 3528 – 3537 (2020).

Schaefer, N.; Garcia-Cortadella, R.; Martínez-Aguilar, J.;… Garrido, JA **(13/13)**, "Multiplexed neural sensor array of graphene solution-gated field-effect transistors", ***2D Materials***, 7 (2), 025046 (2020).

Masvidal-Codina, E.; Illa, X.; Dasilva, M.;…Garrido, JA**,** Guimerà Brunet, A. **(13/14)**, "High-resolution mapping of infraslow cortical brain activity enabled by graphene microtransistors**",** ***Nature Materials***, 18, 280-288 (2019).

Hébert, C.; Masvidal-Codina, E.; Suarez-Perez, A.;…Garrido, JA **(18/18)**, "Flexible Graphene Solution-Gated Field-Effect Transistors: Efficient Transducers for Micro-Electrocorticography", ***Advanced Functional Materials,*** 28, 1703976 (2018).

Pampaloni, N.P.; Lottner, M.; Giugliano, M.;…Garrido, J.A, Ballerini, L. (CA); Scaini, D. **(7/9)**; "Single-layer graphene modulates neuronal communication and augments membrane ion currents" *Nature Nanotechnology* (2018), 13 (8), 755-764 (2018).

Kostarelos, K., Vincent, M.; Hébert, C.; Garrido, J.A **(4/4)**; "Graphene in the design and engineering of next-generation neural interfaces", ***Advanced Materials***, 29, 1700909 (2017).

C.2. Dissemination and Outreach

Jose Garrido has participated in over 100 conferences/talks as invited/keynote speaker, highlighting the following ones from 2017:

Invited speaker in: 2023 Materials Research Society (MRS) Fall Meeting, Boston, 26/11/2023; Neuro X Annual Research Symposium, Geneva, 20/11/2023; Functional 2D Materials, Seoul, 07/11/2023; Massachusetts Institute of Technology, 12/07/23; European Symposium on Pediatric Cochlear Implantation, Rotterdam, 03/06/23; University of Zaragoza, 25/05/23; Graphene Europe 2050. Vision & strategy workshop. The Hague, 19/04/23; The 1st Graphene Flagship EU-Singapore Workshop on Graphene and related 2D materials, Singapore, 28/03/23; TEATRACA 2022, Madrid, 26/01/23; 23rd EVER Congress, Valencia (Spain), 13/10/22; Neurotechnologies (VIB conference), Leuven (Belgium), 29/9/22; Debates CaixaResearch, 25/5/22 (online); Neuroelectronic Interfaces Gordon Research Conference, Ventura (USA), 16/3/22; 2021 MRS Fall Meeting & Exhibit, hybrid event, 7/12/2021; Clustering and Global Challenge 2021, online, 7/4/2021; Eu-China 2019, Shangai (China), 17/10/2019; Graphene Week 2019, Helsinki (Finland), 23/9/2019; E-MRS Spring Meeting 2019, Nice (France), 30/5/2019; Wearable Technologies Conference 2019, Munich (Germany), 6/2/2019;

Graphene 2018, Dresden (Germany), 26/6/2018; Swiss Nano Convention 2017, Fribourg (Switzerland), 30/5/2017; Graphene 2017, Barcelona 29/3/2017;

Keynotes in: NanoBio&Med 2022, 23/11/22 (Barcelona); Graphene Week 2022, Munich (Germany), 9/9/22; Graphene 2022, Aachen (Germany), 7/7/22; Graphene Industrial forum &2DM (GIF 2021), 27/1/2021 (online); Graphene Week2017, Athens (Greece) 27/9/2017; SPIE 2017 Microtechnologies, Barcelona (Spain), 10/5/2017;

Organization of international scientific events (highlights): General Assembly of Minigraph Project (24-25/04/2023, Barcelona, Spain); the BrainCom summer School (18-20/9/2018, Barcelona, Spain); ICN2 Workshop on Research, Strategy and Innovation (4-5/10/18 Castelldefels, Barcelona, Spain); ICN2 Severo Ochoa International Conference (15-16/2/18, Barcelona, Spain); Hasselt Diamond Workshop SBDD (March 2017, Hasselt, Belgium); International Conference on Diamond and Carbon Materials 2017 (3-7/7/2017, Gothenburg, Sweden); New Diamond and Nano Carbons Conference (NDNC) 2017(28 May-1 June 2017, Cairns, Australia);

Outreach activities such as participation in EU Nano2All project, guided visits to learn about projects (e.g. Journalist-in-the-Lab initiative), participations in the event "Joves i Ciència" organized by Fundació Catalunya La Pedrera, participation in the event "Biennal CIUTAT I CIENCIA" and Festa de la Ciència to talk about nanoscience and heath and also participating in events organized by clinicians and patients (Barraquer Foundation – opthalmologists, Asociación de la Retina de Cataluña). He has appeared more than 50 times in media (TV, Radio) and newspapers such as El Mundo, El Periódico, La Razón, La Vanguardia, etc. Within the BrainCom project, ICN2 has developed the **app "VRainCom"**, a VR tour showing the research of the project in multiple languages.

C.3. Research projects

Since 2016, Jose Garrido's group has attracted more than 8,5M€ from competitive funding (8 European, 17 National, 8 regional, and 8 fellowships, highlighting the ones indicated below:

GphT-BCI: "Graphene Transistors for High-Density Brain-Computer Interfaces" - EU-funded HORIZON-EIC-2023-TRANSITION-01 (ID: 101136541; budget: 549211,25€ for ICN2); Duration: Dec 2023 - Nov 2025; European Project Coordinator: Jose A Garrido (INBRAIN)

MINIGRAPH: "Minimally Invasive Neuromodulation Implant and implantation procedure based on ground-breaking GRAPHene technology for treating brain disorders" - EU-funded EIC -Pathfinder (ID: 101070865; budget: 3928 k€ (750 k€ for ICN2); Duration: Oct 2022 – Sep 2025; **European Project Coordinator**: J.A. Garrido (ICN2)

BrainCom: "High-density cortical implants for cognitive neuroscience and rehabilitation of speech using brain-computer interfaces" - EU-funded FET-Proactive (ID: 732032; budget: 8359 k€ (1419 k€ for ICN2); Duration: Dec 2016 – Apr 2022; **European Project Coordinator**: J.A. Garrido (ICN2)

Graphene Flagship, EU- funded: "Graphene-based disruptive technologies (**Graphene Core1,** ID:696656) Budget: 89 M€ (584 735€ for AEMD, ICN2); Duration: Apr 2016-Mar 2018; J.A. Garrido: IP and **deputy of WP5** related to "biomedical applications" (12 teams, 4M€); "Graphene Flagship Core Project 2" (**GrapheneCore2,** ID:785219) - Budget: 88 M€ (570 k€ for AEMD, ICN2); Duration: Apr 2018-Marc 2020; J.A. Garrido: **deputy of WP5** (16 teams, 4.5M€); "Graphene Flagship Core Project 3" (**GrapheneCore3,** ID: 881603) – Budget: 150 M€ (1M€ for AEMD, ICN2); Duration: Apr 2020-Sep 2023; **PI**: J.A. Garrido (ICN2). **European Project Coordinator:** Chalmers (U. Manchester for WP5)

i-VISION: "Adaptive Retinal Implant Technology for Vision Restoration"– Funded by "LaCaixa" Foundation, Health Research 2018 call; Budget: 999,715€ (224,970€ for Garrido's team); Duration: December 2019-November 2022; **Coordinator**: J.A. Garrido (ICN2)

GraphCAT: "Comunidad Emergente de Grafeno de Cataluña"; Co-financed by EU-ERDF (Programa Operativo de Catalunya 2014-2020), with the support of the Secretaria d'Universitats i Recerca del Departament d'Empresa I Coneixement de la Generalitat de Catalunya; Budget: 3.989.227,96€ (432250€ for Garrido's team, 50% funded); Duration: July 2018-June 2022; The project involves over 20 institutions including industry and academia. **Coordinator**: J.A. Garrido (ICN2)

Severo Ochoa Centre of Excellence: "Nanosolutions for a Sustainable Society" - The State Research Agency (AEI) Grant CEX2021-001214-S funded by MCIN/AEI/ 10.13039/501100011033 (budget: 4 M€); Duration: Jan 2023-Dec 2026. Jose Garrido is the Principal Investigator of this project. The budget of 4M€ is not accounted in the total budget (8,5M€) provided above.

C.4. Technology/Knowledge transfer

Patents

Jose Garrido is co-founder (Dec 2019) and CSO of **INBRAIN Neuroelectronics**, which in March 2021 closed a Series A financial round of 15M€, one of the **largest financial rounds of Medtech in Spain**. Since 2017, J. Garrido is co-author of **6 patents (5 already licensed)** and 1 trade secret licensed (see below); the AEMD group, led by J. A. Garrido has R&D collaboration contracts with INBRAIN Neuroelectronics (over 580k€ since 2020).

Patents

J.A. Garrido, M.Torres, M.Decré, Bert Bakker, Damià Viana, Oscar Vico. Neurostimulation system for Deep Brain Stimulation, PCT/EP2021/082838; Priority date: 24/11/2021; Priority Country: ES. Owners: ICN2, ICREA, INBRAIN Neuroelectronics. **Licensed** to INBRAIN Neuroelectronics.

J.A. Garrido, A. Guimerà, X. Illa, R. García. A flexible probe, EP21188748.4; Priority date: 30/7/2021; Priority Country: ES. Owners: ICN2, CSIC, CIBER, ICREA. Not licensed.

J.A. Garrido, E. Masvidal, A. Guimerà, R. Villa, L. Re Blanco, X. Illa, N. Schaefer, R. García. Acquisition device to limit leakage current in electrophysiological signal recording device, EP20382819.9; Priority date: 17/09/2020; Priority Country: ES. Owners: ICN2, CSIC, CIBER, ICREA. **Licensed** to INBRAIN Neuroelectronics.

J.A Garrido, D. Viana, C. Bullock, K. Kostarelos, C. Bussy, S. Walston. Reduced graphene oxide film comprising a stack of rGO layers and its applications, EP19382146.9; Priority date: 27/02/2020; Priority Country: ES. Owners: ICN2, ICREA, Univ. Manchester. **Licensed** to INBRAIN Neuroelectronics.

J.A. Garrido, A. Guimerà, E. Masvidal, R. Villa, X. Illa, M.V. Sánchez. System of graphene transistors for measuring electrophysiological signals, P201831068. Priority date: 6/11/2018; Priority Country: ES. Owners: ICN2, CSIC, CIBER, ICREA, IDIBAPS. **Licensed** to Multichannel Systems.

J.A. Garrido, A. Guimerà, Ll. A. Terés, M. Dei, J. Agustín Cisneros, F. Serra. Circuit for the multiplexing and read-out of variable-resistance sensor arrays, EP18382593. Priority date: 3/8/2018; Priority Country: ES. Owners: ICN2, CSIC, UAB, ICREA. **Licensed** to INBRAIN Neuroelectronics.

Trade Secret

J.A. Garrido, C. Hébert, A.P. Bonaccini, E. del Corro, N. Schaeffer, R. Villa, A. Guimerà, E. Masvidal, P. Godignon, X. Illa, E. Prats. Design and fabrication of flexible arrays of graphene SGFETs for electrocorticography. Registration in Barcelona, 7011/2018; Priority date: 21/12/2018; Priority Country: ES. Owners: I ICN2, CSIC, CIBER, ICREA. **Licensed** to Multichannel Systems.