MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

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	EDUARDO		
Family name	DIAZ		
Gender (*)	Male	Birth date (dd/mm/yyyy)	10/09/1964
Social Security, Passport, ID number	00808442S		
e-mail	ediaz@cib.csic.es	URL Web https://www.cib.csic.es/research/microbial-plant-biotechnology/environmental-microbiology	
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-9731-6524		

(*) Mandatory

A.1. Current position

Position	Staff Research Professor		
Initial date	11-04-2023		
Institution	Spanish National Research Council-CSIC		
Department/Center	Microbial and Plant Biotechnology	Biological Research Center Margarita Salas	
Country	Spain	Teleph. number	34-918373112
Key words	Environmental Microbiology, Systems Metabolic Engineering		

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

Period	Position/Institution/Country/Interruption cause
1988-1991	Predoctoral FIS fellow at the CIB-CSIC (Spain)
1992-1995	Postdoctoral EMBO fellow at the GBF-National Research Centre for Biotechnology (Braunschweig, Germany)
1995-1999	Contracted Research Scientist at the CIB-CSIC
1999-2007	Staff Scientist (Científico Titular) at the CIB-CSIC
2007-2023	Staff Scientist (Research Scientist) at the CIB-CSIC

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Graduate in Biology	Complutense University Madrid (Spain)	1987
PhD in Biology	Complutense University Madrid (Spain)	1991

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

Degree in Biology (1987) and Doctor in Biology (1991) by the University Complutense Madrid (Spain). Predoctoral FIS fellow at the CIB-CSIC (1988-1991) working on pneumococcal cell-wall lytic enzymes under the supervision of Prof. J.L. García. Postdoctoral EMBO fellow (1992-1995) at the GBF-National Research Centre for Biotechnology (Braunschweig, Germany) working in the group of Prof. K.N. Timmis on pioneer studies about aromatic biodegradation pathways and design of containment systems for recombinant bacteria. Contracted Research Scientist at the CIB-CSIC (1995-1999). Staff Scientist (1999-2007), Research Scientist (2007-2022), and since 2023 Research Professor at CIB-CSIC. Since 2012 Prof. Eduardo Díaz leads the Environmental Microbiology group at the CIB Margarita Salas-CSIC. His group has as main research interest the study of the metabolic and regulatory networks that control the bacterial metabolism of toxic compounds and/or biowaste, many of which are major environmental

pollutants. To this end, Prof. Díaz´s group carries out classic approaches of physiology, biochemistry and molecular biology, in combination with modern omic techniques and *in silico* metabolic models, to achieve an integrative and systems biology view. A major research line is the study of the molecular bases that control the degradation of aromatic compounds, e.g., lignin and hydrocarbons, both under aerobic conditions (using *Pseudomonas putida* as model bacterium) or anaerobic conditions (using denitrifying *Aromatoleum* sp. CIB as model bacterium). The characterization of novel signal transduction systems and the resistance mechanisms involved in the bacterial adaptation to the stress caused by aromatics and other toxic compounds, such as certain metals and metalloids, is also under study. The acquired knowledge is then used to design, through systems metabolic engineering, recombinant microorganisms as biofactories for the conversion of contaminants (e.g., hydrocarbons present in oil) or products generated in biowaste recycling (e.g, lignin, synthesis gas, CO, H_2 y CO_2), into added value products, e.g., bioplastics (polyhydroxyalkanoates, PHA) or precursors for polymers, drugs, and nutraceuticals. The study of the bacterial potential for the bioconversion of metals and metalloids into metallic nanoparticles is of great interest in nanotechnology and constitutes another research line of the group.

Along his career, Prof. Díaz (h Index 50, Google Scholar, January 2023) has being PI of 19 research projects (6 EU projects, 1 as coordinator; 10 National Projects; 3 Regional (CAM) projects), and is coauthor of 103 scientific publications (most of them in Q1 journals; 23 with more than 100 cites), 15 book chapters by invitation, Guest Editor of two Special Issues in Microb. Biotechnol. and Genes, and Editor of the "Microbial Biodegradation:Genomics and Molecular Biology" book. He has supervised 14 Doctoral theses (4 more under way), 10 Master thesis, and he has been professor in 39 courses and tribunal member in 31 PhD defences. He has been invited speaker in about 40 Scientific Conferences, he has 155 communications to congresses/workshops, and 4 articles in scientific dissemination magazines. He is co-inventor of 8 patents, he has been PI of two contracts with the industry (Petro Star Inc.-USA; Aramco Overseas-Saudi Arabia), he was cofounder partner of the biotechnology start-up company Darwin Bioprospecting Excellence (Valencia), dedicated to the screening and identification of organisms of biotechnological interest, and currently he has co-funded a new company, Biodriven Technologies (Madrid), dedicated to the production of bio-based polymers. His work as a scientific manager includes his appointment (since 2018) as Collaborator in the Spanish State Research Agency (AEI) (Bioscience and Biotechnology Area), and his participation in 32 Selection Committees of National Research Projects and Human Resources. Prof. Díaz has been a member of the Editorial Board of five reputed Microbiology journals (J Bacteriol; Curr Opin Biotechnol, Environ Microbiol, Microb Biotechnol, Appl Environ Microbiol), and coordinator of the Molecular Biotechnology and Microbial Biotechnology Sections of the Spanish Scientific Societies SEBBM and SEBIOT, respectively. He is funding member of the SusPlast (Interdisciplinary Platform for Sustainable Plastics towards a Circular Economy) PTI-CSIC. Prof. Díaz has participated in the organization of 12 Congresses/Workshops. In 2003, he received the Jaime Ferrán prize of the Spanish Microbiology Society. He has five international-quality 6-years research periods (1988-2017; last one 2012-2017)

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

C.1. Publications

1. Durante-Rodríguez, G., Carmona, M., and **Díaz, E**. **(CA)** 2023. Novel approaches to energize microbial biocatalysts. *Environ. Microbiol*. 25:161-166.

2. Martínez I., El-Said Mohamed M., García, J.L., **Díaz, E. (CA)** 2022. Enhancing biodesulfurization by engineering a synthetic dibenzothiophene mineralization pathway. *Front. Microbiol.* 13:987084.

3. Sanz D., **Díaz E. (CA)** 2022. Genetic characterization of the cyclohexane carboxylate degradation pathway in the denitrifying bacterium *Aromatoleum* sp. CIB. *Environ. Microbiol.* 24:4987-5004.

4. Gómez-Álvarez H., Iturbe P., Rivero-Buceta V., Mines P., Bugg, T.D.H., Nogales, J., **Díaz, E (CA)**. 2022. Bioconversion of lignin-derived aromatics into the building block pyridine 2,4-dicarboxylic acid by engineering recombinant *Pseudomonas putida* strains. *Bioresour. Technol.* 346:126638.

5. Sanz, D., García, J.L., **Díaz, E (CA).** 2020. Expanding the current knowledge and biotechnological applications of the oxygen-independent *ortho*-phthalate degradation pathway. *Environ. Microbiol.* 22: 3478–3493.

6. Valderrama, J.A., Gómez-Álvarez H., Martín-Moldes, Z., Berbís M.A., Cañada, F.J., Durante-Rodríguez, G., **Díaz, E (CA).** 2019. A novel redox-sensing histidine kinase that controls carbon catabolite repression in *Azoarcus* sp. CIB. *mBio*10(2):e00059-19

7. Blázquez, B., Carmona, M., **Díaz, E. (CA)** 2018. Transcriptional regulation of the peripheral pathway for the anaerobic catabolism of toluene and *m*-xylene in *Azoarcus* sp. CIB. *Front. Microbiol.* 9: 506
8. Zamarro, M.T., Barragán, M.J.L., Carmona, M., García, J.L., **Díaz, E.(CA)** 2017. Engineering a bzd cassette for the anaerobic bioconversion of aromatic compounds. *Microb. Biotechnol.* 10: 1418-1425.
9. Martín-Moldes, Z., Blázquez, B., Baraquet, C., Harwood, C.S., Zamarro, M.T.**, Díaz, E. (CA)** 2016. Degradation of cyclic diguanosine monophosphate by a hybrid two-component protein protects *Azoarcus* sp. CIB from toluene toxicity. *Proc. Nat. Acad. Sci.USA*. 113:13174-13179.
10. Jiménez, J.I., Canales, A., Jiménez-Barbero, J., Ginalski, K., Rychlewski, L., García, J.L., **Díaz, E. (CA)** 2008. Deciphering the genetic determinants for aerobic nicotinic acid degradation: the *nic* cluster from *Pseudomonas putida* KT2440. *Proc. Nat. Acad. Sci. USA* 105:11329-11334.

C.2. Congress

Invited lectures

1.Gómez-Álvarez, H., Fernández-Arévalo, U., Sanz, D., de Francisco-Polanco, S. Alonso-Fernandes, E., Serrano-Pelejero, C., Sevilla, C., Espada, P., Valencia, A., del Cerro, C., Durante-Rodríguez, G., and **Díaz, E.** Engineering bacteria for environmental sustainability: valorization of aromatic waste. Keynote Presentation. Congreso Nacional de Biotecnología. Biotec2023. Madrid. 2023.
2. **Díaz E**. Diseño de bioctalizadores bacterianos para la producción sostenible de nuevos monómeros de plásticos bio-basados. Whorkshop: El papel de la biotecnología en la circularidad de los plásticos. PTI Susplast (Interdisciplinary Platform for Sustainable Plastics towards a Circular Economy)/Sebiot. Madrid. 2022.
3. **Díaz E**. Bacterial bioconversions for sustainable oil valorization and recycling of oil-derived products. Biotechnology in Oilfield Workshop. Saudi Aramco/KAUST organizers. Online. September 2021.
4. **Díaz, E**., Durante-Rodríguez G., Hernández N., Drzyzga, O., Prieto A. Nuevas estrategias para incrementar la fijación de CO_2 en bacterias productoras de bioplásticos. Aportando valor al CO_2. Madrid. 2019.
5. Durante-Rodríguez, G., Helena Gómez-Álvarez, H., Iturbe, P., Sanz, D., Alonso-Fernandes, E., Fernández, U., Valencia, A., Carmona, M., **Díaz, E.** Exploiting bacterial metabolism for removal of aromatic pollutants and biowaste revalorization. Keynote Presentation. Congreso Nacional de Biotecnología. Biotec2019. Vigo. 2019.
6. **Díaz, E.** Agrobiotechnoloy Forum. Waste valorization: lignocellulosic feedstocks as a sustainable platform for the production of bio-based compounds. Biospain2018. Sevilla. 2018.
7. Iturbe, P., Gómez-Álvarez H., Nogales,J., Kovacs-Schreiner, K., Bugg, T.D.H., **Díaz, E.** Engineering bacterial biocatalysts for bioconversion of lignin-derived compounds into bioplastic precursors. Lignobiotech2018. 5th Symposium of Biotechnology Applied to Lignocellusoses. Helsinki, Finland. 2018.
8. Valderrama, J.A, Gómez-Álvarez, H., Durante-Rodríguez, G., Martín-Moldes, Z., **Díaz, E.** A new redox-sensing two-component regulatory system controlling the anaerobic degradation of aromatic compounds in *Azoarcus* sp. CIB. Workshop CNRS-CSIC: Microbial adaptation to environmental stresses. Gif-sur-Yvette, France. 2018.
9. **Díaz, E.** Synthetic biology for sensing and removal of pollutants. Synthetic Biology Workshop. The LIAR Project. CIB-CSIC. Madrid. 2016.
10. **Díaz, E.** Nuevos circuitos metabólicos y reguladores implicados en la degradación anaeróbica de contaminantes. VII Curso Nacional de Genética "Metagenómica". Sevilla. 2014.

C.3. Research projects

1. Engineering novel regulatory and metabolic circuits for sustainable bacterial bioconversions (METACIRCUS). **IP E. Díaz**. MICINN. PID2022-142540OB-I00. 362.500€ (2023-2026).
2. Design of a new generation of microbial biocatalysts for efficient CO_2 removal and its conversion to bioplastics (COFIXPOL). **IP E. Díaz**, MICINN. TED2021-132135B-I00. 195.000€ (01-12-2022/30-11-2024).
3. Harnessing the power of nature through productive microbial consortia in biotechnology – measure, model, master (PROMICON) Project No. 101000733. H2020-FNR-2020. Project coordinator: J.O. Krömer (UFZ-Leipzig,Germany) **IP CIB-CSIC E Díaz.** 433.901€ (01-06-2021/31-05-2025)
4. Design of novel metabolic strategies in model bacterial platforms for biosensing and bioconversion of contaminants, and biowaste valorization. **IP E. Díaz.** MICINN PID2019-110612RB-I00. 314.600€ (01-06-2020/31-05-2023)

5. Engineered microbial factories for CO_2 exploitation in an integrated waste treatment platform (ENGICOIN) **Co-ordinator**: G. Saracco (Fondazione Istituto Italiano di Tecnologia, Italy) **I.P. CIB-CSIC, A. Prieto. Grupo CIB-Microbiología Medioambiental, I.P, E. Díaz**. H2020-NMBP-BIO-2017. Reference No: 760994. 511.343 €. (01-01-2018/31-05-2022).
6. Microbial conversion of lignin to monomers for bio-based plastics using synthetic biology (MILIMO) EraCoBiotech-54-2018. Project co-ordinator: T.D. Bugg (Univ. Warwick, UK). **I.P. CSIC. E. Díaz**. PCI2019-111833-2. 150.000 €. (01-02-2020/31-01-2023).
7. Systems metabolic engineering in Azoarcus sp. CIB for removal/revalorization of contaminants in anaerobic conditions. **I.P, E. Díaz.** MINECO. BIO2016-79736-R. 290.400 €. (30-12-2016/29-12-2019).
8. A synthetic biology approach for bacterial bioconversion of lignin into renewable chemicals (Ligbio). ERA-IB 2014 Project co-ordinator: T.D. Bugg (Univ. Warwick, UK). **I.P. CIB-CSIC**: **E. Díaz**. PCIN-2014-113. MINECO. 150.000 € (01-01-2015/31-12-2018)
9. Biopolymers from syngas fermentation (Synpol) Co-ordinator, J.L. García (CIB-CSIC). FP7-KBBE 311815. Grupo CIB-Microbiología Medioambiental, I.P, **E. Díaz**. 290.105 €. (01-10-2012/30-09-2016)
10. Estudio de los mecanismos moleculares que controlan la adaptación bacteriana para la degradación anaeróbica de compuestos aromáticos. **IP**., **E. Díaz.** MINECO, BIO2012-39501. 292.500 € (01-01-2013/31-12-2016)

C.4. Contracts, technological or transfer merits

Patents

1**. Díaz Fernández, E.**, Sanz Mata, D. 2020. Genetic cassette comprising the *pht* pathway genes, recombinant host cells comprising it and their use in the degradation and valorization of phthalates. Spanich Patent EP1641.1544 (March 6, 2020) PCT/EP2021/055322 (03-03-2021)
2. Durante Rodríguez, G., García López, J.L., **Díaz Fernández, E.** 2016. Uso del cluster *cox* para proporcionar a una célula capacidad de metabolizar monóxido de carbono. Spanish Patent P201630314 (March 17, 2016).
3. Zamarro Molina, M.T., López-Barragán, M.J., de la Peña Moreno, F., Prieto Jiménez M.A., Carmona Pérez, M., García López, J.L., **Díaz Fernández, E.** 2013. Procedimiento de obtención de polihidroxibutirato mediante fermentación de la bacteria *Azoarcus* sp. CIB y ácido orgánico como fuente de carbono. Spanish Patent P201330102 (January 29, 2013).
4. Martínez López, V., **Díaz Fernández, E.,** García González, P., García López, J.L., Duque Martín de Oliva, E., Ramos Martín, J. L., y Prieto Jiménez, M.A. 2009. Sistema de autolisis celular para el procesado de la biomasa bacteriana en la produccion de polihidroxialcanoatos en *Pseudomonas putida* KT2440. Patente española ES200923158N. Licenciada a la empresa Biopolis S.L. PCT/ES2010/070858. WO 2011086211 A1 (Cellular autolysis system for processing bacterial biomass in the production of polyhydroxyalkanoates in *Pseudomonas putida* KT2440).
5. Jiménez Zarco, J. I., García López, J.L., **Díaz Fernández, E**. 2005. Microorganismo productor de ácido 6-hidroxinicotínico (6-HNA), procedimiento de obtención, elementos para su realización y sus aplicaciones. Patente Española. Nº 2288070.
6. Galán Sicilia, B., **Díaz Fernández, E.,** Ferrández Barca, A., Prieto Jiménez, M.A., García-Ochoa Soria, F., García Calvo, E., García López, J.L. 2000. Un procedimiento para desulfurar dibenzotiofeno utilizando como biocatalizador una cepa de *Pseudomonas putida* recombinante. Patente Española. Nº: 2168945.

Contracts

1. Engineering a novel generation of bacterial biocatalysts for production of oil-based chemicals: conversion of sulfur-containing compounds into chemicals. **IP, E. Díaz.** Aramco Overseas Company B.V. Contract No. 6600029601. Funding: 329.629 €. Duration: 01/11/2012-31/08/2014