

Part A. PERSONAL INFORMATION

CV date	30/01/2023
---------	------------

First and Family name	Tino Krell		
ID number		Age	
Researcher codes	Open Researcher and Contributor ID (ORCID**)	0000-0002-9040-3166	
	SCOPUS Author ID (*)	7003484914	
	WoS Researcher ID (*)	G-7296-2015	

(*) Optional, (**) Mandatory

A.1. Current position

Name of Institution	Estación Experimental del Zaidín - CSIC		
Department	Environmental Protection		
Address and Country	Prof. Albareda 1, Granada 18008, Spain		
Phone number	(Spain) 958 18 16 00	e-mail	tino.krell@eez.csic.es
Current position	Research Professor	From	16.02.2021
Key words	Bacterial signal transduction, sensing mechanisms, chemotaxis, bacterial motility		

A.2. Education

PhD, Licensed	University	Year
Diploma (License)	Leipzig (Germany)	1993
PhD	Glasgow (United Kingdom)	1997

A.3. General indicators of the quality of scientific production

177 publications in international journals with an average impact factor of 5.9

120 publications in Q1, 28 publications in D1, 67 articles as last author

97 publications in the last 10 years, 21 book chapters, 12 patents, one book as editor.

h-index: 45 (Google Scholar), **i10-index:** 141 (Google Scholar)

Total cites: 7823 (Google Scholar); Number of sexenios: 4, last granted in 2017

Part B. CV SUMMARY

I conducted my PhD studies on enzymes of the shikimate pathway at the University of Glasgow (UK) from 1993-1997, followed by a 1-year post-doctoral stay at the same University. During this time, I participated in the discovery of the shikimate pathway in parasites offering novel strategies to fight malaria (**2 publications in Nature**). Furthermore, I advanced the structural biology of shikimate pathway enzymes (publications in **Nature Struct. Biol, JMB**). Awarded with a Marie-Curie fellowship I worked at the Institute for the Biology and Chemistry of Proteins (Lyon, France) from 1998-2000 on aspects of multidrug resistance. During the following 4,5 years I worked as laboratory head in the Research Department of the **multinational pharmaceutical company Sanofi** (Lyon, France). I made important contributions to vaccine development as evidenced by the **co-authorship in 12 patents**. Financed by a Ramón and Cajal fellowship I initiated my work at the Estación Experimental del Zaidín (EEZ) in 2004. In 2007 I obtained a permanent position as Staff Scientist at the EEZ, was promoted to Scientific Investigator in 2012 and to **Research Professor in 2021**. I now head a laboratory (<http://krell-laboratory.com/>, @KrellLaboratory) that is dedicated to study of bacterial sensing and signal transduction.

My major achievements include

- The identification of signal molecules that stimulate 8 transcriptional regulators, 3 sensor kinases and 17 chemoreceptors (**more than 50 articles, among which 5 mBio, 2 in NAR, 8 in Env Microbiol, 4 in Mol Micro, 3 in J Mol Biol**)
- The definition of a novel sensor kinase family (TodS-like, **2 articles in PNAS, 2 in JMB, JBC**),
- The discovery of a novel sensor domain (HBM domain, **PNAS, JBC**)
- Assignment of chemoreceptors to the individual chemosensory pathways in *P. aeruginosa* (**PNAS**)



- Novel mechanism by which CheR interacts with a specific chemoreceptor (**Science Signal**)
- Identification of amino acid specific receptors in all domains of life (**PNAS**)
- Identification of a plant compound that interferes with quorum sensing (**Science Signal** recommended by faculty of 1000, **Env Microbiol**)
- Novel mechanism by which environmental signals control bacterial antibiotics production (**NAR**)

I have established collaborations with international and national opinion leaders: V. Sourjik (Max-Planck Institute, Germany), I. Zhulin (Ohio State University, USA), M. Galperin (NIH, USA), U. Römling (Karolinska Institute, Sweden), J. Kato (Hiroshima University, Japan), V. deLorenzo (CNB, Madrid) or J.A. Gavira (LEC, Granada). I have supervised 7 PhD and 11 Master theses. All former PhD students pursue their career in life science. The last 4 PhD students published on average 14 international publications each, forming a sound basis for the continuation of their careers.

I am an Editorial board member of J Bacterial and Microb Biotechnol and have reviewed articles for Nature Communications, Nature Microbiology, mBio, mSystems, NAR, Cell Reports, NpJ Biofilms and Microbioms, PLOS Biology or Bioinformatics.

From 2014 to 2022 I have directed the Scientific Instrumentation Service at the EEZ, composed by 4 members. During this time, I have achieved in competitive project calls funding for the acquisition of 3 novel instruments. I am an international opinion leader in the field of signal transduction, evidenced by invitations to **the prestigious “Sensory Transduction in Microorganisms” Gordon Research Conferences (Ventura, USA) to give either oral presentations (2016 and 2020) or chair the session on “Sensing” (2018 and 2022) or to be the Conference chair of the XVII Bacterial Locomotion and Signal Transduction conference (2023, Charleston, USA).** I have served as **principal investigator in 17 projects with a total amount of ~ 2.9 million €.**

Part C. RELEVANT MERITS

C.1. Publications

- Gumerov, V.M., Andrianova, E.P., Matilla, M.A., Page, K.M., Monteagudo-Cascales, E. Dolphin, A.C., **Krell, T.** Zhulin, I.B. (2022) **Proc. Natl. Acad. Sci. USA** 119:e2110415119 (**IF: 12.779**; 9/73 Multidisciplinary Sciences) **T. Krell and I. Zhulin are co-corresponding authors.**
- Matilla, M.A., Velando, F., Tajuelo, A., Martín-Mora, D., Xu, W., Sourjik, V., Gavira, J.A., **Krell, T.** (2022) Chemotaxis of the human pathogen *Pseudomonas aeruginosa* to the neurotransmitter acetylcholine. **mBio** 13: e0345821 (**IF: 7.786**, 22/136 Microbiology).
- Monteagudo-Cascales, E., Martín-Mora, D., Xu, W., Sourjik, V., Matilla, M.A. Ortega, A., **Krell, T.** (2022) The pH robustness of bacterial sensing. **mBio** (**IF: 7.786**, 22/136 Microbiology).
- Feng, H., Lv, Y., **Krell, T.**, Fu, R., Liu, Y., Xu, Z., Du, W., Shen, Q., Zhang, N. Zhang, R. (2022) Signal binding at both modules of its dCache sensor domain enables the McpA chemoreceptor of *Bacillus velezensis* to sense different ligands. **Proc. Natl. Acad. Sci USA** 119:e2201747119 (**IF: 12.779**, 9/73 Multidisciplinary sciences)
- Gavira, J.A., Gumerov, V.M., Rico-Jiménez, M., Petukh, M., Upadhyay, A.A., Ortega, A., Matilla, M.A., Zhulin, I.B., **Krell, T.** (2020) How bacterial chemoreceptors evolve novel ligand specificities. **mBio** 11: e03066-19 (**selected for the editors pick, IF: 6.75**, 14/133 Microbiology)
- Martín-Mora, D., Ortega, A., Matilla, M.A., Martínez-Rodríguez, S., Gavira, J.A., **Krell, T.** (2019) The molecular mechanism of nitrate chemotaxis via direct ligand binding to the PilJ domain of McpN. **mBio** 10: e02334-18 (**IF: 6.75**, 14/133 Microbiology)
- Cerna-Vargas, J.P., Santamaría-Hernando, S., Matilla, M.A., Rodríguez-Herva, J.J., Daddaoua, A., Rodríguez-Palenzuela, P., **Krell, T.** López-Solanilla, E. (2019) Chemoperception of specific amino acids controls phytopathogenicity in *P. syringae* pv. Tomato. **mBio** 10: e01868-19 (**IF: 6.75**, 14/133 Microbiology)
- Matilla MA, Daddaoua A, Chini A, Morel B, **Krell T** (2018) An auxin controls bacterial antibiotics production. **Nucleic Acids Res.** 46:11229-11238 (**IF: 11.56**, 10/292 Biochem. & Mol. Biol.)
- Corral-Lugo, A., Matilla, M.A., Martín-Mora, D., Silva Jiménez, H., Mesa Torres, N., Kato, J., Hida, A., Oku, S., Conejero-Muriel, M., Gavira, J.A., **Krell, T.** (2018) High-affinity chemotaxis to histamine mediated by the TlpQ chemoreceptor of the human pathogen *Pseudomonas aeruginosa*. **mBio** 9:e01894-18 (**IF: 6.69**, 13/125 Microbiology)

- Ortega, D.R., Fleetwood, A.D., **Krell, T.**, Harwood, C.S., Jensen, G.J., Zhulin, I.B. (2017) Assigning chemoreceptors to chemosensory pathways in *Pseudomonas aeruginosa*. **Proc. Natl. Acad. Sci. USA** 114:12809-14 (**IF: 9.66**, 4/64 Multidisciplinary Sciences)
- Corral-Lugo A, Daddaoua A, Ortega A, Espinosa-Urgel M, **Krell T** (2016) Rosmarinic acid is a homoserine lactone mimic produced by plants that activates a bacterial quorum-sensing regulator. **Science Signal**. 9(409):ra1 (**recommended by the Faculty of 1000 PRIME as “very good” (IF: 7.36**, 28/289 Biochemistry and Molecular Biology)
- García-Fontana C, Corral-Lugo A, **Krell T** (2014) Specificity of the CheR2 Methyltransferase in *Pseudomonas aeruginosa* is directed by C-terminal pentapeptides in chemoreceptors. **Science Signal**. 7 (320):ra34 (**IF: 6.34**, 36/291 Biochemistry and Molecular Biology)

C.2. Research projects (T. Krell is the PI in all projects listed)

- Comprensión de la función de quimiorreceptores en bacterias patógenas, PID2020- 112612GB-I00, Ministerio de Ciencia e Investigación, **290.000 € + FPI fellowship**, 1.9.2021-31.8.2024.
- Identificación sistemática y de alto rendimiento de moléculas señal reconocidas por proteínas sensoras bacterianas, BIO2016-76779-P, MINECO, **250.000 € + FPI fellowship**, 30.12.2016-29.6.2021.
- Mecanismos de señalización en *Pseudomonas aeruginosa*: Nuevas estrategias para combatir este patógeno humano, P18-FR-1621, Junta de Andalucía, **125.000 €**, 1.1.2020-31.12.2022.
- Biosensores universales, EXPLORA BIO2017-91210-EXP, MINECO, **48.400 €**, 1.11.2018-31.12.2020
- Comprensión de quimiorreceptores con una región de unión a ligando bimodular, BIO2013-42297 MINECO, **272.250 € + FPI fellowship**, 1.1.2014-30.6.2017.
- Biosensores para monitorización de arsénico en aguas de riego y productos agrícolas, RECUPERA 20134R057, MINECO, **262.075 €**, 2.12.2013-31.12.2015.
- Comprensión de los mecanismos de traducción de señal que determinan la formación y dispersión de biofilm en bacterias, CVI-7335, Junta de Andalucía, **213.149 €**, 1.2.2013-31.3.2018.
- Integrative modeling and engineering of *Pseudomonas putida* for green chemistry, Acción Marie-Curie, PIEF-GA-2012-329682, EU, **173.370 €**, 1.6.2013-31.5.2015.
- Construcción de biosensores de nueva generación para detectar hidrocarburos aromáticos, EXPLORA BIO2011-14589-E, MINECO, **39.200 €**, 1.7.2012-30.6.2014.
- Comprensión y aprovechamiento de la quimiotaxis de las bacterias acuáticas y del suelo, BIO2010-16937, MINECO, **157.000 €**, 1.1.2011-31.12.2013.
- Quimiotaxis en bacterias del suelo: su implicación en la degradación de compuestos tóxicos y en la colonización de raíces y semillas, P09-RNM-4509, Junta de Andalucía, **293.000 €**, 3.2.2010-2.2.2014.

C.3. Contracts

- Biodegradación: abordando las limitaciones, BIOCON08 185/09, Fundación BBVA, **199.520 €**, 2009-2012.
- Development of new techniques for the production of long chain alcohols using *Pseudomonas putida* as producer, Abengoa, S.A., **38 000 €**, 2014-2015.
- Screening CACHE domains for novel ligand capabilities, Ohio State University, **43 000 \$**, 2020-2021

C.4. Organisation of science

- 2023: Chair of the XVII edition of the BLAST (Bacterial Locomotion and Signal Transduction Conference), 15.1.2023 – 20.1.2023, Charleston, USA (>250 participants). This is one of the leading conferences in the area. (<https://www.blastmeetings.org/>)
- 2023: Elected member of the Board of Directors of BLAST, responsible for organising BLAST conferences.
- 2022: Member of the expert panel of the Governmental Research Agency (*Agencia Estatal de Investigación*) to evaluate *Transición Ecológica y Digital* projects (call 2021).
- 2021: Member of the expert panel of the Governmental Research Agency (*Agencia Estatal de Investigación*) to evaluate Proof of concept projects (call 2021).
- 2020: Member of the expert panel of the Governmental Research Agency (*Agencia Estatal de Investigación*) to evaluate projects submitted in the area of biotechnology (call 2019).



- 2019: Member of the expert panel of the Governmental Research Agency (*Agencia Estatal de Investigación*) to evaluate the output of granted projects in the area of biotechnology (call 2016).
2014: Member of the Executive Organising Committee of the XXXVII Meeting of the Spanish Society for Biochemistry and Molecular Biology (SEBBM).

C.5. Invitations for oral presentations at international scientific conferences

Most important in my field are the “Sensory Transduction in Microorganisms Gordon Research Conference” (STIM-GRC) and the “Bacterial Locomotion and Signal Transduction” (BLAST) conferences.

- 01/2022: STIM-GRC (and chair of session “Sensing”), Ventura, USA
01/2020: STIM-GRC, Ventura, USA
01/2018: STIM-GRC (and chair of session “Sensing”), Ventura, USA
01/2016: STIM-GRC, Ventura, USA
01/2017: BLAST IX, New Orleans, USA
01/2015: BLAST XIII, Tucson, USA
01/2013: BLAST XII, Tucson, USA
01/2011: BLAST XI, New Orleans, USA
07/2019: 8th Congress of European Microbiologists (FEMS 2019), Glasgow, United Kingdom
10/2018: Plant-microbe interactions in the rhizosphere, Nanjing, China
10/2016: Chemotaxis and bioremediation of environ. pollutants (+ session chair), Peking, China

C6: Work as an editor

Editor of the book “Cellular Ecophysiology of Microbe: Hydrocarbon and Lipid interactions, Handbook of Hydrocarbon and Lipid Microbiology” (2018), ISBN 978-3-319-50541-1, 599 pp.
Editor of the special issue “Bacterial Chemoreceptors” **Int. J. Mol. Sci.**
Editor of the special issue “Bacterial Chemoreceptors and Chemosensory Pathways” **Int. J. Mol. Sci.**

C7. Supervision of masters and PhD thesis during the last 10 years (two theses are ongoing): PhD

- 2019: **David Martín Mora**, Functional and structural annotation of *Pseudomonas* chemoreceptors.
2016: **Cristina García-Fontana**, Complejidad y diversidad en los sistemas de traducción de señales en *Pseudomonas*.
2016: **Andrés Corral-Lugo**, Molecular basis of chemosensory, biofilm and cell-to-cell signaling in different species of *Pseudomonas*.
2014: **Miriam Rico Jiménez**, Differences in chemosensory pathways between enterobacteria and *Pseudomonads*.
2014: **Saray Santamaría Hernando**, Characterization of an extracellular heme peroxidase from *Pseudomonas putida*: its role in oxidative stress resistance and biocontrol.

Masters (last 5 years only)

- 2022: **Andrea Lozano Montoya**, Identificación de la función de quimiorreceptores de *Pseudomonas aeruginosa*.
2020: **Andrea Domínguez Donoso**, Chemotactic properties of *Pseudomonas aeruginosa* PAO1 towards amino acids and other compounds of interest.
2020: **Blanca Palmero Casanova**, Comportamiento quimiotáctico de la cepa probiótica *Escherichia coli* Nissle 1917.
2019: **Ana Tajuelo Moreno Palancas**, Evaluación de las propiedades quimiotácticas de *Pseudomonas aeruginosa* hacia fuentes nutricionales y otros compuestos de interés.
2018: **Francisco García Montoya**, Caracterización de las propiedades quimiotácticas de la bacteria fitopatógena *Pectobacterium atrosepticum* SCRI1043.
2018: **Marina Navarrete López**, Identificación de nuevas fuentes de carbono y nitrógeno que ejercen capacidad quimiotáctica sobre *Pseudomonas putida* KT2440.