

R&D COLLABORATIVE PROPOSAL /
COMPANY PARTNER SEARCH

合作研发建议书/
公司合作伙伴搜索

The information you are about to provide in this form will be distributed among Chinese companies matching your company profile and that might be interested in the proposal of collaborative R&D project that you will be describing in this form. 您在本表格中提供的信息将被分发给与贵公司简介匹配的中国公司，它们可能对您在本表格中描述的合作研发项目建议书感兴趣。

(Please use English language for filling in the document) (请用英文填写本文件)

In the case that your company will establish a R&D project in collaboration with a Chinese company, you could benefit from the preferential financing given within the CHINEKA Program. 如果贵公司将与中国公司合作建立研发项目，那么您可以受益于中西卡 (CHINEKA) 项目提供的优惠融资。

YOUR COMPANY PROFILE

贵公司

Company name: Mario Lanza research group at Soochow University

公司名称

Number of employees:

Annual turnover:

Balance Total:

Year of latest financial report:

最新财务报告的年份:

Address: 199 Ren Ai Road, Bld. 910, Rm. 316

City: Suzhou

Province: Jiangsu

Postal Code: 215123

Telephone: 008618801544070

Fax:

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Contact: Mario Lanza

Position: Full Professor

Telephone: 008618801544070

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Additional Contact:

Position:

Telephone:

Email:

COLLABORATIVE R&D PROJECT PROPOSAL

(Describe as precisely as possible the technology cooperation proposal. Describe what you have to offer and what you expect from your potential partner) Include: Sector Group; Abstract of Project; Innovations Offered; and Current State of Development

(请尽可能精确地描述技术合作建议书。描述您能提供什么，以及您对潜在合作伙伴的期望)
包括：类别组；项目摘要；提出的创新；发展现状

Title 名称	(Do not exceed 120 characters) (不超过 120 个字符) Synthesis and characterization of 2D materials and 2D materials based electronic devices		
Duration (YM- YM) 持续时间 (年月-年月)			
Budget(1,000 Euro) 预算 (1000 欧元)	SPAIN 西班牙	CHINA 中国	TOTAL 总计
		200,000 Euro	
Technology Field (Click a box) 技术领域 (点击一个复选框)	<input type="checkbox"/> Renewable energy 可再生能源 <input type="checkbox"/> Energy efficiency technology 节能技术 <input type="checkbox"/> Smart Community technology 智能社区技术 <input type="checkbox"/> Environment technology 环境技术 <input type="checkbox"/> Robotics and Machinery systems technology 机器人和机械系统技术 <input checked="" type="checkbox"/> Electronics, materials and nanotechnology 电子、材料和纳米技术 <input type="checkbox"/> Biotechnology 生物技术 <input type="checkbox"/> Others 其他		

Summary
总结

During the last decade, memristors have attracted enormous interest due to their excellent capability to store digital information, and they are being considered a key element to build future artificial neural networks for bio-inspired neuromorphic computing systems. Recent works have shown that memristors made of layered two-dimensional (2D) materials can exhibit some exotic performances that traditional memristors (made of transition metal oxides) do not show, such as excellent transparency and flexibility, high-temperature stability, and unique controllability of the conductance potentiation, depression and relaxation. However, all studies on 2D materials based memristors focused on single devices, and system level performances like yield and device-to-device variability have never been analyzed in depth. Furthermore, several basic properties of 2D materials based memristors (such as switching time, write energy, I-V non-linearities, and scalability) have never been investigated. In this project we aim the wafer-scale statistical analysis of memristive crossbar arrays made of 2D layered materials. By using chemical vapor deposited multilayer hexagonal boron nitride (h-BN) sheets, we will fabricate metal/h-BN/metal and graphene/h-BN/metal memristive crossbar arrays and will analyze their performance, yield and variability.

CHINESE PARTNERS

西班牙合作伙伴

(When you know a potential Spanish company, write its name and contact details in this section.) Please, make a description of the desire type of Spanish Technology Partner.

(如果您知道某一家有潜力的西班牙公司，请在本节中写出它的名称和联系方式)。请描述您渴求的中国技术合作伙伴的类型。

Estamos buscando una empresa española que trabaje en el campo de los materiales bidimensionales, especialmente con grafeno, hexagonal boron nitride (hBN) y MoS₂, para solicitar este proyecto conjunto. Podemos trabajar tanto en síntesis como en caracterización, así como en la fabricación de dispositivos electrónicos usando dichos materiales. Idealmente, nos gustaría encontrar una empresa que fabrique estos materiales mediante chemical vapor deposition, y el material que nos interesa más es el hBN, aunque los demás también nos interesan. La idea sería contribuir a la implementación de estos materiales a escala de obleas, e incluso nos interesa estudiar el proceso de transferencia.

Adjunto un abstracto en inglés:

During the last decade, memristors have attracted enormous interest due to their excellent capability to store digital information, and they are being considered a key element to build future artificial neural networks for bio-inspired neuromorphic computing systems. Recent works have shown that memristors made of layered two-dimensional (2D) materials can exhibit some exotic performances that traditional memristors (made of transition metal oxides) do not show, such as excellent transparency and flexibility, high-temperature stability, and unique controllability of the conductance potentiation, depression and relaxation. However, all studies on 2D materials based memristors focused on single devices, and system level performances like yield and device-to-device variability have never been analyzed in depth. Furthermore, several basic properties of 2D materials based memristors (such as switching time, write energy, I-V non-linearities, and scalability) have never been investigated. In this project we aim the wafer-scale statistical analysis of memristive crossbar arrays made of 2D layered materials. By using chemical vapor deposited multilayer hexagonal boron nitride (h-BN) sheets, we will fabricate metal/h-BN/metal and graphene/h-BN/metal memristive crossbar arrays and will analyze their performance, yield and variability.

YOUR COMPANY DESCRIPTION

贵公司概述

(Company Website, Research and development guidelines, strategic alliances, competitive position, etc)

(The minimum information to show the potential of your company)

Me llamo Mario Lanza, de nacionalidad española, y catedrático por la Universidad de Suzhou. Esta Universidad, a pesar de que en España no es muy conocida, es muy potente en los rankings internacionales. Podéis encontrar más información aquí:

- Rank 19th in Materials Science according to US News ([link here](#))
- Rank 19th in Nanoscience & Nanotechnology according to Shanghai Ranking ([link here](#))
- Rank 29th in Physical Sciences according to Nature Index ([link here](#))

En esta Universidad dirijo un grupo de investigación formado por 20 personas (estudiantes de doctorado y postdoctorandos), y recientemente hemos publicado nuestro trabajo en este campo en Nature Electronics, Advanced Functional Materials, 2D materials y otras revistas en este campo. Podéis encontrar más información sobre mi grupo, incluyendo publicaciones actualizadas, aquí:

<https://lanzalab.com/>

En el campo de los materiales bidimensionales, hemos trabajado con expertos de todo el mundo, como Andrea Ferrari (University of Cambridge, UK), Jing Kong (MIT, USA) y Philip Wong (Stanford University, USA).

YOUR COMPANY PRODUCTS

贵公司产品

(Technologies, applications, services, etc)

(The minimum information to show the potential of your company)

Estamos más interesados en la síntesis de materiales bidimensionales de calidad, y generar unas buenas muestras que se puedan comercializar, especialmente hBN, ya que la calidad que hay hasta ahora en el mercado tiene margen de mejora. También nos interesa generar publicaciones científicas. No tenemos ningún problema en cuanto a propiedad intelectual, nos podemos adaptar a las necesidades de la empresa española. También podemos dar servicio de caracterización de muestras, ya que tenemos una sala blanca muy bien equipada, y también un montón de herramientas que podemos usar sin coste alguno (por ejemplo TEM, SEM, AFM, Raman Spectroscopy, etc...)