

# Curriculum Vitae

## PERSONAL INFORMATION

Last Name: **Azua-Bustos**

First Name: **Armando**

Researcher unique identifiers:

ORCID: 0000-0002-6590-4145

ResearcherID: R-1259-2017

### Websites

- <http://cab.inta.es/es/departamentos/4/departamento-de-planetologia-y-habitabilidad>

- [https://www.ted.com/speakers/armando\\_azua\\_bustos](https://www.ted.com/speakers/armando_azua_bustos)

- [www.astrobiology-in-chile.com](http://www.astrobiology-in-chile.com)

## • EDUCATION

- 2016 Certificate, Super Earths and Life  
Harvard University, USA.
- 2015 Certificate, Astrobiology  
The University of Edinburgh, UK.
- 2013 PhD, Molecular Genetics and Microbiology  
Faculty of Biological Sciences, Department of Molecular Genetics and Microbiology  
Pontificia Universidad Católica de Chile, Chile. **Thesis assigned highest score, 7/7.**
- 2010 MSc, Biological Sciences  
Faculty of Biological Sciences, Department of Molecular Genetics and Microbiology  
Pontificia Universidad Católica de Chile, Chile.
- 2005 MSc, Biochemistry  
Faculty of Chemical and Pharmaceutical Sciences, Universidad de Chile, Chile
- 1998 BSc, Agronomical Sciences, Fruit Culture and Oenology  
Faculty of Agronomy and Forestry Engineering. Department of Fruit Culture and  
Oenology. Pontificia Universidad Católica de Chile. **Graduated ranking in the 10<sup>th</sup>  
place out of a generation of 80 students.**

## • CURRENT POSITION(S)

- 2017 to date Scientific Researcher  
Department of Planetology and Habitability, Center of Astrobiology of the Consejo Superior  
de Investigaciones Científicas CSIC-INTA, Madrid, Spain
- 2017 to date Visiting Scientist  
Global Viral, San Francisco, USA.
- 2016 to date Visiting Scientist  
Institute of Biomedical Sciences, Universidad Autónoma de Chile.
- 2013 to date Scientific Researcher  
Blue Marble Space Institute of Sciences, Seattle, USA.

## • PREVIOUS POSITIONS

- 2016 – 2017 Project Coordinator of the Higher Education Quality Improvement Program of the  
Government of Chile  
Universidad Autónoma de Chile, Chile
- 2015 – 2016 Scientific Advisor  
Senate of the Republic of Chile
- 2013 – 2014 Director of the Department of Astrobiology  
AngelicvM Laboratory for Aerospace Research and Development, Santiago, Chile

## • FELLOWSHIPS AND SCHOLARSHIPS

- 2017 TED Fellows Winner. Gave TED talk in April 2017 in Vancouver, Canada.
- 2014 Brazilian National Council for Scientific and Technological Development (CNPq) Full  
Fellowship from the Ministry of Science and Technology of the Federal Government of

Brazil (declined).  
2011-2013 Full Scholarship for Doctorate studies of the National Commission of Science and Technology of the Chilean Government.

#### • SUPERVISION OF STUDENTS

2011-2013 Co-supervision of the undergraduate thesis of Luis Caro L., entitled “Identification and Initial Characterization of Microorganisms of Hyperarid Soils of the Atacama Desert”. Department of Molecular Genetics and Microbiology, Faculty of Biological Sciences, Pontificia Universidad Católica de Chile  
2009-2011 Co-supervision of the undergraduate thesis of Cristian Arenas F., entitled “UV tolerance of *Gloeocapsopsis* AABI”. Department of Molecular Genetics and Microbiology, Faculty of Biological Sciences, Pontificia Universidad Católica de Chile  
2009-2011 Co-supervision of the undergraduate thesis of Jorge Zúñiga H., entitled “Isolation of a cyanobacterial isolate from hypolithic biofilms of the Coastal Range of the Atacama Desert. Department of Molecular Genetics and Microbiology, Faculty of Biological Sciences, Pontificia Universidad Católica de Chile

#### • TEACHING ACTIVITIES (only last ten years)

2015 Lecturer – Chemistry and Biology. Faculty of Engineering, Universidad Adolfo Ibáñez, Chile.  
2011-2016 Invited Lecturer – Microbiology and Environmental Biotechnology. Faculty of Biological Sciences, Pontificia Universidad Católica de Chile  
2011-2012 Lecturer – The Scientific search of life in the Universe. Center of General Studies, Universidad de los Andes, Chile  
2011-2012 Invited Lecturer – Origins of life. Faculty of Biological Sciences, Pontificia Universidad Católica de Chile  
2009-2010 Invited Lecturer – Astrobiology. Faculty of Physics, Pontificia Universidad Católica de Chile  
2007 Laboratory Professor – Biochemistry. Faculty of Agronomy, Universidad Mayor, Chile.

#### • ORGANISATION OF SCIENTIFIC MEETINGS

2017 Member of the Local Organizing Committee of Astrobiology 2017, Research meeting of the commission F.3 of the International Astronomical Union (IAU).  
2015 Chair of the Session “What we know about water and life on earth: implications for potential life forms elsewhere in the solar system and universe, AbSciCon 2015, Chicago, USA.  
2016 Member of the Local Scientific Committee of the Congress of the Future, Senate of Chile, Santiago, Chile.  
2013 Member of the Local Organizing Committee of AstroBio 2013. Universidad Andrés Bello, Santiago, Chile.  
2010 Member of the Scientific Local Committee of AstroBio 2010. CEPAL, Santiago, Chile.  
2006 Chair and Main Organizer of the First Chilean Symposia of Astrobiology, Santiago, Chile.

#### • INSTITUTIONAL RESPONSIBILITIES

2016 – 2017 Project Coordinator of the Higher Education Quality Improvement Program of the Government of Chile, Universidad Autónoma de Chile, Chile  
2015 – 2016 Scientific Advisor  
Senate of the Republic of Chile  
2013 – 2014 Director of the Department of Astrobiology  
AngelicyM Laboratory for Aerospace Research and Development, Santiago, Chile.

#### • COMMISSIONS OF TRUST

2017 Selected as Science Communicator as part of the official delegation of the Chilean Government at the Guadalajara International Book Fair.  
2017 Elected Member of the International Scientific Committee of the Spanish Network of Planetology and Astrobiology

## EARLY ACHIEVEMENTS TRACK-RECORD

Web of Science H-Index: 7

Google Scholar H-Index: 8

Research Gate impact factor: 24.52

### Awards

2017 **TED Fellows 2017 winner** (out of 3200 applicants). **One of only three Chileans to have won a TED Fellowship and given a TED talk.**

2017 Finalist at the Falling Walls lab, Madrid

2016 Finalist of the 2016 Rolex Awards for Enterprise (out of 2000 applicants). Invited to presented proposal to Geneva, Switzerland.

2016 Finalist at the Falling Walls Lab, Chile

2008 Best poster presentation, Fourth International Symposia, Science and Friendship, organized by the Millennium Institute for Fundamental and Applied Biology (MIFAB), Santiago, Chile.

2007 NASA Group Achievement Award. Ames Research Center, Moffett Field, California, USA.

### Referred Journal Articles as First Author

- **Azua-Bustos A.**, Carlos González-Silva and Gino Corsini. 2017. The hyperarid core of the Atacama Desert, an extremely dry and carbon deprived habitat of potential interest for the field of carbon science. *Frontiers in Microbiology* 8:993. **By invitation.**

- \***Azua-Bustos A.**, L. Caro-Lara, y R. Vicuña. 2015. Discovery and microbial content of the driest site of the hyperarid Atacama Desert, Chile. *Environmental Microbiology Reports*, 7(3): 388–394. 18 cites.

- **Azua-Bustos A.**, González-Silva C. 2014. Biotechnological applications derived from microorganisms of the Atacama Desert. *BioMed Research International*, in its special edition *BIODESERT: Exploring and Exploiting the Microbial Resource of Hot and Cold Deserts*". Volume 2014, Article ID 909312, 7 pages. 3 cites. **By invitation.**

- \***Azua-Bustos A.**, Arenas, C., and Vicuña, R. 2014. *Gloeocapsopsis* AAB1, an extremely desiccation tolerant cyanobacterium isolated from the Atacama Desert. *Extremophiles*. 18(1):61-74. 10 cites.

- \***Azua-Bustos A.** and Vega-Martínez, C. 2013. The potential for detecting life as we don't know it by fractal complexity analysis. *International Journal of Astrobiology*. 12: 314–320. 7 cites.

- \***Azua Bustos A.**, González-Silva C., and Arenas-Fajardo, C., Vicuña R. 2012. Extreme environments as potential drivers of convergent evolution by exaptation: the Atacama Desert Coastal Range case. *Frontiers in Microbiology* 3: 426. Cited by 8.

- **Azua-Bustos A.**, Urrejola C., and Vicuña R. 2012. Life at the dry edge: microorganisms of the Atacama Desert. *FEBS Letters* 586:2939–2945. **By invitation.** 36 cites.

- \***Azua-Bustos A.**, González-Silva C, Mancilla R.A., Salas, L., Gómez-Silva B, McKay CP and Vicuña R. 2011. Hypolithic cyanobacteria supported mainly by fog in the Coastal Range of the Atacama Desert. *Microbial Ecology*. 61:568-581. 56 cites.

- **Azua-Bustos, A.**, González-Silva, C., Salas L, Vicuña, R. 2010. A novel subaerial *Dunaliella* sp. growing on cave spiderwebs in the Atacama Desert. *Extremophiles* 14(5): 443-452. 24 cites.

- **Azua-Bustos A.**, González-Silva, C., Mancilla R.A., Salas L, Palma R.E., Wynne J.J., McKay, C.P. and Vicuña, R. 2009. Ancient Photosynthetic Eukaryote Biofilms in an Atacama Desert Coastal Cave. *Microbial Ecology* 58:485–496. 24 cites.

\**Top five publications.*

### Referred Journal Articles as Co-author:

- Fernando Puentes-Sánchez, Carlos González-Silva, Victor Parro, Javier Tamames and **Armando Azua-Bustos**. Draft Genome Sequence of the Extremely Desiccation-Tolerant Cyanobacterium *Gloeocapsopsis* sp. Strain AAB1. 2018. *Genome Announcements*. 6: 216-218.

- Livia Martinelli, Polona Zalar, Nina Gunde-Cimerman, **Armando Azua-Bustos**, Katja Sterflinger, Guadalupe Piñar. 2017. *Aspergillus atacamensis* and *A. salisburgensis*: two new halophilic species from hypersaline/arid habitats with a phialosimplex-like morphology. *Extremophiles* 21:755–773. 2 cites.

- Ivan Gláucio Paulino Lima, Kosuke Fujishima, Jesica Urbina Navarrete, Douglas Galante, Fabio Rodrigues, **Armando Azua-Bustos**, Lynn Justine Rothschild. 2016. Extremely high UV-C radiation

resistant microorganisms from desert environments with different manganese concentrations. *Journal of Photochemistry and Photobiology B: Biology* 163: 327–336. 6 cites.

- Domagal-Goldman S.D., Wright K.E., fourteen other authors, **Azua-Bustos A.**, *et al.* 2016. The Astrobiology Primer v2.0. *Astrobiology* 16:561-653. 15 cites.

- Paulino-Lima I, **Azua-Bustos A**, Vicuña R, González-Silva C, Salas L, Lia Teixeira, Rosado A, Leitão AC and Lage C. 2013. Isolation of UV-C tolerant bacteria from the hyperarid Atacama Desert, Chile. *Microbial Ecology*, 65:325–335. 21 cites.

- Lage, C., Dalmaso, G., Teixeira, L., Bendia, A., Paulino-Lima, I., Galante, D., Janot-Pacheco, E., Abrevaya, X., **Azua-Bustos, A.**, Pellizari V. and Rosado, A. 2012. Probing the limits of extremophilic life in extraterrestrial environment-simulated experiments. *Int J Astrob* 11:251-256. 8 cites.

### **Books**

- Jacob Haqq-Misra, Zach Adam, Dimitra Atri, **Armando Azua-Bustos**, Seth D. Baum, Sanjoy M. Som. 2016. *Tales From Spaceship Earth (Blue Marble Space Short Story Collection) (Volume 1)*. Habitable Press, USA.

- **Azua Bustos**, A. 2013. Are we alone among all these stars?. An astrobiology book for kids. Amazon editors. **Up to date, this is the only published book on astrobiology for kids.**

### **Book chapters**

- **Azua-Bustos A.**, Vicuña R and Pierrehumbert R. (2012). Early Mars – Cradle or Cauldron?. In *Frontiers in Astrobiology*. C. Impey, J. Lunine and J. Funes, editors. Cambridge University Press. Cambridge, UK. **By invitation.**

- **Azua-Bustos A**, Vicuña R. 2010. Chilean Cave Cyanidium. Capítulo 2 del libro *Red Algae in the Genomic Age*, un volumen de la serie “Cellular Origins, Life in Extreme Habitats and Astrobiology” (COLE), Springer. Joseph Seckbach and David Chapman, editores. PP 425-437. **By invitation.**

### **Participation in conferences**

35, detailed in Annex 1 below.

### **Invitations to give Plenary Talks**

2017 The Atacama Desert. European Mars Conference, Innsbruck, Austria

2016 The Atacama Desert as a Mars Analog. Third International Congress of Astrobiology, Manizales, Colombia.

2016 The Atacama Desert as a Mars Analog. 1st Latin-American Congress of astrobiology, Lima, Perú.

2013 The Atacama Desert as a Mars Analog. 2nd Brazilian Workshop on Astrobiology, Guarujá, Brazil.

2011 Genomics and Metagenomics of Extreme Environments. Simposio Internacional en Genómica, Universidad Mayor. Santiago, Chile.

### **Fellowships received in order to attend international conferences**

Eleven: (Sweden, USA, Colombia, Perú, Denmark, Brasil, Italy) detailed in Annex 1 below.

### **Other Distinctions and prizes**

Five, detailed in Annex 1.

### **Invitations to give seminars and talks**

Twenty-one (Chile, Canada, Brasil) detailed in Annex 1.

### **Appearances in international Documentaries**

Five, **Including National Geographic**, detailed in Annex 1.

### **Radio Interviews**

Three, detailed in Annex 1.

## **Appearances in the international press**

More than 60 (Chile, Spain, Argentina, China, USA, Bolivia, India, Sweden, etc., detailed in Annex 1.

## **Grants**

### **Ongoing Grants**

<i>Project Title</i>	<i>Funding source</i>	<i>Amount (Euros)</i>	<i>Period</i>	<i>Role</i>
Evolutionary puzzles: Do microbes in the Atacama Desert harvest UV as an energy source?	Human Frontiers Science Program	€610.000	2019-2021.	Co-PI

### **Submitted Grant applications**

<i>Project Title</i>	<i>Funding source</i>	<i>Amount (Euros)</i>	<i>Period</i>	<i>Role</i>
Finding the Dry limit for Life on Earth	ERC Starting Grant	€1.500.000	Five years. Applied in October of 2017.	PI
	National Geographic Exploration Grant	€24.300	Two years. Applied in March of 2018	PI
A Greenhouse for the Moon and Mars	MBR Space Settlement Challenge	€9.300	Six months	PI

### **Past Approved Research Grants**

<i>Project Title</i>	<i>Funding source</i>	<i>Amount (Euros)</i>	<i>Period</i>	<i>Role of the PI</i>
Molecular mechanisms allowing cyanobacteria to tolerate the hyperarid conditions of the Atacama Desert	National Commission for Scientific and Technological Research of the Government of Chile	€ 135.000	2011- 2013	Research Assistant.
Bioassay of the anti-stress activity of the commercial products Sagastim and Yodal	ASP Chile	€ 5.000	2012	Principal Investigator
Determination of the bioactivity of the products Booster and Kelpak	ASP Chile	€ 5.000	2009	Principal Investigator
Determination of the anti-biotic stress bioactivity of five commercial products.	ASP Chile	€ 5.000	2007	Principal Investigator
Implementation of a breeding program for the creation of new varieties of	Fund for the Promotion of Scientific and Technological	€ 375.000	2005-2009	Research Assistant.

citrus fruits without seeds through the use of biotechnology tools	Development of the Government of Chile			
--	--	--	--	--

# Annex 1

## Other Relevant Information related to CV

### Fellowships received in order to attend international conferences

- 2017 Deep Carbon Observatory Early Career Scientist Workshop, Sicily, Italy.
- 2016 Third Astrobiology Congress (III CIAB), Manizales, Colombia.
- 2016 Primer Congreso Latinoamericano de Astrobiología, Lima, Perú.
- 2016 Invited Professor in order to attend the Blue Marble Space Institute of Science Astrobiology Summer Academy, Arizona State University, USA.
- 2013 Invited Professor in order to attend the 2nd Brazilian Workshop on Astrobiology, Guarujá, Brazil.
- 2012 Microenergy 2012, Aarhus, Denmark.
- 2012 22ª Reunião Anual de Usuários do LNLS, Campinas, Brazil
- 2011 Invited Professor in order to attend the 2011 Sao Paulo Advanced School of Astrobiology, Sao Paulo, Brazil.
- 2011 2011 UHNAI Astrobiology Interdisciplinary Conference. Hawaii, USA.
- 2010 2010 Astrobiology Graduate Conference, AbGradCon 2010. Tällberg, Sweden.
- 2009 Astrobiology Graduate Conference, AbGradCon 2009. Seattle, WA, USA.
- 2008 5th Astrobiology Science Conference, AbSciCon 2008. Santa Clara, CA, USA.

### Other Distinctions and prizes

- 2014 Picture selected for the MO BIO “Where in the World Calendar” 2015 Photography Contest (USA).
- 2014 First Prize, Research Category in the picture contest “FotoConciencia” organized by CONICYT and the Chilean Government.
- 2012 Picture selected for the MO BIO “Where in the World Calendar” 2013 Photography Contest (USA).
- 2011 Picture selected in the final exposition of the contest “Nuestro Paisaje: Inspiración para el jardín” (Our landscapes: inspiration for our gardens), organized by El Mercurio, the main Newspaper of Chile.
- 2009 Four pictures selected in the final exposition of the contest “El Mar, una mirada a lo nuestro” (The sea, a look to our own), organized by the Pontificia Universidad Católica de Chile and the Chilean Navy.

### Invitations to give seminars and talks

- 2018 TED talk, Medellín, Colombia, Invited by Marriott.
- 2017 The scientific search for life in the Universe. Guadalajara International Book Fair, Mexico.
- 2017 TED talk. Vancouver, Canada.
- 2017 The Atacama Desert as Mars Analog Model. Image of Chile Foundation, Santiago, Chile.
- 2016 The Scientific search for life in the Universe. The Astronomy Nucleus, Faculty of Engineering of Universidad Diego Portales, Santiago, Chile.
- 2015 Astrobiology, as seen from the biological sciences. The Astronomy Nucleus, Faculty of Engineering of Universidad Diego Portales, Santiago, Chile.
- 2014 Future Council of the Chilean Senate, XV National Conference on Science and Technology.
- 2014 Life in Extreme Environments. Clínica Las Condes. Santiago, Chile.
- 2013 Extreme environments as drivers of convergent evolution: the Atacama Desert Coastal Range as a relevant model. 2nd Brazilian Workshop on Astrobiology, Guarujá, Brazil.
- 2013 Is there life out there? The scientific view. Universidad Adolfo Ibáñez. Santiago, Chile.
- 2011 Possibilities of Life in the Solar System. Universidad de los Andes, Santiago, Chile.
- 2011 Are we alone in the Universe? The scientific perspective. Planetary of the Universidad de Santiago, Chile.
- 2010 Why the Atacama is so interesting for Astrobiologists? University of Sao Paulo, Sao Paulo, Brazil.
- 2009 The possibility of life on Mars. La Moneda, House of the Presidency of Chile and Cultural Center, Santiago, Chile.
- 2007 The Atacama Desert and the search of life on Mars Planetary of the Universidad de Santiago, Chile.
- 2006 Exobiology. Planetary of the Universidad de Santiago, Chile.

- 2006 Possibilities of life in the Universe. Chilean Association of Astronomy and Astronautics. Cerro Pochoco Observatory.
- 2004 Genetic Ingeneering and biotechnology in space. Expocosmos 2005. Mall Florida Center, Santiago, Chile.
- 2005 Space Camp of the Americas. Several seminar on biotechnology and astrobiology.
- 2005 Exobiology. Anniversary of the creation of the Universidad de Santiago. Planetary of the Universidad de Santiago, Chile.
- 2004 Genetic Engineering in space. International Fair of Space and Air (FIDAE), Santiago, Chile.
- 2004 Genetic Engineering in space. Science and Technology Committee of the Chilean House of Representatives.
- 2003 The biotechnological Project of the First Chilean Mission to Space. Educational Centre of the Association of British Schools in Chile, Santiago, Chile.

### **Participation in Conferences**

- 2017 **Azua-Bustos, A.** Have we found evidence of life on Mars using fractal complexity analyses?. 17th European Astrobiology Conference,. Aarhus, Denmark.
- 2017 **Azua-Bustos, A.** The Atacama Desert as a Mars Analog Model. European Mars Conference 2017, Innsbruck, Austria
- 2017 **Azua-Bustos, A.** Deep Carbon Observatory Early Career Scientist Workshop, Sicily, Italy.
- 2016 **Azua-Bustos, A.** The Atacama Desert as a Mars Analog. Third International Congress of Astrobiology, Manizales, Colombia.
- 2016 **Azua-Bustos, A.** The Atacama Desert as a Mars Analog. 1st Latin-American Congress of astrobiology, Lima, Perú.
- 2015 **Azua-Bustos, A.** Microbial Communities of the hyperarid areas of the Atacama Desert. DCO Early Career Scientist Workshop, University of Azores, Portugal.
- 2015 **Azua-Bustos, A.** Active metabolism in desiccated cells of an Atacama Desert Cyanobacterium. AstroBio 2015, ESO Office, Santiago, Chile. AstroBio 2015, ESO Office, Santiago, Chile.
- 2015 **Azua-Bustos, A.** Growing the first plants on Mars and the Moon. AstroBio 2015, ESO Office, Santiago, Chile.
- 2014 **Azua-Bustos, A.** psbA Gene Sequences of Cyanophage Origin in Atacama Desert Aerophytic Cyanobacteria. Viruses of microbes: Structure and function, from molecules to communities, Zurich, Switzerland.
- 2013 **Azua Bustos, A.** Extreme environments as drivers of convergent evolution: the Atacama Desert Coastal Range as a relevant model. 2nd Brazilian Workshop on Astrobiology, Guaruja, Brazil.
- 2013 **Azua Bustos, A.** Metabolism under desiccating conditions of Chroococciopsis strain AAB1, a Cyanobacterium isolated from the Atacama Desert, the driest and oldest on Earth. ESF-EMBO Symposium: Molecular Bioenergetics Of Cyanobacteria: Shaping The Environment, Polonia.
- 2012 **Azua-Bustos, A.** Living with the minimum: Microbial Communities from the Atacama Desert, the oldest and driest of the world. Microenergy 2012, Aarhus, Dinamarca.
- 2012 **Azua-Bustos A., C. Arenas, L. Salas, R. Vicuña.** Sucrose Biosynthesis in Chroococciopsis AAB1, a Novel Strain Extremely Tolerant to Desiccation Isolated from the Atacama Desert. AbSciCon 2012, Atlanta, USA.
- 2012 **Azua-Bustos A., Arenas C., Paulino Lima, I. G., and Galante, D.** Chroococciopsis sp. strain AAB1, a new model from the Atacama Desert for the understanding of extreme UV tolerance in an Astrobiological Context. 22ª Reunião Anual de Usuários do LNLS, Campinas, Brazil
- 2011 **Azua-Bustos A, Zúñiga J, Arenas C, Salas L, and Vicuña R.** Chroococciopsis AAB1: a new strain isolated from the Atacama Desert extremely tolerant to desiccation. XIII Congreso Chileno de Microbiología. Olmué, Chile.
- 2011 **Azua-Bustos A and Cristian Vega-Martínez C.** Detecting Life as “we don’t know it” by Fractal Complexity Analysis. Sao Paulo Advanced School of Astrobiology, SPASA 2011. Sao Paulo, Brazil.



- 2011 **Azua-Bustos A**, Zúñiga J, Arenas C, Salas L, and Vicuña R. Chroococciopsis AAB1: a new cyanobacterial strain extremely tolerant to desiccation isolated from the Atacama Desert. Sao Paulo Advanced School of Astrobiology, SPASA 2011. Sao Paulo, Brazil.
- 2011 **Azua-Bustos A**, Zúñiga J, Arenas C, González- Silva C, Salas L, and Vicuña R. A Recipe for eternal life: Just add sugar. VII Simposio Internacional Science and Friendship. Santiago, Chile.
- 2011 **Azua-Bustos A**. Genómica y metagenómica de ambientes extremos. Simposio Internacional en Genómica, Universidad Mayor. Santiago, Chile.
- 2011 **Azua Bustos A**, González- Silva C, Salas L, Zúñiga J, and Vicuña R. The Amazing Atacama Desert: How to Survive with no Water. UHNAI Astrobiology Interdisciplinary Conference. Hawaii, USA.
- 2010 **Azua-Bustos A**, Zúñiga J, Salas L, González- Silva C, and Vicuña R. Surviving in the driest desert of the world: how to photosynthesize with (almost) no water at the Atacama Desert. VI Simposio Internacional Science and Friendship. Santiago, Chile.
- 2010 **Azua-Bustos A**. Microbial Adaptations in the Hyperarid Atacama Desert: What to do, and what to evolve, when there is no water (at all). AbGradCon 2010. Tällberg, Suecia.
- 2010 **Azua-Bustos A**. "The Atacama Desert: Pushing the limits of water-based lifeforms". Exoplanets Workshop. European Southern Observatory (ESO). Santiago, Chile.
- 2010 **Azua-Bustos A**. Fractal Analysis as a new approach for the search of life in the universe. AstroBio 2010. CEPAL, Santiago, Chile.
- 2010 **Azua-Bustos A**. Preliminary studies of microorganisms found in extreme environments of the Atacama Desert. AstroBio 2010. CEPAL, Santiago, Chile.
- 2009 **Azua-Bustos A**, González-Silva C, Salas L, Wynne J.J., McKay C.P., Palma, R.E., and Vicuña R. Atacama Desert Caves as Analog Models of Habitability for Microbial Life on the Surface of Mars. V Simposio Internacional Science and Friendship. Santiago, Chile.
- 2009 Vicuña R and **Azua A**. The Atacama Desert as a model habitat in astrobiology. Study Week on Astrobiology, The Pontifical Academy of Sciences, Vatican City, Italy.
- 2009 **Azua-Bustos, A**. Why the Atacama is so Dam Interesting for Astrobiologists? A Whole System Approach Proposal from a Native Scientist. AbGradCon 2009. Seattle, WA, USA.
- 2009 Zúñiga J., **Azua-Bustos A**, González C., Davila A., Cavalazzi B., Cady S., and Vicuña R. Living Stromatolites in the Midst of the Atacama Desert: A Paradigm for the Origin of Life. Seattle, WA, USA.
- 2009 D Prehn, **A Azua**, L Barrales, JP Manzur, A Perez, I Peña y JP Zoffoli. Efecto de Aplicación de Aire Caliente Sobre el Manejo de Plagas y Productividad de la Vid. XV Congreso Latinoamericano de Fitopatología. Santiago, Chile.
- 2008 **Azua-Bustos A**, González C, Mancilla RE, Salas L, Wynne JJ, McKay CP, and Vicuña R. Understanding the Atacama Desert as an Analog for Astrobiology Related Questions; the Mars Case. IV Simposio Internacional Science and Friendship. Santiago, Chile.
- 2008 **A. Azua-Bustos**, C. González, J.J. Wynne and C.P. McKay. Possible Cave-limited Cyanobacteria from the Atacama Desert, Chile. The 5th Astrobiology Science Conference, AbSciCon 2008. Santa Clara, CA, USA.
- 2008 **A. Azua-Bustos**, C. González, B. Gomez-Silva, and C.P. McKay. A First Glance at the Microenvironmental Conditions Allowing the Colonization of Quartzes by Hypolythic Microorganisms on the Atacama Desert, Chile. The 5th Astrobiology Science Conference, AbSciCon 2008. Santa Clara, CA, USA.
- 2008 **A. Azua-Bustos**. How to uncover the habitats of "life as we don't know it" in other planets; the case of extreme environments of the Atacama Desert and the Andes Mountains of Chile. Astrobiology Graduate Conference, AbGradCon 2008. Santa Clara, CA, USA.

### **Appearances in international Documentaries**

- 2017 Year Million, a **National Geographic Channel** six chapter's documentary, in which chapter 6 focuses in my research. Trailer: <http://channel.nationalgeographic.com/year-million/videos/life-in-the-desert/>

- 2016.- Atacama: la route de l'eau. A french documentary aired the 9th of November at Faut pas rêver, a program of the TV channel France 3 in which one of these chapters focused in my research.  
<https://www.youtube.com/watch?v=ERLa7k7jU-c>
- 2015.- Interview in Megavisión, one of the main TV channels in Chile  
<https://www.youtube.com/watch?v=GAN1rZ6Qtmg>
- 2014.- Hijos de las estrellas (Son of the Stars), a series of chapters focused in astronomy and astrobiology related subjects, in which one of these chapters focused in my research. This documentary was aired in the Chilean television (La Red Television) and other South American and European countries.  
<http://www.youtube.com/watch?v=RHV3ZV1eIMs>
- 2014.- Entre Terre et Ciel. A french documentary. A series of chapters focused in astronomy and astrobiology related subjects, in which one of these chapters focused in my research.  
[https://www.youtube.com/watch?v=B02-pID\\_f34](https://www.youtube.com/watch?v=B02-pID_f34)

### Appearances in the international press

- El desierto de Atacama relacionado con la búsqueda de vida en Marte. March 8, 2018. Urgente24 (Argentina).  
<https://www.urgente24.com/274837-el-desierto-de-atacama-relacionado-con-la-busqueda-de-vida-en-marte>
- En que se parece la superficie de Marte al Desierto de Atacama? Las Últimas Noticias (Chile). March 5, 2018.  
<http://www.lun.com/Pages/NewsDetail.aspx?dt=2018-03-05&BodyID=0&PaginaId=32> and  
<http://www.lun.com/Pages/NewsDetail.aspx?dt=2018-03-05&BodyID=0&PaginaId=33>
- Tipos de suelo y humedad relativa en el aire: Conoce las similitudes y diferencias entre el desierto de Atacama y Marte. March 2, 2018. El Mercurio de Santiago (Chile).  
<http://www.emol.com/noticias/Tecnologia/2018/03/02/897179/Tipos-de-suelo-y-humedad-relativa-en-el-aire-Conoce-las-similitudes-y-diferencias-entre-el-desierto-de-Atacama-y-Marte.html>
- Con mưa bão hiêm đánh thức vi khuẩn chưa chết ở Sa mạc Atacama của Chile. March 1, 2018. Dantri (Vietnam).  
<http://dantri.com.vn/khoa-hoc-cong-nghe/con-mua-bao-hiem-danh-thuc-vi-khuan-chua-chet-o-sa-mac-atacama-cua-chile-20180301142402797.htm>
- A rare rainstorm wakes undead microbes in Chile's Atacama Desert. February 27, 2018. **Science News** (USA).  
<https://www.sciencenews.org/article/rain-wakes-undead-microbes-chile-atacama-desert>
- La búsqueda de vida en Marte se topa con una sorpresa en el desierto de Atacama. February 26, 2018. HiperTextual (Spain).  
<https://hipertextual.com/2018/02/vida-marte-atacama>
- Life Can Survive in the Most Mars-Like Place on Earth. **The Atlantic** (USA). February 26, 2018.  
<https://www.theatlantic.com/science/archive/2018/02/atacama-desert-life/553976/>
- How One Scientist Defined His Purpose To Reframe Life On Earth. **Forbes Magazine** (USA). June 1, 2017.  
<https://www.forbes.com/sites/karimabouelnaga/2017/06/01/how-one-scientist-defined-his-purpose-to-reframe-life-on-earth/#7e58049e48d7>
- Desierto de Atacama podría albergar microorganismos "marcianos". **National Geographic in Spanish**, March 3, 2017.  
<http://www.ngenespanol.com/ciencia/descubrimientos/17/02/22/un-nuevo-descubrimiento-en-el-desierto-de-atacama1>
- Que falta para hacer crecer vida en la superficie de Marte. El Mercurio de Santiago (Chile). February 4, 2017.  
<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2017-02-04&dtB=20-02-2017%200:00:00&PaginaId=5&bodyid=9>
- La detección de vida extraterrestre y el ahorro energético entre los proyectos seleccionados para el Falling Walls Chile. El Mostrador (Chile). 21 de septiembre de 2016.

<http://www.elmostrador.cl/cultura/2016/09/21/la-deteccion-de-vida-extraterrestre-y-el-ahorro-energetico-entre-los-proyectos-seleccionados-para-el-falling-walls-chile/>

- Polémica generan los hallazgos que ponen en duda la evidencia de agua en Marte y la Luna. El Mercurio de Santiago (Chile). August 2, 2016.

<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2016-08-02&dtB=08-08-2016%200:00:00&PaginaId=11&bodyid=1>

- Astrofísico Bryan May alerta a los gobiernos para que se avisen con los asteroides. Las Últimas Noticias (Chile). July 10, 2016.

<http://www.lun.com/Pages/NewsDetail.aspx?dt=2016-07-10&PaginaId=33&bodyid=0>

- La Fuente de la vida estaría en moléculas flotando en el espacio. El Mercurio de Santiago (Chile), July 9, 2016.

<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2016-07-09&dtB=09-07-2016%200:00:00&PaginaId=6&bodyid=9>

- Marte también tuvo una glaciación como la de la Tierra. El Mercurio de Santiago (Chile). May 27, 2016.

<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2016-05-27&dtB=05-06-2016%200:00:00&PaginaId=12&bodyid=1>

- Los 250 experimentos de la NASA en el espacio. El Mercurio de Santiago (Chile). April 2, 2016.

<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2016-04-02&dtB=02-04-2016%200:00:00&PaginaId=6&bodyid=9>

- Semillas chilenas compiten por llegar a Marte. La Tercera (Chile). January 31, 2016.

<http://www.latercera.com/noticia/tendencias/2016/01/659-666442-9-semillas-chilenas-compiten-por-llegar-a-marte.shtml>

- 地球上最干旱的地方存在生命 (The existence of life in the driest place of Earth, China). January 15, 2016.

[http://news.sznews.com/content/2016-01/15/content\\_12741992.htm](http://news.sznews.com/content/2016-01/15/content_12741992.htm)

- El lugar más seco con vida de la Tierra podría ser como Marte (China). December 21, 2015.

<http://spanish.peopledaily.com.cn/n/2015/0520/c92121-8894898.html>

- 地球上最干旱的地方存在生命 The existence of life on Earth's driest places. (China). December 21, 2015.

<http://www.ljj3.com/html/?237.html>

- 我们能够喝上“来自火星的水”吗? Can we drink Water from Mars? (China). December 21, 2015.

- Encuentran Vida En El Lugar Más Seco de la Tierra. (USA) December 20, 2015.

<https://distrends.com/encuentran-vida-en-el-lugar-mas-seco-de-la-tierra/>

- Más allá de la ficción: La Astrobiología, pilar científico del Congreso del Futuro. El Mostrador (Chile). December 14, 2015.

<http://www.elmostrador.cl/cultura/2015/12/14/mas-alla-de-la-ficcion-la-astrobiologia-pilar-cientifico-del-congreso-del-futuro/>

- El Impactante reclamo de los científicos chilenos. Las Últimas Noticias, (Chile). November 9, 2015.

<http://www.lun.com/Pages/NewsDetail.aspx?dt=2015-11-09&PaginaId=24&bodyid=0>

- Experimento chileno busca cultivar plantas en Marte. Las Últimas Noticias (Chile)., October 12, 2015.

<http://www.lun.com/Pages/NewsDetail.aspx?dt=2015-10-13&PaginaId=18&bodyid=0>

- UF! Oni by tam vážně mohli být! Na Marsu je to stejné jako na Zemi (Czech Republic). September 29, 2015.

<http://tn.nova.cz/clanek/objev-na-marsu-podobne-podminky-jsou-i-na-jednom-miste-na-zemi.html>

- Cómo empaquetar varios metros de ADN sin un solo nudo. **Ciencias Mixtas** (Spain). July 31, 2015.

<http://blogs.20minutos.es/ciencias-mixtas/2015/07/31/como-empaquetar-varios-metros-de-adn-sin-un-solo-nudo/>

- Un lugar terrestre tan seco como Marte alberga vida. Meteorología en Red (Spain). June 12, 2015.

<http://www.meteorologiaenred.com/un-lugar-terrestre-tan-seco-como-marte-alberga-vida.html>

- El límite seco para la vida en la Tierra. (Bolivia). June 7, 2015.

[http://www.opinion.com.bo/opinion/revista\\_asi/2015/0607/suplementos.php?id=6334](http://www.opinion.com.bo/opinion/revista_asi/2015/0607/suplementos.php?id=6334)

- 地球上最乾旱的地方仍存在生命 The Driest place on Earth Still has life (China). June 1, 2015.

<http://digital.sina.com.hk/news/4472/20150601/4414499/>

- Experimento chileno busca cultivar plantas en Marte. Taringa! (Argentina) June 1, 2015.  
<http://www.taringa.net/posts/ciencia-educacion/19007467/Experimento-chileno-busca-cultivar-plantas-en-Marte.html>.
- En Chile está el lugar más seco del mundo, con características similares a Marte. Canal 13 (Chile). May 21, 2015.  
<http://www.t13.cl/noticia/tendencias/tecnologia/medio-ambiente/En-Chile-esta-el-lugar-mas-seco-del-mundo-que-tiene-caracteristicas-similares-a-Marte>
- El curioso tomatillo que crece en pleno Desierto de Atacama. Las Últimas Noticias (Chile)., May 20, 2015.  
<http://www.lun.com/Pages/NewsDetail.aspx?dt=2015-05-20&PaginaId=14&bodyid=0>
- This Desert May Be The Driest Place On Earth, But That Doesn't Mean Life Can't Exist There. **The Huffington Post** (USA). May 20, 2015.  
[http://www.huffingtonpost.com/2015/05/20/driest-place-on-earth-life\\_n\\_7313074.html?utm\\_hp\\_ref=science](http://www.huffingtonpost.com/2015/05/20/driest-place-on-earth-life_n_7313074.html?utm_hp_ref=science)
- Driest place on earth found in Atacama Desert, Chile. The Times of India. May 19, 2015.  
<http://timesofindia.indiatimes.com/home/environment/the-good-earth/Driest-place-on-earth-found-in-Atacama-Desert-Chile/articleshow/47345456.cms>
- El Lugar más seco de la Tierra alberga vida con condiciones como las de Marte. (ABC, Spain). May 19, 2015.  
<http://www.abc.es/ciencia/20150519/abci-lugar-seco-vida-201505192025.html>
- Driest place on Earth hosts life. **NASA Astrobiology Magazine**. May 18, 2015.  
<http://www.astrobio.net/topic/origins/extreme-life/driest-place-on-earth-hosts-life/>
- Hay vida en el lugar más seco del mundo (Dcyt, Spain). January 19, 2015.  
<http://www.dicyt.com/noticias/hay-vida-en-el-lugar-mas-seco-del-mundo>
- 地球上最干旱的地方存在生命 The existence of Life in the driest places on Earth. (China). March 10, 2015.  
[http://wap.kaiwind.com/baike/201510/03/t20151003\\_2910456.shtml](http://wap.kaiwind.com/baike/201510/03/t20151003_2910456.shtml)
- El lugar más seco del mundo se ubica en Chile y es similar al planeta Marte. Página web de la Radio Bío Bío (Chile). February 10, 2015.  
<http://www.biobiochile.cl/2015/02/10/el-lugar-mas-seco-del-mundo-se-ubica-en-chile-y-es-similar-al-planeta-marte.shtml>
- El lugar más seco del mundo está en María Elena, en el Desierto de Atacama. El Mercurio de Santiago (Chile). January 4, 2015.  
<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2015-01-04&dtB=31-01-2016%20:00:00&PaginaId=10&bodyid=1>
- Sonda de la NASA llega en Marzo al planeta enano Ceres. El Mercurio de Santiago (Chile). December 30, 2014.  
<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2014-12-30&dtB=31-01-2016%20:00:00&PaginaId=10&bodyid=1>
- Premio nacional de ciencias comenta detallitos de “Interstellar”. Las Últimas Noticias (Chile). November 6, 2014.  
<http://www.lun.com/Pages/NewsDetail.aspx?dt=2014-11-06&PaginaId=44&bodyid=0>
- Chileno encontró lugar más seco de la Tierra cerca de una salitrera. Las Últimas Noticias(Chile). October 31, 2014.  
<http://www.lun.com/Pages/NewsDetail.aspx?dt=2014-10-31&PaginaId=12&bodyid=0>
- Proyectos chilenos prueban factibilidad de llevar maqui, quinoa y alfalfa al espacio. El Mercurio de Santiago (Chile). October 30, 2014.  
<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2014-10-30&dtB=31-01-2016%20:00:00&PaginaId=9&bodyid=1>
- Cómo deberían ser los otros planetas Tierra que hoy tanto se buscan. El Mercurio de Santiago (Chile). May 5, 2014.  
<http://impresa.elmercurio.com/Pages/NewsDetail.aspx?dt=2014-05-03&dtB=31-01-2016%20:00:00&PaginaId=5&bodyid=9>
- ¿Cómo saber qué vida buscar fuera de la Tierra si no se conoce ninguna? El Mercurio de Santiago (Chile). September 23, 2013.

<http://impresaelmercurio.com/Pages/NewsDetail.aspx?dt=2013-09-23&dtB=31-01-2016%20:00:00&PaginaId=13&bodyid=1>

- El primer año del Curiosity, el robot más exitoso de NASA. El Mercurio de Santiago (Chile). August 4, 2013.

<http://impresaelmercurio.com/Pages/NewsDetail.aspx?dt=2013-08-04&dtB=31-01-2016%20:00:00&PaginaId=13&bodyid=1>

- Modelo matemático para detectar vida. Página 12 (Argentina). July 21, 2013.

<http://www.pagina12.com.ar/diario/sociedad/subnotas/3-64303-2013-07-21.html>

- Modelo matemático para detectar vida. WordPress. July 29, 2013.

<http://noticiastectv.wordpress.com/2013/07/29/modelo-matematico-para-detectar-vida/>

- La vida como la conocemos, ¿es la única que existe? El Mercurio de Santiago (Chile). May 13, 2013.

<http://impresaelmercurio.com/Pages/NewsDetail.aspx?dt=2013-05-13&dtB=31-01-2016%20:00:00&PaginaId=13&bodyid=1>

- Por qué el Curiosity es el robot más famoso de la NASA. El Mercurio de Santiago (Chile). December 8, 2012.

<http://impresaelmercurio.com/Pages/NewsDetail.aspx?dt=2012-12-08&dtB=31-01-2016%20:00:00&PaginaId=6&bodyid=9>

- El altiplano se está secando por dentro. El Mercurio de Santiago (Chile). October 4, 2011.

<http://diario.elmercurio.com/detalle/index.asp?id={eadf1f2c-d091-499e-be4f-aaa81255747e}>

- El "hombre de las cavernas" lanza un llamado de alerta. El Mercurio de Santiago (Chile). August 6, 2011.

<http://diario.elmercurio.com/detalle/index.asp?id={cb2eaafc-bd51-4836-92c0-114917af05a9}>

- Bacterias capaces de vivir en Arsénico redefinen la forma de entender la vida. El Mercurio de Santiago (Chile). December 3, 2010.

<http://diario.elmercurio.com/detalle/index.asp?id={323609fd-e8bc-491e-be70-a9dbc45dca51}>

- Extreme microbe drinks dew on spiderwebs to live. Live Science (USA), September 22, 2010.

<http://www.livescience.com/8648-extreme-microbe-drinks-dew-spiderwebs-live.html>

- Extreme microbe drinks dew on spiderwebs to live. NBC News (USA), September 22, 2010.

[http://www.msnbc.msn.com/id/39309515/ns/technology\\_and\\_science-science/?ocid=twitter](http://www.msnbc.msn.com/id/39309515/ns/technology_and_science-science/?ocid=twitter)

- Extreme microbe drinks dew on spiderwebs to live. Our Amazing Planet (USA), September 20, 2010.

<http://www.ouramazingplanet.com/extreme-microbe-drinks-dew-on-spiderwebs-to-live-0550/>

- Astrobiologi vid Siljan. Populär Astronomi (Sweden). September 2010.

[http://www.popast.nu/wp-content/uploads/2010/09/2010\\_3\\_astrobiologer.pdf](http://www.popast.nu/wp-content/uploads/2010/09/2010_3_astrobiologer.pdf)

- El extraño paisaje de Avatar podría ser real. El Mercurio de Santiago (Chile). January 23, 2010.

<http://diario.elmercurio.com/detalle/index.asp?id={486fbf74-d86b-4eb3-b7a6-d6c8b8bb3535}>

- Bacterias dan indicios sobre el origen de la vida. Visión Universitaria (Chile). October 1, 2009.

<http://issuu.com/visionuniversitaria/docs/vision183>

- Por qué el hombre insiste en viajar a Marte. El Mercurio de Santiago (Chile). September 2, 2009.

<http://diario.elmercurio.com/detalle/index.asp?id={8e20678e-64bc-484d-be20-bae75758b6fb}>

- La vida habría llegado en la cola de un cometa. El Mercurio de Santiago (Chile). August 19, 2009.

<http://diario.elmercurio.com/detalle/index.asp?id={053ede8d-eb54-4de0-a3f4-5cae148282cc}>

## Radio Interviews

2017 Radio Agricultura: Conectados (from 59m:21s) (Santiago, Chile).

<http://www.radioagricultura.cl/podcast/conectados-miercoles-22-febrero-2017/>

2017 Radio Duna: El astrobiólogo chileno tras la búsqueda de vida en Marte. (Santiago, Chile).

<http://www.duna.cl/podcasts/el-astrobiologo-chileno-tras-la-busqueda-de-vida-en-marte/>

2014 Fronteiras da Ciencia: Atacama e Extremofilas (Guaruja, Brazil).

<https://www.podcat.com/podcasts/hbaplj-fronteiras-da-ciencia/episodes/wezcxy-deserto-do-atacama-e-extremofilas>