



Dear Photonics21 Secretariat

We herewith submit the nomination of the following Photonics21 Board of Stakeholder candidate (Catalan Institute of Nanoscience and Nanotechnology) / representative (Prof. Arben Merkoçi).

**- Letter of Nomination -
Photonics21 Board of Stakeholders
Election 2018**

Photonics21 Board of Stakeholders - Letter of Nomination

§ 5 BOARD OF STAKEHOLDERS (6) b....A candidate nomination will always contain the name of the candidate organisation together with its proposed BoS Representative, and voting on a candidate implies voting on this combination.

1. Full legal name of the affiliation nominated as BoS Member (candidate's organisation):

Fundació Institut Català de Nanociència i Nanotecnologia

2. Full contact details of the affiliation (street, postal code, country) nominated as BoS Member and invoice address (in case the candidate is elected, the affiliation needs to pay an annual service fee according the Photonics21 Terms of Reference §5 (10)):

Catalan Institute of Nanoscience and Nanotechnology – ICN2

Campus UAB, ICN2 Building , 08193 Bellaterra, Spain

Contact Tel. +34 93 737 26 17

VAT Number: G-63277776

Contact e-mail: strategy@icn2.cat

3. Name of the suggested BoS Representative (the personal candidate)

Prof. Dr. Arben Merkoçi

4. Information about the BoS candidate and the BoS representative

Extract Photonics21 Terms of Reference¹: “§ 5 BOARD OF STAKEHOLDERS; ... (6) Election of BoS Members: “Description of the activities of, and information about the added value and contribution to the BoS by both the nominated BoS member and the BoS Representative”

- a) Description of the activities and information about the expected contribution and value added the nominated BoS member (candidates organization) will bring to the BoS²

The Catalan Institute of Nanoscience and Nanotechnologies (ICN2) is a foundation with the objective of becoming a world-renowned centre for nanoscience and nanotechnology research. Its Board of Trustees is formed by the Consejo Superior de Investigaciones Científicas (CSIC), the Government of Catalonia and the Autonomous University of Barcelona. It is part of CERCA, the network of Research Centres launched by the Catalan Government as a milestone of its long-term strategy to foster development of a knowledge-based economy.

ICN2's research lines focus on the newly discovered physical and chemical properties that arise from the fascinating behaviour of matter at the nanoscale. Much of our work is devoted towards the understanding of fundamental physical phenomena associated to state variables as regards electrons, phonons, photons, plasmons, etc., the investigation of new properties derived from

¹ Photonics21 Terms of reference are available at https://www.photonics21.org/download/about-us/structure/ETP_Photonics21_Terms_of_Reference_C3.pdf?m=1513688127&?m=1499877714

² The candidate is aware and accepts that according to the Photonics21 Terms of Reference a service agreement and a service fee invoice is to be signed / paid with the Photonics21 association.

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tailored nanostructures and establishing new processes for the design and fabrication of novel nanodevices.

This work enables functionalisation of nanoparticles, encapsulation of active agents and creation of new nanodevices and nanosensors, through frontier science that has direct implications for various sectors (health, food, energy, the environment, etc.). Recognising that nanotechnology is an interdisciplinary arena, the ICN2 actively promotes collaboration among scientists from diverse backgrounds (physics, chemistry, biology, engineering), seeking to integrate their knowledge to complete its mission. The ICN2 trains researchers in nanotechnology via studentships, doctoral and post-doctoral positions. We also provide custom training courses for technicians and R&D personnel at private companies and other research institutes.

Concerning photonics research, ICN2 has intensive activity, with the three of the largest groups of the Institute developing photonics-based technologies within their main research lines, among them, Prof. Arben Merkoçi's group (**Bioelectronics and Biosensors**), whose candidacy as Board of Stakeholders Member of Photonics 21 is presented in this Letter of Nomination.

The other two ICN2 groups with intensive research activity on photonics are:

The *Phononic and Photonic Nanostructures Group (P2N)*, led by Prof. Clivia M. Sotomayor Torres. Prof. Sotomayor, who was a founding member of Photonics 21. Prof Dr. Sotomayor Torres contributed to setup the community of nanophotonics, as coordinator of the Network of Excellence PHOREMOST and in recent years contributed to the consolidation of the nanophononics research community in Europe promoting and participating in several initiatives and projects. The P2N group has had an important role in establishing the field with mainly experimental research, spanning phononics from hypersound to thermal phonons, for the manipulation and control of phonons and heat management.

Prof. Laura M. Lechuga's group (*Nanobiosensors and Bioanalytical Applications*), among other research lines, develops silicon photonics biosensors. These are integrated nano-interferometric transducers for high performance biosensors based on the evanescent field detection principle. They combine high sensitivity, real-time and label-free detection with mechanical stability, miniaturization and the possibility of mass-production. The group aims to integrate interferometric biosensors into lab-on-a-chip (LOC) platforms which could be used as hand-held and portable devices for point-of-care diagnosis. This device must be easy to use, fast (seconds) and should allow multiplexed detection in real-time with very low volumes (nl) of samples and reagents. The point-of-care device will allow for the identification and quantification of biomarkers at femtomolar level without using fluorescent or radioactive labels.

ICN2 researchers actively participate in EU and national projects as valued partners and coordinators. Below a selection of on-going projects in photonics at ICN2 is given:

- 1.- Diamond-based nanomaterials and nanostructures for advanced electronic and photonic applications (D-SPA). European Commission, 2017-01-01 / 2020-12-31. PI: Kehagias, N.
- 2.- All-Phononic circuits Enabled by Opto-mechanics (PHENOMEN). Funded by European Commission, 2016-09-01 / 2019-08-31. PI and coordinator: Sotomayor Torres, C.M.
- 3.- Ingeniería de fonones para la gestión térmica avanzada a la nanoescala y la optomecánica a temperatura ambiente (PHENTOM). MINECO, 2016-01-01/2018-12-31.PI: Sotomayor Torres, C.M.

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- 4.- Thematic network of excellence on “Photonic Integrated Circuits for Telecom & Bio Sciences (PIC4TB). <http://pic4tb.blogs.upv.es/>. PI: Prof. L. M. Lechuga
- 5.- PreDICT: Point-of-care Nanoplasmonic Platforms for Novel High-Value Diagnostics and Therapy Follow-Up. MINECO (TEC 2016-78515-R), 31/12/2016-31/12/2019. PI: Prof. L. M. Lechuga
- 6.- DIONISOS: Desarrollo de Inmunoreactivos y biosensores para el análisis de trazadores en yacimientos petrolíferos. Financial support: Retos Colaboración 2017, Programa Estatal de I+D+i Orientada a los Retos de la Sociedad Referencia: RTC-2017-6222-5 Participating institutions: CEPESA S.L. (coordination), Universidad Politécnica de València (UPV) From: 2018-2021. PI: Prof. L. M. Lechuga
- 7.- INTCATCH, Development and application of Novel, Integrated Tools for monitoring and managing Catchments. Funded by EC, 2016-06-01 / 2020-01-31. IP: Prof. A. Merkoçi
- 8.- NACANCELL, Development of a Nanodiagnostic platform for monitoring of Cancer cell secreted proteins. MINECO, 2016-06-01 / 2020-01-31. IP: Prof. A. Merkoçi.

Furthermore, ICN2 is member of EPIC (European Photonics Industry Consortium), Fotonica 21 (Spanish mirror platform to Photonics 21) and is involved in activities led by SECPHO (Technology innovation cluster on photonics). It is also member of Chamber B of AENEAS and member of its Scientific Community Council.

- b)** Description of the activities and information about expected contribution and value added the BoS Representative (candidate / person) will bring to the BoS.

Prof. Arben Merkoçi is an ICREA Professor, his research is focused on the design and application of cutting-edge nanotechnology and nanoscience based biosensors being photonics based on nanomaterials one of his main research lines. Prof. Merkoçi has pioneered the research and application of plasmonics of nanoparticles in paper-based sensors with interest for diagnostics. His group has been the first one to introduce innovative biosensing applications taking advantages of quenching properties of graphene oxide and photoluminescence of graphene quantum dots including coupling of such platforms with smartphone technology. He has published around 270 peer review research papers (IF 54, WOS; 65, Google Scholar), is editor of books, encyclopedia series and special issues of several journals dedicated to the field of nanomaterials integration and applications in biosensors. Prof. Merkoçi is Editor of Biosensors and Bioelectronics, the leading international journal devoted to research, design development and application of biosensors and bioelectronics, member of editorial board of Electroanalysis, Microchimica Acta and other journals. He is actively involved in postgraduate courses in field of nanomaterials-based biosensors in several Spanish and international centres. For example, he was member of commission for establishing the new Nanoscience and Nanotechnology undergraduate academic curricula at the UAB, the first one in Spain, which started in the academic year 2010-2011. Prof. Merkoçi has supervised 27 PhD students besides several national & international postdoctoral and other researchers in his lab and has been member or head of more than 20 PhD panels in various countries. He has been awarded several national and international grants related to nanomaterials application in biosensors and his group is collaborating with several worldwide leading labs in the field of nanobiosensors. Prof. Merkoçi has been/is involved as IP in various EU (FP5, 6,7, H2020) projects being collaborator with important industries developing healthcare devices such as IBM, Samsung, Nokia and many other industries involved in Graphene Flagship (ChemSens spearhead project, Euronanomed (NACANCELL project he

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is coordinating) and other networks He serves also as scientific evaluator and member of panels of experts of various international governmental and nongovernmental agencies (FP EU, USA, various EU and other countries), member of scientific committee of various international congresses, director of several workshops and other scientific events and have been invited to give plenary lectures and keynote speeches in more than 100 occasions in various countries. He is co-founder of two spin off technological companies (PaperDrop and GraphenicaLab).

Being a BoS Representative Prof. Merkoçi will support the European leadership in biophotonics for which he is an international leader and will contribute to the work of WG 3 and WG7. Biophotonics in general and particularly the field of optical nanobiosensors is nowadays crucial for the development of instant diagnosis of major diseases including strokes and other major diseases in addition to food control, safety and security, environment monitoring etc. Coupling of optical properties of nanomaterials, including quantum dots, with cost-effective platforms such as plastic or paper is leading to a new generation of biophotonics-based sensing that can be used even at home or at doctor office, as wearable devices with interest for pervasive monitoring and other innovative e-health to detect body signals, symptoms and diseases early on. The biophotonic detection platforms based on such materials are the best alternatives to be linked with therapy leading to nanotheranostics technologies which will put Europe on forefront of innovation in health and environment care.

5. Signatures

*Extract Photonics21 Terms of Reference: “§ 5 BOARD OF STAKEHOLDERS; ... (6) Election of BoS Members: “No later than 45 days before the Election Date new candidates can be proposed with a letter of nomination to the Photonics21 Secretariat, signed by at least **10 Photonics21 members**”.*

Number	Name	Organisation	Signature
1			
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Please note that electronic/scanned signatures are accepted

Final information from the Photonics21 secretariat:

- We recommend limiting the BoS nomination letter to 3-4 pages max.
- Letters of nominations should be either submitted via the Photonics21 website <https://www.photonics21.org/bos-election/index.php> or via e-mail to secretariat@photonics21.org.
- It is highly recommended to consult the Photonics21 Terms of Reference before submitting the nomination
- Please note that the deadline for providing BoS nominations to the Photonics21 Secretariat is the **21st September 2018**.