

Part A. PERSONAL INFORMATION

CV date	15/12/2023
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First name	Juan Bautista		
Family name	Arellano Martínez		
Gender (*)	male	Birth date	07/06/1966
ID number	25.992.827-K		
e-mail	juan.arellano@irnasa.csic.es	https://www.irnasa.csic.es/grupo-de-fotosintesis/	
Open Researcher and Contributor ID (ORCID)*	https://orcid.org/0000-0001-8677-8697		

(*) Mandatory

A.1. Current position

Position	Investigador Científico de OPIs		
Initial date	08/06/2009		
Institution	Inst. Natural Resources and Agrobiology of Salamanca (IRNASA-CSIC)		
Department/Center	Abiotic Stress		
Country	Spain	Phone. nº	+34 923 386 369
Key words	Plant biochemistry, ROS, singlet oxygen, enzymatic and non-enzymatic antioxidant systems, environmental stress, plant defence responses, photosystem II, leaf photosynthesis, PAM fluorescence, cereal crops.		

A.2. Previous positions (research activity interruptions, see call)

Period	Position/Institution/Country/Interruption cause
30/09/2011 – 21/09/2015	Head of the Institute (IRNASA-CSIC)
01/07/2001 – 08/06/2009	Científico Titular de OPIs

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD. Chemistry (Extraordinary doctorate award)	University of Granada	1994
BSc. Chemistry	University of Granada	1989

Part B. CV SUMMARY

JBA (WoS-h 25, nº sexennia 5) is the coordinator of the [Photosynthesis group](#) (CSIC 2004, ref. nº 641324), recognized by JCyL as a **Consolidated Research Unit 044** from 2015. At present, he is involved in an ongoing project (PN, PID2019-107154RB-I00, **Co-IP**), the main objectives of which are to investigate the adaptation of wheat species to combined environmental conditions (high atmospheric CO₂, elevated temperature and drought) and the analysis of grain yield and nutritional quality. Since December 2022, JBA has also been enrolled in two ecological and digital transition projects (TED2021-129733B-I00 and TED2021-129405B-I00) led by IPs belonging to IAS-CSIC and MBG-CSIC, respectively.

Over his scientific career, JBA has gained experience in electron transfer (ET) and excitation energy transfer (EET) in photosynthesis and plant defence response to abiotic stresses. JBA started his PhD in 1990 at Zaidin Experimental Station (Granada, CSIC), where he worked on ET inhibition in photosystem II (PSII) by copper, and later moved as a postdoctoral fellow to the Universities of Glasgow (UE, ERB4050PL930855-LIFE), Umeå (UE, ERBFMRX-CT96-0081), and Girona (PN, BIO96-1229-C02-01), where he worked on EET and photoprotection. His most relevant contributions were the molecular identification of the ET inhibition site(s) of copper in PSII ([J Biol Chem JCR1994: D1](#)) and the detangling of the ultrafast pigment EET in antenna complexes ([Biophys J JCR2001: Q1](#)).

In 2001, he earned a tenured position as a Científico Titular OPIs at IRNASA-CSIC. There, he as the **IP** led several scientific projects funded by PN and JCyL (AGL2003-0045, BFU2004-04914-C02-02, BFU2007-68107-C02-02/BMC, CSI03A07 and CSI002A10-2). His research delved into singlet oxygen (¹O₂) production by PSII and the plant transcriptional triggering in response to ¹O₂ in Arabidopsis and mutants with defects in hormone biosynthesis. The findings that programmed cell death activation and the operational ¹O₂-mediated retrograde signalling relied on fully active chloroplasts were

JBA's most relevant results ([Plant Physiol JCR2011: D1, CA: JBA](#); [J Exp Bot JCR2014: D1, CA: JBA](#)) together with the time-dependent phosphorescence resolution of endogenous PSII-photosensitized $^1\text{O}_2$ in aqueous milieu ([Photosynth Res JCR 2012: Q1, CA: JBA](#)).

In the 2000s, JBA established new scientific collaborations with researchers at the Universities of Trondheim (Trondheim, Norway), the Republic of Uruguay (Montevideo, Uruguay) and Charles University (Prague, Czech Republic), for which received funding from CSIC VRI programs. During his short-term visits, he investigated short-lived transient species (triplet excited states and/or radicals of pigments and ROS), the deleterious effect of RNS in photosynthesis, and protein structure. A spectroscopic method to examine hydrophilic carotenoid radicals was developed ([Phys Chem Chem Phys JCR2009: Q1](#)) and the 3D structure of PsbP was elucidated ([PLOS One JCR 2012, Q1](#)).

JBA was the head of department from 2004 to 2007, promoted to Investigador Científico OPIs in 2009 and was the head of IRNASA from 2011 to 2015.

Since 2016, JBA has been enrolled in the analyses of leaf photosynthesis, antioxidant status and grain antioxidant properties of (i) wheat species exposed to combined adverse stresses (AGL2016-79589-R, CSI083U16), (ii) non-GM-based transfer hybrids, i.e., tritordeum in which beneficial interactions with fungal endophytes were investigated in collaboration with the seed company CECOSA S.L. (RTC-2014-3112-2, RTC-2017-6756-2), and (iii) *Festuca rubra* and tomato plants exposed to salinity or drought (H2020-MSCA-ITN-2015, Ref.: 676480). A better adaption of ears to water deficit was unveiled when compared with flag leaves ([Plants JCR2022: Q1, CA: JBA](#)) and methods to measure antioxidant activities were improved ([Antioxidants JCR2022: D1; CA: JBA](#)).

JBA is a member of the Excellence Network CERES (Cereales Resilientes), the CSIC PTI AGROFOR (PTI27), the operative group FITONET (REGAGE22e00014997141, MAPA) and more recently also member of the Connexion-CSIC called Trigo. JBA is also member of the academic commission of the USAL doctorate program of Agrobiotechnology. JBA has co-supervised 2 PhD theses (now, one fellow is a Científico Titular OPIs and the other is a postdoctoral at the University of Dublin) and is currently supervising 2 new PhD theses funded by Algerian government and JCyL, respectively. JBA has been a UE evaluator (FP6-2003-NMP-TI-3, FP6-2004-NMP-TI-4), ANEP evaluator from 2004 and article peer reviewer from early 2000's. JBA has introduced IRNASA-CSIC activities to visitors in the agricultural fair SALAMAQ (2014-17), the Fascination of Plants Day (2017, 18 & 22) and European Researcher's Night (2018 & 20). JBA has been in charge of organizing Qué sabemos de ...? CSIC (2016-18) at IRNASA and has been interviewed in press, radio and TV channel as Tele 5 about his research and other IRNASA activities. JBA has also contributed an [outreach article](#) in 2021 (nº 209) to the Spanish SEBBM journal.

Part C. RELEVANT MERITS

C.1. Publications (Corresponding author *; period 2023–2019)

1. Pereira E.C., Zabalgoeazcoa I., **Arellano J.B.**, Ugalde U., Vázquez de Aldana B.R*. (2023) *Diaporthe atlantica* enhances tomato drought tolerance by improving photosynthesis, nutrient uptake and enzymatic antioxidant response. *Front. Plant Sci* 14:1118698, [doi:10.3389/fpls.2023.1118698](#), (Q1, I.F. 5.600).
2. **Arellano J.B.*** (2023) Non-photochemical quenching of photosystem I as an adaptive response to prolonged drought. *J. Exp. Bot.* Insight 74(1):16-18, [doi:10.1093/jxb/erac438](#), (D1, I.F.: 6.9).
3. Bendou, O.; Gutiérrez-Fernández, I.; Marcos-Barbero, E.L.; Bueno-Ramos, N.; González-Hernández, A.I.; Morcuende, R.; **Arellano, J.B.*** (2022) Theoretical and experimental considerations for a rapid and high throughput measurement of catalase in vitro. *Antioxidants*, 11, 21, [doi:10.3390/antiox11010021](#), (D1, I.F.: 7.0).
4. Gutiérrez-Fernández, I., Bendou, O., Bueno-Ramos, N., Marcos-Barbero, E.L., Morcuende, R. and **Arellano, J.B.*** (2022) One-step suicide substrate inactivation kinetics of a ping-pong reaction with one substrate undergoing disproportionation: A Theoretical approach with approximate solutions. *Mathematics* 10, 4240, [doi:10.3390/math10224240](#), (D1, I.F.: 2.4).
5. Bendou, O., Gutiérrez-Fernández, I., Marcos-Barbero, E.L., Bueno-Ramos, N., Miranda-Apodaca, J., González-Hernández, A.I., Morcuende, R*, **Arellano, J.B.*** (2022) Physiological and antioxidant response to different water deficit regimes of flag leaves and ears of wheat grown under

combined elevated CO₂ and high temperature. *Plants* 11(18):2384, [doi:10.3390/plants11182384](https://doi.org/10.3390/plants11182384) (Q1, I.F. 4.5).

6. Marcos-Barbero, E.L.; Pérez, P.; Martínez-Carrasco, R.; **Arellano, J.B.**; Morcuende, R.* (2021) Genotypic variability on grain yield and grain nutritional quality characteristics of wheat grown under elevated CO₂ and high temperature. *Plants*, 10, no. e1043, [doi:10.3390/plants10061043](https://doi.org/10.3390/plants10061043), (Q1, I.F.: 4.658).
7. Marcos-Barbero, E.L.; Pérez, P.; Martínez-Carrasco, R.; **Arellano, J.B.**; Morcuende, R.* (2021) Screening for higher grain yield and biomass among sixty bread wheat genotypes grown under elevated CO₂ and high-temperature conditions. *Plants*, 10, no. e1596, [doi:10.3390/plants10081596](https://doi.org/10.3390/plants10081596), (Q1, I.F.: 4.658).
8. Pereira, E.C.; Vázquez de Aldana, B.R.V.; **Arellano, J.B.**; Zabalgoeazcoa, I.* (2021). The Role of fungal microbiome components on the adaptation to salinity of *Festuca rubra* subsp. *pruinosa*. *Front. Plant Sci.*, 12, 695717, [doi:10.3389/fpls.2021.695717](https://doi.org/10.3389/fpls.2021.695717), (D1, I.F.: 6.627).
9. Vázquez de Aldana, B.R.; **Arellano, J.B.**; Cuesta, M.J.; Mellado-Ortega, E.; González, V.; Zabalgoeazcoa, I.* (2021) Screening fungal endophytes from a wild grass for growth promotion in tritordeum, an agricultural cereal. *Plant Sci.*, 303, [doi:10.1016/j.plantsci.2020.110762](https://doi.org/10.1016/j.plantsci.2020.110762). (Q1, I.F.: 5.363).
10. Miranda-Apodaca, J.; Hananya, N.; Velázquez-Campoy, A.; Shabat, D.; **Arellano, J.B.*** (2019) Emissive enhancement of the singlet oxygen chemiluminescence probe after binding to bovine serum albumin. *Molecules*, 24, [doi:10.3390/molecules24132422](https://doi.org/10.3390/molecules24132422). (Q2, IF.: 3.267).

C.2. Congress (Period 2023–2019)

A number of **25** communications have been presented at national and international congresses.

1. Title: The abnormal formation of short-lived singlet oxygen threatens plants with programmed cell death: Studies in cell cultures and the Arabidopsis mutants *aba1* and *max4*
Meeting name: 17th International Congress of Photobiology
Place of celebration: Barcelona Start-end date: 25/08/2019-30/08/2019
Type of presentation: Invited conference
2. Title: Is stay green relevant for further raising yield in wheat and barley?
Meeting name: Workshop on Physiological Traits that might be Relevant for Future Cereal Breeding
Place of celebration: Zaragoza Start-end date: 25/02/2019
Organizer: Network of Excellence FIRCME
Type of presentation: Oral communication

C.3. Research projects (Period 2023-2019)

1. Project title: Spanish wheat landraces: a healthy source of genetic variability for fighting wheat intolerances and its response to climate change (Ref.: TED2021-129733B-I00).
Research leader: Francisco Barros Losada (IAS-CSIC)
Program name: SP of R+D+I Strategy Projects Oriented to the Ecological and Digital Transition of the AEI/MICINN.
Start-end date: 2022-2023 Total funding: 264,500 €.
JBA is a scientific team researcher (STR). RLs: Carotenoid and antioxidant analyses in wheat grain.
2. Project title: Development of maize varieties with double use in a scenario of climate change (Ref.: TED2021-129405B-I00).
Research leader: Ana María Butrón Gómez (MBG-CSIC) Co-IP: Rogelio Santiago Carabelos
Program name: SP of R+D+I Strategy Projects Oriented to the Ecological and Digital Transition of the AEI/MICINN.
Start-end date: 2022-2023 Total funding: 218.500 €.
JBA is a STR. RLs: Leaf photosynthesis and antioxidant status in wheat under drought.
4. Project title: Variability in wheat species response to water deficit under elevated CO₂ and temperature: Impact on primary, secondary and antioxidant metabolism and grain quality (Ref. PID2019-107154RB-I00).
Research leader: Rosa Morcuende Morcuende Co-IP: Juan B. Arellano Martínez.

Program name: SP of R+D+I Oriented to Societal Challenges: "Proyectos de I+D+i".
Start-end date: 01/06/2020-31/05/2024 Sub-total funding: 165.770 €.
JBA is the Co-IP. RLs: Leaf photosynthesis, PAM fluorescence, ROS scavenging systems in wheat.

5. Project title: Effect of nitrogen availability on the yield and composition of bioactive compounds in grain of wheat varieties grown in a CO₂-enriched atmosphere and elevated temperature (Ref. CSI260P20).
Research leader: Rosa Morcuende Morcuende.
Program name: Research Project Program of Junta de CyL to start in 2016.
Start-end date: 01/12/2021-31/12/2023 Sub-total funding: 172.000€.
JBA is a STR. RLs: TOC, total antioxidant capacity and carotenoid composition in wheat grain.
6. Project title: Application of advanced technological processes for the production of improved cereal seeds with formulations based on endophytic fungi (RTC-2017-6756-2).
Research leader: Dra. Beatriz Rodríguez Vázquez de Aldana.
Program name: SP of R+D+I Oriented to Societal Challenges: "Retos-Colaboración".
Start-end date: 01/01/2018–31/12/2021 Sub-total funding: 167,621 €.
JBA was a STR. RLs: Chromatographic search for growth promoting compounds in fungal extracts.
7. Project title: Genotypic variability of wheat in the C-N homeostasis and the antioxidant capacity and its dependency of nitrate availability in the future climatic scenario (AGL2016-79589-R).
Research leader: Dra. Rosa Morcuende Morcuende.
Program name: State Program of R+D+I Oriented to Societal Challenges: "Retos-Investigación"
Start-end date: 01/01/2017–31/12/2019 Total funding: 145,200 €.
JBA was a STR. RLs: Leaf photosynthesis, morphophysiology, ROS scavenging systems in wheat.
8. Project title: Boosting plant-Endophyte STability, compatibility and Performance Across Scales (Nº 676480).
EU coordinator: David B. Collinge (University of Copenhagen)
Research leader: Dr. Íñigo Zabalgogea González (IRNASA-CSIC)
Program name: Marie Skłodowska-Curie. H2020-MSCA-ITN-2015.
Start-end date: 01/09/2015–31/08/2019 Sub-total funding: 247,872 €.
JBA was a STR. RLs: Eric. C. Pereira's PhD thesis Co-supervisor. *Diaporthe* antioxidant benefits

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

A. Participation in operative groups

1. Project title: Development of a digital environment and living laboratories to value plant genetic resources of agricultural interest (Ref.: REGAGE22e00014997141).
Research leader: FUNDACION CELLBITEC.
Program name: State Program of Rural Development, MAPA. EU Next Generation.
Start-end date: 2022-2025 Total funding: 594,138 €.

B. Research network of excellence

1. Project title: Research network in resilient quality cereals for Spanish food security (Ref. RED2022-134922-T).
Researcher leader: Ernesto Igartua (EEAD-CSIC).
Program name: Research networks of the State Research Plan I + D+ i.
Start-end date: 2023-24 Total funding: 18,000 €.
2. Project title: Trigo
Research leader: Francisco Barro (IAS-CSIC) and Rosa Morcuende Morcuende (IRNASA-CSIC)
Program name: Conexiones CSIC
Start-end date: 2024-25 Total funding: 200,000 €.

C. Participation in agreements with private companies

1. Title: Effect of nitrogen availability on the yield and composition of bioactive compounds in grain of wheat varieties grown in a CO₂-enriched atmosphere and elevated temperature.
Research leader: Rosa Morcuende Morcuende
Private companies: Fundación CARTIF, Fertilizantes Félix Beltrán, Biocompostajes Laso.
Start-end date: 2021-2023.