

## CURRICULUM VITAE ABREVIADO (CVA)

**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

### Part A. PERSONAL INFORMATION

|                                                |               |                         |            |
|------------------------------------------------|---------------|-------------------------|------------|
| First name                                     | Alejandro     |                         |            |
| Family name                                    | Cebrecos Ruiz |                         |            |
| Gender (*)                                     | Male          | Birth date (dd/mm/yyyy) | 12/03/1982 |
| ID number                                      | 72060542R     |                         |            |
| e-mail                                         | alcebrui      | URL Web                 |            |
| Open Researcher and Contributor ID (ORCID) (*) |               | 0000-0001-8790-8668     |            |

(\*) Mandatory

#### A.1. Current position

|                   |                                                        |                |              |
|-------------------|--------------------------------------------------------|----------------|--------------|
| Position          | Científico Titular                                     |                |              |
| Initial date      | 16/12/24                                               |                |              |
| Institution       | Consejo Superior de Investigaciones Científicas (CSIC) |                |              |
| Department/Center | Instituto de Instrumentación para Imagen Molecular i3M |                |              |
| Country           | Spain                                                  | Teleph. number | +34622036593 |
| Key words         | Medical Imaging, Photoacoustics, Acoustics, Ultrasound |                |              |

#### A.2. Previous positions (research activity interruptions, indicate total months)

| Period                  | Position/Institution/Country/Interruption cause            |
|-------------------------|------------------------------------------------------------|
| 07/02/2024 – 15/12/2024 | Postdoc / Consejo Superior de Investigaciones Científicas  |
| 01/02/2020 – 31/01/2024 | Postdoc SECTI/Universitat Politècnica de València          |
| 01/07/2018 – 31/01/2020 | Postdoc/Consejo Superior de Investigaciones Científicas    |
| 02/11/2015 – 30/06/2018 | Postdoc/Laboratoire d'Acoustique Le Mans Université/France |
| 01/04/2011 – 31/03/2015 | PhD FPI Grant/Universitat Politècnica de València          |
| 11/05/2010 – 10/11/2010 | Research Technician/Universitat Politècnica de València    |

#### A.3. Education

| PhD, Licensed, Graduate | University/Country                        | Year |
|-------------------------|-------------------------------------------|------|
| PhD                     | Universitat Politècnica de Valencia/Spain | 2015 |
| MSc                     | Universitat Politècnica de Valencia/Spain | 2010 |
| BSc                     | Universitat Politècnica de Valencia/Spain | 2009 |

(Include all the necessary rows)

### Part B. CV SUMMARY (max. 5000 characters, including spaces)

**Alejandro Cebrecos is a Tenured Research Scientist (Científico Titular) at the Spanish National Research Council (CSIC)**, based at the Institute for Molecular Imaging Instrumentation (i3M). He leads research lines in **ultrasound and photoacoustic imaging** focused on emerging biomedical technologies, combining fundamental wave physics with advanced instrumentation and experimental validation.

He was trained at the Universitat Politècnica de València (UPV), where he obtained degrees in Telecommunications Engineering and Acoustic Engineering (2009–2010), and completed his **PhD in 2015 with Cum Laude and International distinction**, receiving the **Extraordinary Doctoral Award**. His international experience includes a nine-month predoctoral stay at the University of Colorado Boulder (USA) and a postdoctoral position of more than two and a half years at the Laboratoire d'Acoustique de l'Université du Mans (UMR-CNRS, France). He maintains active collaborations with research groups in France, Korea, and leading photoacoustic imaging groups at **University College London and ETH Zürich**.

In **2019**, he founded the **photoacoustic imaging line at i3M**, now fully consolidated with dedicated infrastructure and international visibility. His research includes **low-cost OR-PAM instrumentation, single-detector photoacoustic tomography using reverberant cavities**, novel beamforming and reconstruction strategies, and the use of **covalent organic framework nanoparticles as photoacoustic contrast agents**. These contributions have resulted in **Q1 publications** (Ultrasonics, Photoacoustics, Scientific Reports), a **granted patent (ES2916219B2)** and invited international talks.

His work integrates **metamaterials, phononics, nonlinear acoustics and wave propagation in complex media** with applied developments in biomedical imaging and therapy. He is the author of **23 JCR-indexed publications (13 Q1, 5 D1)**, with **over 700 citations** and an **h-index of 13**, including articles in **Nature Communications**, IEEE TUFFC, Ultrasonics and Computer Physics Communications. He has presented **more than 80 conference contributions** and received **two international awards (EPS and ONR Global)**.

He has participated in **26 competitive research projects** and served as **Principal Investigator in five**, including **two consecutive projects funded by the Spanish State Research Agency** on the development and preclinical validation of sonophoresis technologies. He has also led projects funded by regional agencies and UPV, coordinated a scientific-technical contract with industry, and contributed to international projects with the **European Space Agency**, SNCF (France), and the **COST Action DENORMS**.

He has been involved in **12 technology-transfer contracts** related to focused ultrasound therapy, hyperthermia, acoustic sensors for cancer screening, and photoacoustic diagnostic devices. His profile combines **basic research, instrumental development and experimental validation**, strengthening the link between applied physics and biomedical engineering.

He has extensive teaching experience (**over 500 hours**), is **accredited as Associate Professor (Profesor Titular de Universidad)**, and has supervised **one completed PhD thesis**, two ongoing PhDs, and **14 completed BSc/MSc theses**. He currently coordinates a **multidisciplinary team** and contributes actively to the community through conference organization, editorial roles, and training activities. He holds **two recognized six-year research periods (sexenios)** and the **AEI R3 certification as a consolidated researcher**.

## **Part C. RELEVANT MERITS** (*sorted by typology*)

### **C.1. Publications** (*see instructions*)

1. **Scientific paper.** A. Navarro-Calvo; A. Cebrecos; A. Arándiga; L. Lorenzo-Rebenaque; F. Marco-Jiménez; J. M. Benlloch; F. Camarena; J.J. García-Garrigós. 2025. Cost-effective laser diode scanning 3D photoacoustic microscopy of melanocytic dermal tumors in situ. Ultrasonics. 158, pp. 107831. ISSN 0041-624X
2. **Scientific paper.** I. Pi-Martín et al. (4/9). 2025. Nanoparticles of non-porphyrinic covalent organic frameworks as contrast agents for photoacoustic imaging. Scientific Reports. 15, pp. 33909. ISSN 2045-2322
3. **Scientific paper.** I. Pi-Martín, A. Cebrecos, J. García-Garrigós, N. Jiménez, F. Camarena. 2023. Spatial resolution and reconstructed size accuracy using advanced beamformers in linear array-based PAT systems. Photoacoustics. 34, pp. 100576. ISSN 2213-5979.
4. **Scientific paper.** J. J. García-Garrigós, A. Cebrecos, J. Navarro-Calvo, F. Camarena. 2023. A fiber-coupled laser diode design for reflection mode optical resolution photoacoustic microscopy. Ultrasonics. 132, pp. 1007008. ISSN 0041-624X.
5. **Scientific paper.** A. Cebrecos; N. Jiménez; R. Tarazona; M. Company; J. M. Benlloch; F. Camarena. 2021. Characterization of viscoelastic media combining ultrasound and magnetic-force induced vibrations on an embedded soft magnetic sphere. IEEE Trans. Ultrason. Ferroelectr. Freq. Control. 68-12, pp. 3540-3548. ISSN 0885-3010.

6. **Scientific paper.** A. Cebrecos; J. García-Garrigós; A. Descals; N. Jimenez; J. M. Benlloch; F. Camarena. 2021. Beamforming for large-area scan and improved SNR in array-based photoacoustic microscopy. *Ultrasonics*, 111, pp. 106317. ISSN 0041-624X.
7. **Scientific paper.** T. Devaux; A. Cebrecos; O. Richoux; V. Pagneux; V. Tournat. 2019. Acoustic radiation pressure for nonreciprocal transmission and switch effects. *Nature Communications*. 10-3292, pp.1-8. ISSN 2041-1723.
8. **Scientific paper.** A. Cebrecos; D. Krattiger; V. Sánchez-Morcillo, V. Romero-García, M. Hussein. 2019. The finite-element time-domain method for elastic band-structure calculation *Computer Physics Communications*. 238, pp.77-87. ISSN 0010-4655.
9. **Scientific paper.** L.M. Garcia-Raffi; et al. (9/11). 2018. Broadband reduction of the specular reflections by using sonic crystals: A proof of concept for noise mitigation in aerospace applications. *Aerosp. Sci. Technol.* 73, 300 – 308. ISSN 1270-9638.
10. **Scientific paper.** V. Romero-García; R. Picó; A. Cebrecos; V. J. Sánchez-Morcillo; K. Staliunas. 2014 Enhancement of sound in chirped sonic crystals, *Applied Physics Letters*, 102-9, pp.091906. ISSN 0003-6951.
11. **Scientific paper.** V. Romero-García; A. Cebrecos; R. Picó; V. Sánchez-Morcillo; L. Garcia-Raffi; J. Sánchez-Pérez. 2013. Wave focusing using symmetry matching in axisymmetric acoustic gradient index lenses, *Appl. Phys. Lett.* 103-26, pp.264106 ISSN 0003-6951.

**C.2. Congress**, indicating the modality of their participation (invited conference, oral presentation, poster)

1. A new single detector 3D PAT: preliminary results. **Poster** I. Pi-Martín; A. Cebrecos; V. Company-Rubio; J. J. García-Garrigós; N. Jiménez. 2025 IEEE International Ultrasonics Symposium. 15/09/25 – 18/09/25. Utrecht, Netherlands.
2. Laser diode scanning photoacoustic microscopy with extended field-of-view using calibration-based algorithms **Oral presentation.** J.A. Navarro-Calvo; J. J. García-Garrigós; A. Arándiga; A. Cebrecos; V. Company-Rubio; N. Jiménez. 2025 IEEE International Ultrasonics Symposium. 15/09/25 – 18/09/25. Utrecht, Netherlands
3. Diffusive acoustic metasurfaces for single-element photoacoustic imaging. **Invited:** A. Cebrecos; I. Pi-Martín; Roby Weeteling; J. J. García-Garrigós; N. Jiménez. META 2024, the 14th International Conference on Metamaterials, Photonic Crystals and Plasmonics. 16/07/24 – 19/07/24. Toyama, Japan
4. Laser Diode Beam Shaping and Homogenization with a Multimode Fiber applied to Optical Resolution Photoacoustic Microscopy based on Linear Phased Array Ultrasound Probe. **Oral presentation.** J. J. García-Garrigós; A. Cebrecos; J. Navarro-Calvo; N. Jiménez; J. Benlloch; F. Camarena. IEEE International Ultrasonics Symposium (IUS). 10/10/22 – 13/10/22. Venice, Italy
5. On the Psychoacoustics of Metamaterials: A Comparative Listening Test & Design Recommendations. **Invited.** L. De Ryck; J. Cuenca; V. Bruniaux; K. Jambrosic; C. Glorieux; M. Rychtarikova; V. Romero-García; A. Cebrecos; N. Jiménez; J. P. Groby. DENORMS Action Final Event. 18/02/2020 - 21/02/2020. Coimbra, Portugal.
6. Static effects from dynamic excitations in flexible elastic metamaterials. **Invited** A. Cebrecos; X. Guo; B. Deng; K. Bertoldi; V. Tournat. DENORMS Action Final Event. 18/02/2020 - 21/02/2020. Coimbra, Portugal.
7. Spatial laplace transform for complex wavenumber recovery and its application to the analysis of attenuation in structured media. **Invited.** A. Cebrecos; L. Schwan; A. Geslain; V. Romero-García; N. Boechler; J. P. Groby. The Exeter Acoustic Metamaterials meeting. 16/04/2018 - 17/04/2018. Exeter, England.
8. Dynamic Rotations in Nonlinear Granular Metamaterials. **Keynote.** F. Allein; A. Cebrecos; L. Zheng; G. Theocharis; P. Bequin; V. Gusev; V. Tournat. The 4th International Conference on Phononic Crystals/Metamaterials, Phonon Transport/Coupling and Topological Phononics. 04/06/2017 - 09/06/2017. Coimbra, Portugal.

**C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. **Project:** Escáner fotoacústico 3D-subcutáneo. Prototipo clínico portátil para el diagnóstico temprano de melanoma (INNVA1/2025/89). J. J. García-Garrigós (CSIC); **Researcher.** 01/09/25 – 30/08/28. 249.784 €.

2. **Project:** Extensión del protocolo estándar para la realización de estudios por sonoforesis - Solución de retos y desarrollo clínico hacia mercado (CPP2024-011430). A. Cebrecos (CSIC). **Principal Investigator.** 01/03/25 – 28/02/28
3. **Project:** Desarrollo de sistema de tomografía fotoacústica para imagen biomédica (PAID-PD-22). Universitat Politècnica de València. A. Cebrecos. **Principal Investigator.** 17/10/22 – 31/01/24. 3.500 €.
4. **Project:** Microscopio fotoacústico con capacidad de imagen subcutánea 3D para el diagnóstico no invasivo de melanoma y enfermedades dermatológicas (INNVA1/2022/50). Agencia Valenciana de Innovació. J. J. García-Garrigós (CSIC); **Researcher.** 01/01/22 – 30/09/24. 328.000 €.
5. **Project:** Ultrasonidos focalizados para el tratamiento de la obstrucción de la arteria central de la retina mediante (GVA/2021/041). Generalitat Valenciana. Alejandro Cebrecos (UPV). **Principal Investigator.** 01/01/2021 – 01/01/2022. 10.000 €.
6. **Project:** Nuevas técnicas para Elastografía multimodal (FIS2015-65998-C2-2-P). Ministerio de Ciencia, Innovación y Universidades. Francisco Camarena (UPV); **Researcher.** 01/06/2020 – 01/06/2023. 89.000 €.
7. **Project:** Validación del prototipo USOFT para el tratamiento del infarto ocular (UPV-FISABIO-2020-B15). Universidad Politécnica de Valencia. Rubén Picó (UPV). **co-PI** 01/01/2021 – 31/12/2021. 7.500 €.
8. **Project:** Dispositivos biomédicos de diagnóstico y terapia con tecnologías físicas avanzadas (INNVA2/2022/11). Agencia Valenciana de Innovació. F. Camarena (UPV); **Researcher.** 01/01/19 – 01/01/21. 500.000 €.
9. **Project:** PROPASYM: Acoustic asymmetric propagation based on nonlinear processes and time-dependent processes. Region Pays de la Loire (France). Vincent Tournat (CNRS). **Researcher.** 01/01/2014, 01/01/2018. 250.000 €.
10. **Project:** Material with Tunable Constitution for Elastodynamic Deformation. National Science Foundation (NSF Grant Number 1538596). M. Hussein (Univ. Colorado). **Researcher.** 01/10/2013 - 01/10/2016. 364.884 \$.

#### C.4. Contracts, technological or transfer merits,

1. **Contract:** Desarrollo de sistema de hipertermia por ultrasonidos para animales pequeños. Scientia Biotech S. Alejandro Cebrecos (UPV). **Principal Investigator.** 01/02/2022 – 01/06/2022. 98.825 €.
2. **Contract:** Monitorización y tratamiento de hipertermia localizada por ultrasonidos. Scientia Biotech S.L. Noé Jiménez (UPV). **co-PI.** 01/02/2022 – 31/12/2022. 98.825 €.
3. **Contract:** Desarrollo de un sistema ultrasónico de guía para procesos de cribado de cáncer prostático con un dispositivo de indentación. Scientia Biotech S.L. Francisco Camarena (UPV). **Researcher.** 13/12/2021 – 13/12/2022. 45.682 €.
4. **Contract:** Tecnologías físicas de monitorización y tratamiento (INNCON/2021/8). Agencia Valenciana de Innovación. Francisco Camarena (UPV). **Researcher.** 01/01/2021 – 31/12/2021. 250.000 €
5. **Contract:** Imagen, Terapia y Caracterización Ultrasónica (INNCON/2020/009). Agencia Valenciana de Innovación. Francisco Camarena (UPV). **Researcher.** 01/01/2020 – 31/12/2020. 249.720 €
6. **Contract:** Launch Sound Level Reduction. European Space Agency. José Nieto (COMET); Francisco Simón (CSIC), Víctor Sánchez (UPV); Vicent Romero (CNRS); Marcos Chimeno (UPM). **Researcher.** 15/03/2019 – 15/09/2021. 350.000 €
7. **Contract:** Modélisation des écrans anti-bruit. Application des cristaux soniques au cas Ferroviaire. Direction Innovation & Recherche SNCF. Claire Chaufour (SNCF); Vicent Romero (CNRS). **Researcher.** 01/03/2017 – 01/03/2018. 10.686 €
8. **Contract:** Sonic crystal for noise reduction at the launch pad. European Space Agency. Víctor Sánchez (UPV). **Researcher.** 02/06/2014 – 02/06/2015. 50.000 €.

#### C.5. Patents

1. J. J. García-Garrigós (CSIC); A. Cebrecos (UPV); F. Camarena; (UPV); J. M. Benlloch (CSIC). Dispositivo óptico, sistema y procedimiento de obtención de imágenes fotoacústicas mediante el uso de haces homogeneizados provenientes de fuentes luminosas pulsadas. P202230298. Priority date: 01/01/2022, PCT date: 20/03/2023