

CURRICULUM VITAE

Ferran Garcia-Pichel, Ph.D

Founding Director, Center for Fundamental and Applied Microbiomics, and
Virginia M. Ullman Professor for the Environment, School of the Life Sciences

Arizona State University, Tempe, AZ85287

Phone: (480) 9651457 Fax: (408) 965 0098 ferran@asu.edu Version 5/2019

WEBSITES:

garcia-pichel.lab.asu.edu
<https://biodesign.asu.edu/cfam>

GENERAL

Academic Degrees

- 1992: Ph.D. in Biology (Microbiology). University of Oregon.
- 1988: Master's of Arts. University of Oregon.
- 1986: Licenciatura con Grado (Master's in Science), Autonomous University of Barcelona, Spain

Academic Posts

- 1992 Post-Doc, University of Oregon.
- 1993-1995, Post-Doctoral Fellow. Max Planck Institute for Marine Microbiology, Germany
- 1996-1999, Associate Researcher. Max Planck Institute for Marine Microbiology, Germany
- 1998, Visiting Professor, Dept. of Chemistry, University of Las Palmas de Gran Canaria, Spain
- 2000- 2002, Assistant Professor, Department of Microbiology, Arizona State University.
- 2002- 2006, Associate Professor, Department of Microbiology/ School of the Life Sciences, ASU
- 2005-2006 Visiting Professor (CSIC) Centre d'Investigacions Marines (Barcelona, Spain)
- 2006, present, Professor, School of the Life Sciences, ASU
- 2011-present Affiliated Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA.

Academic Leadership

- 2006- 2010, Director, Graduate Program in Microbiology, ASU
- 2003-2013. Supervisory Board Member, NIH/EPA Superfund Project, University of Arizona

- 2006-2012 Editor, FEMS Microbiology Reviews
- 2008-2009 President, American Society for Microbiology, Arizona/Nevada Branch
- 2009-2011 Associate Dean (Facilities, School of Life Sciences)
- 2011-2013 Associate Dean/Director for Research and Training Initiatives, School of Life Sciences
- 2011-2016 ASU POC for the Lawrence Berkeley National Lab/ASU Co-laboratory
- 2014-2016 ASU POC for co-laboratory between ASU & Deutsches Elektronen-Synchrotron (DESY)
- 2015-present Founding Director, Center for Applied and Fundamental Microbiomics, ASU
- 2013- 2018 Dean of Natural Sciences, College of Liberal Arts and Sciences, ASU
- Research Centers Established at ASU:
 - ASU REACH (Research and Education Advancing Children's Health), 2014
 - Institute for Interdisciplinary Salivary Science Research, 2013
 - ASU Center for Evolution and Medicine, 2014
 - Center for Applied Structural Discovery, 2014
 - Center for Molecular Design and Biomimetics, 2013
 - Biodiversity Knowledge Integration Center (BioKIC) (2015)
 - Center for Applied and Fundamental Microbiomics (2015)

Languages

Catalan (Reads, Speaks, Writes), Spanish (R, S, W), English (R, S, W), German (S, R, W), French, (S, R)

Awards and Honors

- Fulbright Scholar (1986-1988)
- Harold T. Bold Award in Phycology (1991)
- Max-Planck Society Post-Doctoral Stipend (1992-1994)
- 2002 Henry W. Menn Memorial Award, Skin Cancer Foundation
- Outreach efforts singled by NSF's director in Report to Congress (2004)
- 2004 Named "Faculty Exemplar" by ASU's President.
- 2009 American Society for Microbiology Distinguished Lecturer (2010-2012)
- 2010 Elected Fellow, American Academy of Microbiology
- 2013 Elected 2014 Neil Welker Award Lecturer in Prokaryotic Biology
- 2014 Named Virginia M. Ullman Professor for the Environment
- 2015 Inducted Honorary Member, Sigma Delta Pi (National Collegiate Hispanic Honor Society)
- 2018 Finalist, Arizona Governor's Innovation Award

- 2019 Lifetime Achievement Award, Founding Society for Biocrust Research

RESEARCH

Research Funding

Current:

- NSF (coPI; 2019-2021). Long-Term Ecological Research Site: Long-Term Research at The Jornada Basin
- NSF- ERC Engineering Research Center for Bio-Mediated and Bio-Inspired Geotechnics. (Co-PI; 2016 - 2021 \$925,000 to own project).

Past

- DFG (German Science Foundation). 4 -year project Grant (1995-1999): "Molecular and traditional cyanobacterial biodiversity in hypersaline environments"
- EU Biotechnology Panel, 3-year grant (1996-1999): "Biodiversity: cyanobacteria, systematic and applied aspects". €300,000
- USDA (2000-2003). Microscale Carbon and Nitrogen cycling in biological desert crusts. \$120,000
- NASA (2000-2002): Ecogenomics: molecular biological analyses of hypersaline microbial communities. \$120,000
- NASA (with 7 other PI's): (2000-2003). Evolution of microbe-based ecosystems: desert springs as analogues for the early development and stabilization of ecosystems. \$1,317, 666
- NASA (2003-2005): Genomic approaches to the Geomicrobiology of intertidal evaporites (\$103,000)
- Ministry Of Science & Education (Spain)-Faculty Mobility Program Fellowship, 2005 (€40,000)
- NRI – USDA (one co-PI; 2003-2006). Microscale Carbon and Nitrogen cycling in biological desert crusts (renewal). \$280,000
- NSF-BIO (2002-2008): Prokaryotic diversity of biological soil crusts in arid lands of North America. \$491,000
- NSF-BIO (2005-2009). Fungal populations in biological soil crusts (\$34,867)
- NSF-GEO (2003-2009). Mechanism of carbonate dissolution by cyanobacteria (\$504,000)
- NASA (with 1 co-PI; 2005-2009). Geomicrobiology and fossil biosignatures of cold spring carbonates, Mono Lake and the Pleistocene Lahonton Basin (CA) (\$399,146)
- SFAZ-SRG (7 co-PI; 2007-2009) Cyanobacteria for generating solar-powered carbon neutral and cost-effective biodiesel \$2,200,000
- NSF-GEO (with 2 co-PI; 2005-2009) Biogeochemistry Of Desert Crust Communities: Organic Carbon And Trace Metal Dynamics (\$389,331)
- NSF-BIO (sole PI; 2007-2011): ROA Microbial Distributions in North American Biological Soil Crusts: Exploring the Great Divide \$32,000

- NSF-EDU (14 co-PIs; 2005-2009) Minority Graduate Education at Mountain State Alliance (\$10,000,000)
- NRI - US Dept. of Agriculture- (sole PI; 2007-2011). Functional Constraints in Microscale Carbon and Nitrogen Cycling by Biological Soil Crusts. \$365,000
- NSF-BIO (sole PI; 2007-2013): Microbial Distributions in North American Biological Soil Crusts: Exploring the Great Divide \$650,000
- DOE (co PI; administered through LBNL). LDRD Biological arid soil crust carbon cycling (BASiC-C) \$1,500,000.
- US/IL Binational Science Foundation (coPI; 2011-2013). US\$117,000 (\$30,000 to ASU)
- Smithsonian Tropical Res. Inst. /ASU Collaborative (2011-2013). \$146,100
- NSF-GEO (PI; 2012-2016). Intracellular metal pumping in mineral excavation by microbes \$449,861.
- European Union, Marie Curie Postdoctoral Scholarship Support (co-PI; €23,000; approx. US\$30,000); 2013-2016
- NSF-BIO (sole PI; 2012-2016) Regulation of microbial sunscreen biosynthesis. \$715,682
- DoD/DoE/EPA (coPI; 2013-2018). Achieving dryland restoration through the deployment of enhanced biocrusts to improve soil stability, fertilization and native plant recruitment \$2,200K (\$860K to ASU)
- NSF-BIO (co-PI; 2013-2018) Photodegradation in Deserts: litter optical and structural consideration \$1,002,500

Endowments & Industry Partnerships

- Swette's Fusion Fund: Designer Organisms and Fuel Cells for Biohydrogen Production (co-PI, 1 of 3; 2007-2011): \$3,000,000 approx.
- British Petroleum: (7 co-PI; 2007-2009) Cyanobacteria for generating solar-powered carbon neutral and cost-effective biodiesel \$2,500,000

Patents

- U.S. Patent No. 5461070. 1995 (with WH Gerwick, R.S Jacobs, RW Castenholz, KJS Grace, PJ Proteau and J. Rossi). Indole alkaloids useful as UV protective and anti-inflammatory agents.

Publications

H-index = 66; Citations > 14000

Scholarly journals (peer-reviewed only)

1. **Garcia-Pichel, F.** (1989). Rapid bacterial swimming measured in swarming cells of *Thiovulum majus* J. Bacteriol. 171: 3560-3563.

2. **Garcia-Pichel, F.** and R.W. Castenholz (1990). Comparative anoxygenic photosynthetic capacity in 7 strains of a thermophilic cyanobacterium. *Arch. Microbiol.* 153: 344-351.
3. **Garcia-Pichel, F.** and R.W. Castenholz (1991). Characterization and biological implications of scytonemin, a cyanobacterial sheath pigment. *J. Phycol.* 27: 395-409
4. **Garcia-Pichel, F.,** N.D. Sherry and R.W. Castenholz (1992). Evidence for a UV sunscreen role of the extracellular pigment Scytonemin in the cyanobacterium *Chlorogloeopsis* sp. *Photochem. Photobiol.* 56:17-26.
5. **Garcia-Pichel, F.** and Castenholz R.W. (1993). Occurrence of UV absorbing, mycosporine-like, compounds among cyanobacterial isolates and an estimate of their screening capacity. *Appl. Environ. Microbiol.* 59:163-169.
6. **Garcia-Pichel, F.,** C. Wingard, RW Castenholz (1993) Evidence regarding the UV sunscreen role of a mycosporine-like compound in the cyanobacterium *Gloeocapsa* sp. *Appl. Environ. Microbiol.* 59:170-176.
7. Proteau, P. J., W. H. Gerwick, F. **Garcia-Pichel** and R.W. Castenholz. (1993) The structure of Scytonemin, an ultraviolet sunscreen pigment from the sheaths of cyanobacteria. *Experientia* 49: 825-829
8. **Garcia-Pichel, F.,** M. Mechling and R. W.Castenholz (1994) Diel migrations of microorganisms in a hypersaline microbial mat. *Appl. Environ. Microbiol.* 60: 1500-1511
9. **Garcia-Pichel, F.** (1994). A model for internal self-shading in planktonic microorganisms and its implications for the usefulness of sunscreens. *Limnol. Oceanogr.* 39:1704-1717.
10. **Garcia-Pichel, F.** (1995). A scalar irradiance microprobe for the measurement of UV radiation at high spatial resolution. *Photochem. Photobiol.* 61:248-254
11. **Garcia-Pichel, F.** and B. Bebout (1996) Penetration of ultraviolet radiation into shallow water sediments: high exposure for photosynthetic microbial communities. *Mar. Ecol. Progress Series* 131: 257-262
12. **Garcia-Pichel, F.** (1996). The absorption of ultraviolet radiation by microalgae: simple optics and photobiological implications. *Sci. Mar.* 60: 73-79
13. Bebout B. and F. **Garcia-Pichel** (1996). Ultraviolet B induced cyanobacterial migrations in a hypersaline microbial mat. *Appl. Environ. Microbiol.* 61:4215-4222
14. **Garcia-Pichel, F.** and J. Belnap. (1996). Microenvironments and microscale productivity of cyanobacterial desert crusts. *J. Phycol.* 32:774-782
15. **Garcia-Pichel, F.,** L. Prufert-Bebout and G. Muyzer. (1996) Phenotypic and phylogenetic analyses show *Microcoleus chthonoplastes* to be a cosmopolitan cyanobacterium. *Appl. Environ. Microbiol.* 62 3284-3291
16. Karsten, U, and F. **Garcia-Pichel** (1996). Carotenoids and mycosporine-like amino acid compounds in members of the genus *Microcoleus* (Cyanobacteria): a chemosystematic study. *System. Appl. Microbiol.* 19 285-294
17. Camacho, A., F. **Garcia-Pichel,** E. Vicente and R. W. Castenholz (1996). Adaptation to sulfide and to the underwater light field in three cyanobacterial isolates from lake Arcas (Spain) *FEMS Microbiol. Ecol.* 21 293-301

18. Nübel, U., F. **Garcia-Pichel**, G. Muyzer (1997) PCR primers to amplify 16S rRNA genes from Cyanobacteria. *Appl. Environ. Microbiol.* 63 3327-3332
19. Büdel, B, U. Karsten and F. **Garcia-Pichel** (1997) Ultraviolet-absorbing scytonemin and mycosporine-like amino acid derivatives in exposed, rock inhabiting cyanobacterial lichens. *Oecologia* 112: 165-172
20. **Garcia-Pichel**, F. (1998). Solar Ultraviolet and the evolutionary history of cyanobacteria. *Origins Life Evol. Biosphere* 28: 321-347
21. **Garcia-Pichel**, F., U. Nübel and G. Muyzer (1998). The phylogeny of unicellular, extremely halotolerant cyanobacteria. *Arch. Microbiol* 169: 469-482
22. Karsten, U., J Maier, and F **Garcia-Pichel** (1998). Seasonal variation in UV-absorbing compounds in cyanobacterial mats from an intertidal mangrove flat. *Aquat Microb Ecol* 16:37-44
23. **Garcia-Pichel**, F., M. Kühl, U. Nübel, and G. Muyzer (1998). Salinity-dependent limitation of photosynthesis and oxygen exchange in microbial mats. *J Phycol* 35: 227-238
24. Nübel, U, F. **Garcia-Pichel**, M.Kühl and G Muyzer (1998). Quantifying microbial diversity: morphotypes, 16S rRNA genes, and carotenoids of oxygenic phototrophs in microbial mats. *Appl Environm Microbiol* 65:422-430
25. Sommaruga, R, and F. **Garcia-Pichel** (1999). UV- absorbing mycosporine-like compounds in planktonic and benthic organisms from a high-mountain lake. *Arch. Hydrobiol* 144:3 255-269
26. Nübel, U, F. **Garcia-Pichel**, M Kuhl, G Muyzer (1999) Spatial scale and the diversity of benthic cyanobacteria and diatoms in a salina. *Hydrobiologia* 401:381-391
27. Portwich, A., and F. **Garcia-Pichel** (1999) Ultraviolet and osmotic stresses induce and regulate the synthesis of mycosporines in the cyanobacterium *Chlorogloeopsis* PCC 6912. *Arch Microbiol* 172: 187-192
28. Wynn-Williams, D.D., H.G.M. Edwards and F **Garcia-Pichel**. (2000) Functional biomolecules of Antartic stromatolitic and endolithic cyanobacterial communities. *Eur. J. Phycol.* 34:381-391
29. Nübel, U, F. **Garcia-Pichel** and G Muyzer (2000) The halotolerance and phylogeny of cyanobacteria with tightly coiled trichomes (*Spirulina* Turpin) and the description of *Halospirulina tapeticola* gen. nov. et sp. nov. *Int. J. System.Evol. Microbiol.* 50: 1265-1277
30. Nübel, U, F. **Garcia-Pichel**, E Clavero and G Muyzer (2000) Matching molecular diversity and ecophysiology of benthic cyanobacteria and diatoms in communities along a salinity gradient. *Environm. Microbiol.* 2: 217-226
31. Portwich, A and F. **Garcia-Pichel** (2000) A novel prokaryotic UVB photoreceptor in the cyanobacterium *Chlorogloeopsis* PCC6912. *Photochem. Photobiol.* 71: 493-499
32. Edwards, HGM, F. **Garcia-Pichel**, EM Newton, DD Wynn-Williams (2000) Vibrational spectroscopy study of scytonemin, the UV-protective cyanobacterial pigment. *Spectrochimica Acta, A*: 56:193-200
33. Clavero, E, M. Hernández-Mariné, J. Grimalt and F. **Garcia-Pichel** (2000). Ecophysiology of salinity tolerance in diatoms from hypersaline environments. *J Phycol* 36 1021-1034
34. Pringault, O, and F. **Garcia-Pichel** (2000). Monitoring of oxygenic and anoxygenic photosynthesis in a unicyanobacterial biofilm grown on benthic gradient chambers. *FEMS Microbiol. Ecol* 33:251-258.

35. Abed, R, and F. **Garcia-Pichel** (2001). Long-term compositional changes after transplant in a microbial mat cyanobacterial community revealed with a polyphasic approach. *Environ. Microbiol.* 3: 53-62
36. **Garcia-Pichel**, F, A López-Cortés, U Nübel (2001) Phylogenetic and morphological diversity of cyanobacteria in soil desert crusts from the Colorado Plateau. *Appl. Environ. Microbiol* 67:1902-1910
37. **Garcia-Pichel** F and O Pringault (2001). Cyanobacteria track the water in desert soils. *Nature* 413, 380 - 381
38. Clavero, E, **Garcia-Pichel**, F, Grimalt, J.O., Hernández-Mariné, M (2001) Behaviour of diatoms apparently adapted to salinity. The case of *Climaconeis scopulorioides* and *Amphora aff. hyalina* *Nova Hedwigia* 123:453-463
39. Abed R, **Garcia-Pichel** F, Hernández-Mariné, M (2002). Polyphasic characterization of moderately halophilic, moderately thermophilic, filamentous cyanobacteria of very narrow trichomes: *Halomicronema excentricum* gen. novum, sp. nova. *Arch. Microbiol* 177:361-370
40. Abed, R MM, Nimer Safi, Jürgen Köster, Jürgen Rullkotter and Ferran **Garcia-Pichel** (2002). Microbial Diversity of a Polluted Microbial Mat and Its Community Changes Following Degradation of Petroleum Compounds. *Appl Environ Microbiol* 68:1674-1683
41. López-Cortés, A, **Garcia-Pichel**, F, Nübel, U., and R Vázquez-Juárez (2002.) Cyanobacterial diversity in extreme environments in Baja California, Mexico: a polyphasic study. *Int. Microbiol* 4: 227-236
42. **Garcia-Pichel**, F. B. Wade and J Farmer (2002). Jet-suspended, calcite ballasted cyanobacterial waterwarts in a desert spring. *J. Phycol* 38:420-428
43. Abed, RMM, W Schoenhuber, R. Amann, F **Garcia-Pichel**. (2002) Picobenthic cyanobacterial populations revealed by RNA targeted *In situ* hybridization *Environm. Microbiol.* 4:375-382
44. Bebout, B, and 14 others (2002) Long term manipulations of intact microbial mats in a greenhouse collaborative simulations of Earth-s present and past field environments. *Astrobiol.* 2: 383-400
45. Wade, B.D. and F **Garcia-Pichel** (2003). Evaluation of DNA extraction methods for molecular analyses of microbial communities in modern microbialites. *Geomicrobiol. J.* 40: 1-134
46. Portwich, A and F **Garcia-Pichel** (2003). Biosynthetic pathway of mycosporines in the cyanobacterium *Chlorogloeopsis* PCC 6912. *Phycologia* 42:384-392
47. **Garcia-Pichel**, F., Johnson, S.L, Youngkin,D. and Belnap,J. (2003). Small-scale vertical distribution of bacterial biomass and diversity in biological soil crusts from arid lands in the Colorado Plateau. *Microbial Ecology* 46:312-321
48. **Garcia-Pichel**, F, J. Belnap, S. Neuer, F Schanz (2003) Estimates of global cyanobacterial biomass and its distribution. *Archive for Hydrobiology/Algological Studies* 109: 213-228
49. Abed, R., Golubic, S., **Garcia-Pichel**, F., Camoin, G. and Lee Seong-Joo (2003). Identity and speciation in marine benthic cyanobacteria: The *Phormidium*- complex. *Archive for Hydrobiology/Algological Studies*, 109: 35-56
50. Abed, R, S. Golubic, F. **Garcia-Pichel**, and G Camoin (2003). Characterization of microbialite forming cyanobacteria in a tropical lagoon; Tikehau Atoll, French Polynesia. *Journal of Phycology.* 39: 862-873
51. **Garcia-Pichel**, F., Al Horani, F., Ludwig, R., Farmer, J., Wade, B. (2004) Balance between calcification and bioerosion in modern stromatolites. *Geobiology* 2:49-57

52. Pringault, O, **Garcia-Pichel**, F. (2004). Hydrotaxis of cyanobacteria in desert crusts. *Microbial Ecology* 47:363-373
53. Smith, S.M., Abed, R.M.M. and F. **Garcia-Pichel** (2004) Biological soil crusts of sand dunes in Cape Cod National Seashore, Massachusetts, USA. *Microbial Ecology* 28:200-208
54. Johnson, S.L., Budinoff, C.R., Belnap, J., **Garcia-Pichel**, F (2005). Relevance of ammonium oxidation in biological soil crust communities. *Environmental Microbiology* 7:1-12
55. Rothrock, M and F **Garcia-Pichel** (2005) Microbial diversity of benthic mats along a tidal desiccation gradient. *Environmental Microbiology* 7: 593-601
56. Elser JJ JH Schampel, F **Garcia-Pichel**, BD Wade, V Souza, L Eguiarte, A Escalante and JD Farmer (2005) Effects of phosphorus enrichment and grazing snails on modern stromatolitic microbial communities. *Freshwater Biology* 50:1808-1825
57. Reddy SG and F **Garcia-Pichel** (2004) *Dyadobacter crusticola* sp. nov. isolated from biological soil crusts in the Colorado Plateau, USA. *Journal of Systematic and Evolutionary Microbiology* 55 1295-1299
58. Nagy, M, Perez, A and F **Garcia-Pichel** (2005) The prokaryotic diversity of biological soil crusts in the Sonoran Desert of Arizona. *FEMS Microbiol Ecol* 54: 233-245
59. **Garcia-Pichel**, F, (2006) Plausible mechanisms for the boring on carbonates by microbial phototrophs. *Sedimentary Geology* 185: 205-213
60. Chacon, E, E Berrendero. and F **Garcia-Pichel** (2006). Biogeological signatures of microboring cyanobacterial communities in marine carbonates from Cabo Rojo, Puerto Rico. *Sedimentary Geology* 185:215-228
61. Reddy, SG, and F **Garcia-Pichel** (2006) The community and phylogenetic diversity of biological soil crusts in the Colorado Plateau studied by molecular fingerprinting and intensive cultivation. *Microbial Ecology* 52: 345-357
62. Reddy, SG, M. Nagy and F **Garcia-Pichel** (2006) *Belnapia moabensis* gen. nov. et sp. nov., an oligotrophic bacterium from biological soil crusts in the Colorado Plateau, USA. *Int. J. Syst. Evol. Microbiol.*, 2006, **56**, 51-58
63. Bates, S, Reddy S G, and F **Garcia-Pichel** (2006) *Exophiala crusticola* anam. nov. (affinity Herpotrichiellaceae), a novel black yeast from biological soil crusts in the western United States. *International Journal of Systematic and Evolutionary Microbiology* 56: 2697-2702.
64. Johnson, S.L., S. Neuer and F. **Garcia-Pichel** (2007) Export of nitrogenous compounds due to incomplete cycling within biological soil crusts of arid lands. *Environmental Microbiology*. Vol. 9: 680-689.
65. Reddy, G.S.N. and **Garcia-Pichel**, F. (2007) *Sphingomonas mucosissima* sp. nov. and *Sphingomonas desiccabilis* sp. nov., from biological soil crusts in the Colorado Plateau, USA. *Int. J. Syst. Evol. Microbiol*, 57, 1028-1034.
66. Yeager, C M, Kornosky, J L, Morgan, R L, Cain, E C, Belnap, J, **Garcia-Pichel**, F and Kuske C R (2007). Three distinct clades of cultured heterocystous cyanobacteria constitute the dominant N-fixing members of biological soil crusts of the Colorado Plateau, USA. *FEMS Microbiol Ecol* 60 (1): 85-97
67. G. S. N. Reddy, R. M. Potrafka, and F. **Garcia-Pichel** (2007) *Modestobacter versicolor* sp. nov., an actinobacterium from biological soil crusts that produces melanins under oligotrophy, with emended

- descriptions of the genus *Modestobacter* and *Modestobacter multiseptatus* Mevs et al. 2000 *Int J Syst Evol Microbiol* 57(9): 2014 - 2020.
68. Soule, T., Stout, V., Swingley, W. D., Meeks, J.C. and F. **Garcia-Pichel** (2007) Molecular Genetics and Genomic Analysis of Scytonemin Biosynthesis in *Nostoc punctiforme* ATCC 29133. *J Bacteriol.* 189: 4465-4472
 69. Chorover, J., R Kretschmar, F **Garcia-Pichel**, D Sparks (2007) Soil Biogeochemical Processes within the critical zone. *Elements* 3: 321-326.
 70. Sa, E., **Garcia-Pichel**, F. Oms, O., Valles, F. Gasol, J.M. (2008) Paisaje submarino en un pinar mediterráneo. *Investigación y Ciencia*: 384 2-3
 71. Reddy, G.S.N., and F. **Garcia-Pichel** (2009) Description of *Patulibacter americanus* sp. nov., isolated from biological soil crusts, emended description of the genus *Patulibacter* Takahashi et al. 2006 and proposal of *Solirubrobacterales* ord. nov. and *Thermoleophilales* ord. nov. *Int J Syst Evol Microbiol* 59: 87-94
 72. Bates, S.T. and F. **Garcia-Pichel** (2009). A culture-independent study of free-living fungi in biological soil crusts of the Colorado Plateau: their diversity and relative contribution to microbial biomass *Environmental Microbiology* 11, 56-67
 73. Beraldi-Campesi, H, Hartnett, H, Anbar, A, Gordon, G, and F. **Garcia-Pichel**, F (2009) Effects of biological soil crusts on soil elemental concentrations; implications for biogeochemistry and as traceable biosignatures of ancient life on land. *Geobiology* 7:348-359
 74. Soule, T, Palmer, K, Gao, Q, Potrafka, R, Stout, V and F **Garcia-Pichel** (2009) A comparative genomics approach to understanding the biosynthesis of the sunscreen scytonemin in cyanobacteria *BMC Genomics* 10: 336. doi:10.1186/1471-2164-10-336
 75. Soule, T., I.J Anderson., S.L. Johnson, S.T Bates, (2009) Archaeal populations in biological soil crusts from arid lands *Soil Biol Biochem* 41 2069-2074
 76. **Garcia-Pichel**, F and MF Wojciechowski (2009). The Evolution of a Capacity to Build Supra-Cellular Ropes Enabled Filamentous Cyanobacteria to Colonize Highly Erodible Substrates. *PLoS ONE* 4(11): e7801.
 77. Soule, T., F. **Garcia-Pichel**, V. Stout (2009) Expression patterns associated with the biosynthesis of the sunscreen scytonemin in *Nostoc punctiforme* ATCC 29133. *J Bacteriol* 191: 4639-4646
 78. Bates, S.T. Nash T.H., Sweat K. G and F. **Garcia-Pichel** (2010) Fungal communities of lichen-dominated biological soil crusts: diversity, relative microbial biomass, and their relationship to disturbance and crust cover. *J Arid Environments* 74: 1192-1199
 79. Beraldi-Campesi, H and **Garcia-Pichel** (2010) Biogenicity of roll-up structures and their potential as biosignatures of ancient life on land. *Geobiology* 9(1):10-23
 80. **Garcia-Pichel**, F, Ramirez-Reinat E. Gao, Q (2010) Microbial excavation of carbonates powered by P-type ATPase-mediated transcellular calcium transport. *PNAS* 107: 21749-21754
 81. Bates, S.T. Nash T.H. F. **Garcia-Pichel** (2010) Fungal components of biological soil crusts: insights from culture-dependent and culture-independent studies. *Bibliotheca Lichenologica* 105: 197-210.
 82. Gao,Q. and F. **Garcia-Pichel** (2011) A unique synthetase involved in the last biosynthetic step of the imino-mycosporine, shinorine, in *Nostoc punctiforme* ATCC29133. *J Bacteriol* 193:5923-5928

83. Gao, Q and F **Garcia-Pichel** (2011). Microbial Ultraviolet Sunscreens. *Nature Reviews Microbiol.* 9: 791-802
84. Starkenburg, SR, Reitinga K, Freitas T, Johnson SL, Chain, PSG, **Garcia-Pichel**, F, Kuske CR (2011). The Genome of the Cyanobacterium *Microcoleus vaginatus FGP-2*, a Photosynthetic 2 Ecosystem Engineer of Arid Land Soil Biocrusts Worldwide . *J Bacteriol.* 193: 4569-4570
85. Strauss, S L, Day T.A., **Garcia-Pichel** (2012) Nitrogen cycling in biological soil crusts across biogeography regions in the Southwestern United States. *Biogeochemistry* 108: 171-183
86. Rossi, F, Potrafka, R, **Garcia-Pichel**, F, and R. de Philippis (2012). Role of the exo-polysaccharides in enhancing hydraulic conductivity of biological soil crusts. *Soil Biology and Biochemistry* 46:33-40
87. Bates, S.T., Nash T, and F. **Garcia-Pichel** (2012) Patterns of diversity for fungal assemblages of biological soil crusts from the southwestern United States. *Mycologia* 104:353-361
88. Beraldi-Campesi, H., Arenas, C., **Garcia-Pichel**, F., Arellano-Aguilar, O., Auqué, L., Vázquez-Urbez, M., Sancho, C., Oscar, C and S. Ruiz-Velasco (2012) Benthic bacterial diversity from freshwater tufas of the Iberian Range (Spain). *FEMS Microbiol Ecol* 80: 363-379
89. Ramirez-Reinat, E, and F. **Garcia-Pichel** (2012) Characterization of a marine cyanobacterium that bores into carbonates and the redescription of the genus *Mastigocoleus*. *J Phycol.* 48 740-749
90. Ramirez-Reinat, E, and F. **Garcia-Pichel** (2012) Ca²⁺-ATPase mediated carbonate dissolution is prevalent among cyanobacterial euendoliths. *Appl Environm. Microbiol.* 78:7-13
91. Strauss, SL, **Garcia-Pichel**, F, Day TA (2012) Soil microbial carbon and nitrogen transformations at a glacial foreland on Anvers Island, Antarctic Peninsula. *Polar Biology* 35:1459-1457
92. Kothari, A, F. **Garcia-Pichel** (2012) Diversity in hydrogen evolution from bidirectional hydrogenases in cyanobacteria from terrestrial, freshwater and marine intertidal environments *Journal of Biotechnology* 162:105-114
93. Reddy G S N, **Garcia-Pichel** (2012) Description of *Hymenobacter arizonensis* sp. nov. from the southwestern arid lands of the United States of America. *Antonie van Leeuwenhoek* 103.2 (2013): 321-330.
94. Soule, T, Gao, Q, Stout V, F. **Garcia-Pichel** (2012) The Global Response of *Nostoc punctiforme* ATCC 29133 to UVA Stress, Assessed in a Temporal DNA Microarray Study. *Photochem Photobiol* 89:415-423
95. Rajeev L, U Nunes da Rocha, N Klitgord, Eric G. Luning, Julian Fortney, Seth P. Axen, Patrick M. Shih, Nicholas J. Bouskill, Benjamin P. Bowen, Cheryl Kerfeld, Ferran **Garcia-Pichel**, Eoin L. Brodie, Trent R. Northen, Aindrila Mukhopadhyay (2013) Dynamic cyanobacterial response to hydration and dehydration in a desert biological soil crust. *ISME Journal* DOI:10.1038/ismej.2013.83
96. **Garcia-Pichel**, F, V. Loza, Y. Marusenko, P Mateo, R.M. Potrafka (2013). Temperature determines the continental-scale distribution of keystone species in topsoil microbial communities. *Science* 340: 1574-1577 DOI: 10.1126/science.1236404
97. Marusenko Y, S.T. Bates, I Anderson. S Johnson, T Soule, F. **Garcia-Pichel** (2013) Ammonia-oxidizing archaea and bacteria are structured by geography in biological soil crusts across North American arid lands. *Ecological Processes* 2:9 10.1186/2192-1709-2-9
98. Baran R, Ivanova N, Jose N, **Garcia-Pichel** F, Kyrpides N, Gugger M, Trent Northen T. (2013) Functional genomics of novel secondary metabolites from diverse cyanobacteria using untargeted metabolomics. *Marine Drugs* 2013, 11, 3617-3631; doi:10.3390/md11103617

99. Kothari, A, Vaughn, M, **Garcia-Pichel**, F. (2013) Comparative genomic analyses of the cyanobacterium, *Lyngbya aestuarii* BL J, a powerful hydrogen producer. *Front Microbiol.* 4:363. doi: 10.3389/fmicb.2013.00363.
100. Beraldi-Campesi, H., J. Farmer and F. **Garcia-Pichel** (2014) Modern terrestrial sedimentary biostructures and their fossil analogs in Mesoproterozoic subaerial deposits. *PALAIOS* 29(2):45-54. 2014; doi: <http://dx.doi.org/10.2110/palo.2013.084>.
101. Marusenko, Y, Hall S., **Garcia-Pichel** (2014) Ammonia-oxidizing archaea respond positively to inorganic nitrogen addition in desert soils. *FEMS Microbiology Ecology* 91(2): 1-11 <http://dx.doi.org/10.1093/femsec/fiu023>
102. Kothari A, Parameswaran P, F **Garcia-Pichel** (2014) Powerful Fermentative Hydrogen Evolution of Photosynthate in the Cyanobacterium *Lyngbya aestuarii* BL J Mediated by a Bidirectional Hydrogenase *Front Microbiol.* 2014; 5: 680. Published online Dec 10, 2014. doi: [10.3389/fmicb.2014.00680](http://dx.doi.org/10.3389/fmicb.2014.00680)
103. Gundlapally S N Reddy and F. **Garcia-Pichel** (2015) Description of *Pseudomonas asuensis* sp. nov. from biological soil crusts in the Colorado Plateau, United States of America. *J Microbiol* 53(1):6-13. doi: 10.1007/s12275-015-4462-4
104. Baran R, Eoin L. Brodie, Jazmine Mayberry-Lewis, Ulisses Nunes Da Rocha, Benjamin P. Bowen, Ulas Karaoz, Hinsby Cadillo-Quiroz, Ferran **Garcia-Pichel**, Trent R. Northen (2015) Exometabolite niche partitioning among sympatric soil bacteria. *Nature Communications* 6, 8289 doi:10.1038/ncomms9289
105. Nunes da Rocha, U., H. Cadillo-Quiroz, U. Karaoz, L. Rajeev, N. Klitgord, S. Dunn, V. Truong, M. Buenrostro, B.P. Bowen, F. **Garcia-Pichel**, A. Mukhopadhyay, T. R. Northen and E. L. Brodie (2015) Isolation of a significant fraction of non-phototroph diversity from a desert Biological Soil Crust. *Frontiers in Microbiology* 6: 277. doi: 10.3389/fmicb.2015.00277
106. Pepe-Ranney C, Koechli, R. Potrafka, C. Andam, E. Eggleston, F. **Garcia-Pichel**, D.H. Buckley (2015). Non-cyanobacterial diazotrophs dominate dinitrogen fixation in biological soil crusts at early crust formation *ISME J.* (doi:10.1038/ismej.2015.106)
107. Hoffmann, D., J. Maldonado, M. F. Wojciechowski and F. **Garcia-Pichel** (2015) Hydrogen export from intertidal cyanobacterial mats: sources, fluxes and the influence of community composition. *Environm Microbiol* doi:10.1111/1462-2920.12769
108. Couradeau, E., Karaoz U., HsiaoChien L., Nunes da Rocha U., Northen T., Brodie E., **Garcia-Pichel** F. (2016) Bacteria increase arid land soil surface temperature through the production of sunscreens *Nature Communications* 7, Article number: 10373 doi:10.1038/ncomms10373
109. Guida BS, **Garcia-Pichel** F. 2016. Draft genome assembly of a filamentous euendolithic (true boring) cyanobacterium, *Mastigocoleus testarum* strain BC008. *Genome Announc* 4(1):e01574-15. doi:10.1128/genomeA.01574-15.
110. Ferreira, D and F. **Garcia-Pichel** (2016) Mutational studies of putative biosynthetic genes for the cyanobacterial sunscreen scytonemin in *Nostoc punctiforme* ATCC 29133. *Frontiers in Microbiology.* *Frontiers in Microbiology* 7: 735 doi: [10.3389/fmicb.2016.00735](http://dx.doi.org/10.3389/fmicb.2016.00735)
111. Guida B. and **Garcia-Pichel**. F. (2016). Extreme cellular adaptations and cell differentiation required for carbonate excavation by a cyanobacterium. *Proc Natl Acad Sci U S A.* 17;113(20):5712-7. doi: 10.1073/pnas.1524687113

112. Velasco Ayuso S., Giraldo Silva A., Nelson C.J. Barger NN, and **Garcia-Pichel F** (2017) Microbial nursery production of high-quality biological soil crust biomass for restoration of degraded dryland soils. *Appl. Environm. Microbiol* 83: 3 e02179-16
113. Couradeau, E., Roush, D., Guida, B. S., and Garcia-Pichel, F. (2017) Diversity and mineral substrate preference in endolithic microbial communities from marine intertidal outcrops (Isla de Mona, Puerto Rico), *Biogeosciences*, 14, 311-324, doi:10.5194/bg-14-311-2017
114. Zhou X, Smith H, Giraldo Silva A, Belnap J, **Garcia-Pichel F** (2016) Differential Responses of Dinitrogen Fixation, Diazotrophic Cyanobacteria and Ammonia Oxidation Reveal a Potential Warming-Induced Imbalance of the N-Cycle in Biological Soil Crusts. *PLoS ONE* 11(10): e0164932. doi:10.1371/journal.pone.0164932
115. Gundlapally, S.R. & **Garcia-Pichel, F.** (2106) Description of *Deinococcus oregonensis* sp. nov, from biological soil crusts in the Southwestern arid lands of the United States of America *Arch Microbiol* doi:10.1007/s00203-016-1273-x
116. Baran R, Lau R, Bowen BP, Diamond S, Jose N, Garcia-Pichel F, Northen TR (2017) Extensive Turnover of Compatible Solutes in Cyanobacteria Revealed by Deuterium Oxide (D₂O) Stable Isotope Probing. *ACS Chemical Biology* 12 (3), 674-681 DOI: 10.1021/acscchembio.6b00890
117. Guida, B S, Bose, M and **Garcia-Pichel, F** (2017) Carbon fixation from mineral carbonates *Nature Communications* 8, 1025 (2017) doi:10.1038/s41467-017-00703-4
118. Fernandes V, Machado de Lima N, Roush D, Collins S, Rutgers J, Garcia-Pichel F (2018), Exposure to predicted precipitation patterns decrease population size and alter community structure of cyanobacteria in biological soil crusts from the Chihuahuan Desert, *Environm. Microbiol.* 259-269. doi: 10.1111/1462-2920.13983.
119. Thomazo, C, Couradeau E, and Garcia-Pichel F (2018). Possible Nitrogen fertilization of the early Earth ocean by continental biomass. *Nat. Comm.* 9 <https://doi.org/10.1038/s41467-018-04995-y>
120. Karaoz U., Estelle Couradeau, Ulisses da Rocha, HsiaoChien Lim, Trent Northen, Ferran Garcia-Pichel, and Eoin Brodie (2018) Large blooms of Bacillales (Firmicutes) underlie the response to wetting of cyanobacterial biocrusts of varying maturity, *mBio vol. 9 no. 2 e01366-16*; doi: 10.1128/mBio.01366-16
121. Jose, NA, Lau R, Swenson TL, Klitgord N, **Garcia-Pichel, F.**, Bowen BP., Baran, R, and Northen TR (2017) Flux balance modelling to predict bacterial survival during pulsed activity events. *Biogeosciences*, 15, 2219-2229, <https://doi.org/10.5194/bg-15-2219-2018>, 2018.
122. Roush, D., Couradeau, E, Guida, B, Neuer, S, **Garcia-Pichel, F.** A New Niche for Anoxygenic Phototrophs as Endoliths (2018). *Appl. Environm. Microbiol.* DOI:10.1128/AEM.02055-17
123. Couradeau, E, Felde VJMNL, Parkinson D, Uteau D, Rochet A, Cuellar C, Winegar G, Peth S, Northen T, Garcia-Pichel F (2018). *In situ* X-ray tomography imaging of soil water and cyanobacteria from biological soil crusts undergoing desiccation. *Front. Environ. Sci.*, doi.org/10.3389/fenvs.2018.00065
124. Muñoz-Martin MA, Becerra-Absalón I, Perona E. Fernández-Valbuena, L, Garcia-Pichel, F, Mateo, P. (2018) Cyanobacterial biocrust diversity in Mediterranean ecosystems along a latitudinal and climatic gradient. *New Phytologist* <https://doi.org/10.1111/nph.15355>
125. Sorochkina K, Velasco Ayuso S, Garcia-Pichel F. (2018) Establishing rates of lateral expansion of cyanobacterial biological soil crusts for optimal restoration. *Plant and Soil*, 429 (1-2) , pp. 199-211 [10.1007/s11104-018-3695-5](https://doi.org/10.1007/s11104-018-3695-5)

126. Klicki, K, Ferreira D, Hamill D, Dirks B, Mitchell N, F **Garcia-Pichel** (2018) The Widely Conserved ebo Cluster Is Involved in Precursor Transport to the Periplasm during Scytonemin Synthesis in *Nostoc punctiforme*. mBio 9:e02266-18. <https://doi.org/10.1128/mBio.02266-18>
127. Couradeau E, Giraldo-Silva, A, De Martini, F, Garcia-Pichel, F (2019) Spatial segregation of the biological soil crust microbiome around its foundational cyanobacterium, *Microcoleus vaginatus*, and the formation of a nitrogen-fixing cyanosphere. Microbiome 7 (1) 55
128. Giraldo-Silva, A, Nelson, C, Barger, N, and **Garcia-Pichel**, F (2019) Nursing biological soil crusts: isolation, biomass production, conditioning and fitness test of indigenous cyanobacteria. Restoration Ecology <https://doi.org/10.1111/rec.12920>
129. Garcia-Pichel, F, Lombard T, Soule T, Wu S, Dunaj S, Wojciechowski MF, (2019) Timing the evolutionary advent of cyanobacteria and the later Great Oxidation Event using gene phylogenies of a sunscreen. mBio (03). pii: e00561-19. doi: 10.1128/mBio.00561-19.
130. Bethany, J., Giraldo-Silva, A., Nelson, C., Barger, N., Garcia-Pichel, F. (2019). Optimizing production of nursery-based biological soil crusts for restoration of arid land soils. Applied and Environmental Microbiology doi: 10.1128/AEM.00735-19
131. Giraldo-Silva, A, Nelson C, Penfold C, Barger NN, Garcia-Pichel, F. (2019) Effect of preconditioning to the soil environment on the performance of 20 cyanobacterial cultured strains used as inoculum for biocrust restoration. Restoration Ecology (<https://doi.org/10.1111/rec.13048>)
132. Garcia-Pichel, F, Zehr, J, Battacharya, D, Pakrasi, H (2019). What's in a name: the case of cyanobacteria J. Phycol (<https://doi.org/10.1111/jpy.12934>)
133. Antoninka A, Bowker M.A., Barger N.N., Belnap, Giraldo-Silva A, Reed SC, Garcia-Pichel, Duniway M.C (2019). Addressing barriers to improve biocrust colonization and establishment in restoration. Restoration Ecology (<https://doi.org/10.1111/rec.13052>)
134. Machado de Lima, N, Fernandes, VMC, Roush, D, Velasco-Ayuso, S, Rigonato, J, Garcia-Pichel, F and Zanini Branco, LH (2019) The compositionally distinct cyanobacterial biocrusts from the Brazilian Cerrado and their environmental drivers of community biodiversity. Frontiers in Microbiology (<https://doi.org/10.3389/fmicb.2019.02798>)
135. Faist, A. M., Antoninka, A. J., Belnap, J., Bowker, M. A., Duniway, M. C., Garcia-Pichel, F., ... & Barger, N. N. (2019). Inoculation and habitat amelioration efforts in biological soil crust recovery vary by desert and soil texture. *Restoration Ecology* <https://doi.org/10.1111/rec.13087>
136. Giraldo-Silva, A., Fernandes, V., Bethany, J., & Garcia-Pichel, F. (2020). Niche Partitioning with Temperature among Heterocystous Cyanobacteria (*Scytonema* spp., *Nostoc* spp., and *Tolypothrix* spp.) from Biological Soil Crusts. *Microorganisms*, 8(3), 396.
137. Roush, D, Garcia-Pichel, F (2020) Succession and Colonization Dynamics of Endolithic Phototrophs within Intertidal Carbonates. *Microorganisms*. 2020 Feb 5;8(2). pii: E214. doi: 10.3390/microorganisms8020214.
138. Martiny, J. B. H., Whiteson, K. L., Bohannan, B. J. M., David, L. A., Hynson, N. A., McFall-Ngai, M., ... & Bordenstein, S. (2020). The emergence of microbiome centres. *Nature microbiology*, 5(1), 2.
139. Ayuso, S. V., Giraldo-Silva, A., Barger, N. N., & Garcia-Pichel, F. (2020). Microbial inoculum production for biocrust restoration: testing the effects of a common substrate versus native soils on yield and community composition. *Restoration Ecology (in the press)*

140. Thomazo, C., Couradeau, E., Giraldo-Silva, A., Marin-Carbonne, J., Brayard, A., Homann, M., ... & Garcia-Pichel, F. (2020). Biological Soil Crusts as Modern Analogues for the Archean Continental Biosphere: Insights from Carbon and Nitrogen Isotopes. *Astrobiology* (in the press)
141. Nelson, C., Giraldo-Silva, A., & Garcia-Pichel, F. (2020). A fog-irrigated soil substrate (FISS) system unifies and optimizes cyanobacterial biocrust inoculum production. *Applied and Environmental Microbiology* (doi:10.1128/AEM.00624-20)
142. Cao H, Shimura Y, Steffen MM, Yang Z, Lu J , Allen J , Jenkins L , Kawachi M , Yin Y Garcia-Pichel F (2020) The trait repertoire enabling cyanobacteria to bloom assessed through comparative genomic complexity and metatranscriptomics (in the press)
143. Stricker E, Crain G, Rudgers J, Sinsabaugh, R, Fernandes V, Nelson, C, Giraldo-Silva A, Garcia-Pichel F. Belnap J, Darrouzet-Nardi A (2020) What could explain $\delta^{13}\text{C}$ signatures in biocrust cyanobacteria of drylands? *Microbial Ecology* (in the press)
144. Nelson, C, Giraldo-silva, A, Garcia-Pichel F (2020). A symbiotic nutrient exchange within the cyanosphere microbiome of the biocrust cyanobacterium, *Microcoleus vaginatus*. (submitted)
145. Finn, DR, Yu J, Ilhan, ZE, Fernandes VMC, Penton CR, Krajmalnik-Brown, R, Garcia-Pichel F, . Vogel, TM (2020). MicroNiche: an R package for assessing microbial niche breadth and overlap from amplicon sequencing data. *FEMS Microbiol. Ecol.* (in the press)

Published Contributions to **Edited Books, Encyclopedia Articles and Science Outreach**

146. **Garcia-Pichel**, and Castenholz, R.W. (1994). On the importance of UV radiation for the ecology of microbial mats. In: L. Stal and P. Caumette (Eds.) *Microbial Mats: Structure, Development and Environmental Significance*. Nato ASI Series, V.G35 , pp. 77-83 Springer verlag, Heidelberg
147. Bjorn L.O, Cunningham A, Dubinsky Z, Estrada M, Figueroa FL, **Garcia-Pichel** F, Häder DP, Hanelt D, Levavasseur G, Luning K. (1996) Technical Discussion I: Underwater light measurement and light absorption by algae. *Sci. Mar.* 60: 293-297
148. **Garcia-Pichel**, F., U. Nübel, G. Muyzer and M Kühl (2000). On Cyanobacterial Community Diversity: which diversity and how to quantify it. In Bell CR, Brylisnky M, Johnson-Green P (eds). *Microbial biosystems: New Frontiers*. Canada Sociey for Microbial Ecology, Halifax
149. Overmann, J and F. **Garcia-Pichel** (2000). The phototrophic way of life. In Dworkin, M (ed). *The Prokaryotes* (Electronic Edition). Springer-Verlag. Heidelberg (<http://link.springer-ny.com/link/service/books/10125/>)
150. Castenholz, R W, and F. **Garcia-Pichel**. (2000). Cyanobacterial responses to UV-radiation. In M. Potts. and B.A. Whitton (Eds.) *The ecology of cyanobacteria.*, pp.591-611 Kluwer, Dordrecht.
151. **Garcia-Pichel**, F. (2000) Cyanobacteria. In *Encyclopedia of Microbiology*, 2nd Edition, J Lederberg (Ed.) Academic Press, San Diego
152. **Garcia-Pichel**, F. and R W Castenholz (2001) Photomovements of microorganisms in sedimentary environments. In D-P Haeder (Ed) *Comprehensive Series in Photosciences*, vol 1: Photomovements. Elsevier, Amsterdam (in the press), pp. 401-418
153. **Garcia-Pichel**, F. and J Belnap (2001) Microenvironments of biological soil crusts. In J Belnap and O L Lange (Eds.) *Biological Soil Crusts: Structure, Function and Management*. Springer-Verlag, Heidelberg

154. Belnap, J, D. Evans and **Garcia-Pichel, F.** (2001) Global change and biological soil crusts. *In* J Belnap and O L Lange (Eds.) *Biological Soil Crusts: Structure, Function and Management*. Springer-Verlag, Heidelberg.
155. **Garcia-Pichel, F.** 2002. Desert Environments: Biological Soil Crusts, p. 1019-1023. *In* G. Bitton (ed.), *Encyclopedia of Environmental Microbiology*. John Wiley, New York.
156. Carson E, Dowling, T. Eguiarte. L.E, Elser, J., Escalante, A., Farmer, J. **Garcia-Pichel, F.** Roopnarine P, Souza, V., Tang, C., and B., Wade (2004). Cuatro Ciénegas: a living lab for the study of present and past biospheres. *In* Badino, G , Bernabei, T, De Vivo, A., Giulivo, I. Savino, G (Eds). *Under the desert. The mysterious waters of Cuatro Ciénegas*. Edizioni Tintoretto-La Venta
157. **Garcia-Pichel** (2005) Microbes and the search for Life beyond Earth, *In* *Fundamentals and Challenges in Astrobiology*, M. Vazquez-Abeledo (Ed), Science SignPost
158. **Garcia-Pichel F** and Reddy, SGN (2010) The genus *Dyadobacter*, *In* *Bergey's Manual of Determinative Bacteriology*, 9th Edition, John G. Holt (Ed), Williams & Wilkins, Baltimore
159. Schulz-Vogt, Heide N; Angert, Esther R and **Garcia-Pichel, Ferran** (2007) Giant Bacteria. *In*: *ENCYCLOPEDIA OF LIFE SCIENCES*. John Wiley & Sons, Ltd: Chichester <http://www.els.net/> [DOI: 10.1002/9780470015902.a0020371]
160. Garcia-Pichel, F (2009). Cyanobacteria. *In* Schaechter, M. (Ed) *Encyclopedia of Microbiology*, 3d edition, Elsevier.
161. **Garcia-Pichel F** (2008) Molecular ecology and Environmental Genomics. *In*: *The cyanobacteria: molecular biology, genomics and evolution*, A. Herrero, (Ed), Horizon Sci.Press, London.
162. Castenholz, R W and Garcia-Pichel, F (2012). *Cyanobacterial responses to UV radiation*. *In* Whitton, B. *Ecology of Cyanobacteria II*. Springer
163. Overmann, J and F. **Garcia-Pichel** (2013). The phototrophic way of life. *In* Dworkin, M (ed). *The Prokaryotes (Electronic Edition)*. Springer-Verlag. Heidelberg (<http://link.springer-ny.com/link/service/books/10125>)
164. Soule and F **Garcia-Pichel** (2013) Ultraviolet Photoprotective Compounds from Cyanobacteria in Biomedical Applications. *In*: Naveen Sharma, Lucas Stal and Ashawani Rai (Eds.) *Cyanobacteria: An Economic Perspective*. Wiley
165. **Garcia-Pichel**, Weber, B, Felde V, Drahorad, S (2016) Microstructure and weathering processes within biological soil crusts *In*: Weber B, Belnap J, Buedel B, (eds.). *Ecological Studies: Biological Soil Crust*, Springer.
166. Barger, N, Zaady E., Weber B, **Garcia-Pichel F**, Belnap J. (2016) Patterns and controls on nitrogen cycling of biological soil crusts, *In*: Weber B, Belnap J, Buedel B, (eds.). *Ecological Studies: Biological Soil Crust*, Springer.
167. Bethany Rakes, J, Nelson, C. and F. Garcia-Pichel (2018) Biocrusts, a secret garden in the desert. *Mountain Lines*, Summer 2018, p. 20-21.
168. Soule T & **Garcia-Pichel, F** (2019). Cyanobacteria. *In* Schaechter, M. (Ed) *Encyclopedia of Microbiology*, 4d edition, Elsevier.
169. **Garcia-Pichel, F** and Belnap, J (2020). Cyanobacteria and algae. *In* Gentry, T Fuhrman J [Eds]. *Principles and Applications of Soil Microbiology*, Elsevier

Invited Seminars (last 15 years)

- 2004 Department Seminar Speaker. University of California, Merced
Invited Speaker, Workshop on Microbialites, Soci t  G ologique de France, Paris
Round Table: Desert Bacteria, during Microbial ecology Meeting (Cancun, Mexico)
- 2005 Carbon and Nitrogen Cycling in Soil, USDA-SOILS PROGRAM meeting, Wilmington, DE
Molecular Lessons learned in the Bacterial and Algal Systematics, University of Barcelona
Ecology Section of the Catalan Society for Biology, Monthly Seminar, Barcelona
- 2006 Invited speaker: International Society Microbial Ecology Meeting (Vienna, Austria)
Invited Speaker: Symposium on Photosynthetic Prokaryotes (Pau, France)
Invited Speaker: Soil Science Society of America Annual Meeting (Indianapolis, Indiana)
- 2007 Plenary Lecturer: Congress on Cyanophyte Reserch, Merida, Mexico.
- 2008 Seminar Speaker. Biogeochemistry IGERT, Cornell University
Seminar Speaker, ASU Civil Environmental Engineer Department
- 2009 Department Seminar Speaker Washington Univ., St. Louis
Department Seminar Speaker, Lafayette College, PE
- 2010 Department Seminar Speaker, UC Riverside
Department Seminar Speaker, University of Florence, Italy
Inaugural Plenary Speaker, International Workshop on Soil Crusts (W rzburg, FRG)
Opening Lecture, NorthWest Branch, ASM Annual meeting, Seattle.
- 2011 Opening Lecture, Mountain Branch, ASM annual meeting, Salt Lake City
Carbon Cycle Initiative Seminar, LB National Lab, Berkeley
Invited Speaker, "OMICS in Soil Science", Nanjing, China
Geological Society of America Meetings, Symposium Invited speaker
Opening Lecture, Missouri Branch, ASM annual meeting, St Louis
Opening Lecture, S Carolina Branch, ASM annual meeting, Aiken
- 2012 Opening Lecture, AZ/NV Branch, ASM annual meeting, Tempe
Department Seminar Speaker, Penn State University
Invited Lecture, Intl. Soc. Microbial Ecology meeting, Copenhagen, Denmark
Plenary Lecture, 3Intl. Symp. Photosynth. Prokaryotes Meeting, Porto, Portugal
- 2013 Plenary Lecture, CyanoPhyte Research Meeting, Cleveland
Plenary Lecture, Annual Spanish Cryptogamic Botany Meeting, Las Palmas
- 2014 Neil Welker Award Lecture, Wind River, CO
- 2015 BAGECO (Bacterial Genomics and Ecology Congress), Opening Lecture, Milan (Italy)
Opening Lecture, Center for Genome Research & Biocomputing Fall Conference, Oregon St. U.
Department Seminar, Biology, UNM, Albuquerque
- 2016 Jornada LTER Annual All Hands meeting, Las Cruces, NM
- 2018 University of Colorado, Seminar Colloquium, Dept Ecol. & Evol.
- 2019 Plenary Lecture: Biocrust-4, Brisbane Australia
Plenary Lecture: Annual Meeting of the German Botanical Society, Rostock, Germany
Plenary Lecture: 21st Meeting of the Intl. Soc. for Cyanobacteria Research, Brisbane, Australia
- 2020 Plenary Lecture: Microbial Ecology of Arid areas in the Middle East, Abu Dhabi

TEACHING & MENTORING

Graduate Teaching Assistant (University of Oregon, 1990-1992)

- General Microbiology
- Limnology
- Evolutionary Biology
- Human Reproduction and Development

Courses developed or taught at Arizona State University

- Geomicrobiology. Newly developed, 1-semester, interdisciplinary, 3-credit, 400-level course (Spring 2000, 2001, 2002, 2003, 2005, 2007, 2013, 2014, 2015, 2016) . Offered in Microbiology and Geology.
- Biology of Microorganisms (MIC 220). 3 credit, Introductory Microbiology, (2005, 2006, 2008, 2009, 2010, 2012)
- Techniques in Molecular Biology. Core Curriculum Course, 1-semester, 2-credit (2000, 2001, Fall, shared teaching). Offered to Microbiology, Molecular and Cell Biology, as well as Molecular Biosciences & Biotechnology Majors
- Techniques in Molecular Biology Lab. Core curriculum Course, 1-semester, 2-credit (2000 , 2001, Fall, shared)
- The Biology of Cyanobacteria. 500 level, 1 semester, 1-2, credit course (2000, 2001, 2002, 2003, 2006)
- Experiments in Biogeochemistry. Newly developed, 400-500 level, 3 credit, lab and field experiments (Fall 2002, shared teaching)
- Microbial Ecology Seminar, 2-credit Graduate weekly seminar. (Fall and Spring, 2000, 2001, 2002, Spring 2003, Fall, 2006, 2008)
- Microbiology Capstone Course (Independent Research Paper), ad hoc assignment of graduating seniors in Microbiology (every semester)
- Undergraduate Independent Research. Ad hoc, typically 1-2 students per semester, 3-5 credit hours.
- Communicating Microbiology, 1 credit course on effective strategies to present scientific information. (Spring, Fall, 2009, 2010)
- ELS 502. Environmental Lab Sciences field camp. (Mixed lecture and field exercises in environmental biology. 4 credit. Required for ELS graduate program. (Spring 2011)
- MIC469. Microbiomics Seminar: emergence of microbiome properties (Spring 2016, 2017, 2018)
- MIC 591 The human microbiome in space (Fall, 2019)

Short courses (less than 1 month) and workshops taught as Visiting Instructor

- Summer Microbiology Field Course: Thermophiles of Yellowstone. University of **Oldenburg, Germany**, 1994

- Graduate Course: Environmental UV Photobiology, University of **Gothenburg, Sweden**, 1996.
- Graduate Course: Methods in Molecular Microbial Ecology. University of **Helsinki, Finland**, 1998.
- Microsensors in Microbial Ecology Course. Max Planck Institute for Marine Microbiology, **Bremen Germany**, 1996 & 1998.
- Workshop: Molecular Methods for Cyanobacterial Ecology. Centro de Investigaciones Biologicas del Noroeste. LaPaz, Baja California Sur, **Mexico**, 2001
- Workshop: DNA Methodologies to Study Cyanobacterial Diversity. Within the frame of the 15th Symposium for Cyanophyte Research. University of **Barcelona, Spain**, 2001
- Instructor for “The Great Desert”, a training workshop with field studies for high school teachers (U. **New Mexico**; July , 2003; www.lpi.usra.edu/education/EPO/desert2003/index.html)
- Faculty, Microbial Diversity Summer Course, Marine Biological Laboratory, **Woods Hole , MA**, 2004
- Coastal Geomicrobiology, Doctoral Intensive Course, University of **Cadiz, Spain**, School of the Environment (2006)

GRADUATE EDUCATION HIGHLIGHTS

- A total of 21 Ph.D’s and Master’s students graduated under direct supervision (names in bold)
- Formally a total of 51 graduate students mentored
- All graduated Ph.D’s are active in science as either professors, research scientists, or in industry.
- Currently mentoring 7 Ph.D students as Chair/Co-chair
- Graduate Programs included: Microbiology, Environmental Life Sciences, Plant Biology, Biology, Geology, Chemistry and Civil Engineering
- 2011, 2013 Finalist, ASU’s Outstanding Mentor

GRADUATE STUDENTS (completed students in own lab are in bold)

Student	Degree (year)	Role	Major (University)	Presently at
L. Prufert-Bebout	Ph.D (1998)	Member	Microbiol (Århus)	NASA, Staff Scientist
Ulrich Nübel	Ph.D (1999)	Co-Chair	Microbiol (Bremen)	R. Koch Inst., Scientist
Andrea Mandalka	Masters (1999)	Chair	Microbiol (Bremen)	Deutsche Lufthansa
Rebecca Ludwig	Masters (1999)	Chair	Microbiol (Osnabrück)	
Anne Portwich	Ph.D (2000)	Chair	Microbiol (Bremen)	LSP, The Netherlands
Raeid Abed	Ph.D (2001)	Chair	Microbiol. (Bremen)	Prof, SQU, Oman
Hodon Ryu	Ph.D (2003)	Member	Civ Eng	Asst Res. Prof, ASU
Moria Nagy	MS (2004)	Chair	Microbiology	Rock Valley College (IL)
Shahin Lavasani	Ph.D (2004)	Member	Microbiology	Industry
Chris Bartholomew	Ph.D. (2004)	Member	Microbiology	Chandler Reg. Hosp.
Ryan Sponseller	Ph.D (2005)	Member*	Biology	Prof., U. Alabama
Ken Voglesonger	PhD (2005)	Member	Geology	Prof. NE Illinois
M.J. Rothrock,	Ph.D (2005)	Chair	Microbiology	Scientist, USDA
H. Mohammed	Ph.D (2005)	Member	Plant Biology	Oregon St. U., Postdoc
Shannon Johnson	Ph.D (2005)	Chair	Microbiology	Scientist, L. Alamos NL
Brian Eddie	Master’s (2007)	Member	Microbiology	US Naval Res. Lab
Jessica Mohler	Master’s (2007)	Member	Biology	
Wes Swingley	Ph.D (2007)	Chair*	Microbiology	Prof. N Illinois U
Brad de Gregorio	Ph D (2007)	Member	Geology	US Naval Res Lab
Tanya Soule	Ph.D (2008)	Co-Chair	Microbiology	Assoc. Prof, Purdue U.

Joseph Manfrida	Ph.D (2006)	Member	Microbiology	Unknown
Jennifer Ridell	Ph.D (2009)	Member	Plant Biology	Post-Doc, U Wash.
Yifei Wu	Ph.D (2009)	Member	Mol Cell. Biol	UA Coll Med
Jill Lockard	Master's (2009)	Member	Geology	Unknown
Jeff Havig	Ph.D (2009)	Member	Geology	Unknown
Hugo Beraldi	Ph.D (2009)	Chair	Microbiology	Assoc. Prof., UNAM
Scott Bates	Ph.D (2009)	Co-Chair	Plant Biology	Asst. Prof., U Minnesota
Tanya Botchard	Master's (2009)	Member	Microbiology	Unknown
Sarah Strauss	Ph.D (2010)	Co-chair*	Plant Biology	Asst. Prof., U. Florida
Edgardo Ramirez	Ph.D (2010)	Chair	Microbiology	Grand Canyon U, Prof
Jamie Howard	Ph.D (2010)	Member	Plant Biology	Post-Doc, NM State
Jessica Amacher	Ph.D (2011)	Member	Biology	Argonne National Lab
Jorge Nuñez	Ph.D (2012)	Member	Geology	NASA
Katie Alexander	Ph.D (2012)	Member	Chemistry	Industry
Jon Badalamendi	Ph. D (2013)	Member	Microbiology	PostDoc, U Minnessota
Natalie Myers	MS (2013)	Chair	Microbiology	Instructor, Mesa CC
Yev Marusenko	PhD (2013)	co-Chair	ELS	Industry
Ankita Kothari	Ph.D (2013)	Chair	Mol Cell Biol	Berkeley Natl. Lab
Ippsita Dutta	PhD (2015)	Member	Mol Cell Biol	India
Kirsten Whittney	MS (2015)	Member	Geology	ASU, PhD program
Brandon S Guida	PhD (2016)	Chair	Microbiology	UA Coll. Med.
Fca. de Martini	PhD (2016)	Member	ELS	Asst .Prof. Maricopa CC
Benjamin McNeille	MS (2016)	CoChair	Sustainability	
Kira Sorochkina	MS (2017)	Chair	Plant Biology	U. Florida PhD program
Brian St Clair	PhD (2017)	Member	ELS	Yachai Univ., Ecuador
Marisol Juárez	PhD (2020)	Member	Geology	
Donald Glaser	PhD (2020)	Member	Chemistry	
Jonathan Zaloumis	PhD (2020)	Member	Geology	
Kassandra Dudek	PhD (2022)	Member	ELS	
Alexander Tomes	PhD (2020)	Member	ELS	
Julian Yu	PhD (2020)	Member	ELS	
Ana Giraldo Silva	PhD (2019)	Chair	ELS	
Jonathon Hileman	PhD (2024)	Member	Post-doc, Rice U.	
Edauri Navarro-Pérez	PhD (2024)	Member	ELS	

*only for part of their time in graduate school

CURRENT STUDENTS (Committee chairmanships only)

Student	Degree (year)	Role	Major
Daniel Roush	Ph.D (2020)	Chair	Microbiology
Vanessa Fernandes	Ph.D (2020)	Chair	Microbiology
Kevin Klicki	Ph.D. (2021)	Chair	Molecular & Cellular Biology
Julie Bethany	Ph.D (2022)	Chair	Env. Life Sciences
Corey Nelson	MS (2022)	Chair	Microbiology
Luis G. de Salceda	PhD (2024)	Chair	Microbiology
Thuong Cao	PhD (2023)	co-Chair	Chemistry

Post-Doctoral Mentoring

- Olivier Pringault 2000
- Laura Torrentera 2003
- Sathyanarayana Reddy 2004
- Elizabeth Chacon-Baca 2004
- Cosmin Sicora, 2008

- Qunjie Gao, 2010
- Tanya Soule, 2008
- Dörte Hoffmann 2009
- Estelle Couradeau 2012
- Chongfeng, Bu, 2012
- Patricia Ferreira, 2012
- Juan Maldonado Ortiz, 2012
- Rene Guénon, 2013
- Sergio Velasco Ayuso, 2013
- Huansheng Cao, 2017
- Ana Giraldo Silva, 2019

SERVICE

National & International Level

- Editor, FEMS Microbiology Reviews, 2006-2014
- President (and past president elect). American Society for Microbiology, AZ-NV Branch (2007-2009)
- Elected Member: “International Subcommittee for Taxonomy and Nomenclature of Phototrophic Bacteria”. Reviews and assesses newly proposed or described taxa of oxygenic and anoxygenic phototrophic bacteria, reporting to the General Committee (1998-present)
- Member, NASA Astrobiology Task Force. Expert Panel that evaluates the performance of the National Astrobiology Institute, Associated Universities and NASA’s Exobiology small-grant program. Reports to and advises NASA-headquarters (2000-2002)
- Member, MEPAG. NASA’S Expert panel to provide guidance for payload in future Mars missions (2002-2003).
- External Advisory Committee. University of Arizona Superfund project (2004-2014)
- Editorial Board: International Microbiology
- Organizing Committee, 15th Symposium for Cyanophyte Research, Barcelona, 2001
- Co-Organizer; “Biogeochemistry of stromatolites and microbial mats”. Special Session at the Annual Meeting of the American Society for Limnology and Oceanography (2003)
- Co-Organizer: Session on “Desert Microbes” within the 2004. International Society for Microbial Ecology meeting, Cancun, Mexico
- Panelist for NSF’s “Microbial Observatories” (2002, 2003, 2004)
- Panelist for NIH’s Special Grants Program (2002, 2008)
- Panelist for NASA’s ASTED Grants Program (2006)
- Panelist for NASA’s Astrobiology Institutes Program (2012)
- Organizer 14th Workshop on Cyanobacteria (2016)

Institutional Level

- Associate Director for Research and Training Initiatives (2011-2012), School of Life Sciences
- Associate Dean for Facilities (2009-2012), School of Life Sciences.
- Chair, Steering Committee of the Interdisciplinary Microbiology Graduate Program (2007-2009)
- Cohort Director of NSF funded WAESO- Bridges to the doctorate program for minority graduate education (Phase III) (2005, 2006, 2007)
- Chair, SoLS Safety Committee (2007-2008)
- Chair, School's Committee for Adjunct and Affiliate Appointments (2004-2005)
- Member, College of Liberal Arts and Sciences Committee on Academic Awards (2001- 2003)
- Chair, Departmental Search for "Director of Research and Academic Support Services" (2001)
- Appointed Member, SoLS Strategic Planning Committee (2004).
- Member: Search Committee for 3 Associate Directors in the new School of the Life Sciences (2003).
- Elected Member, Dean's Search Committee for Director of SoLS (2003-2004)
- Member, Dean's Committee for the Reorganization of the Life Sciences Departments. (2002-2003)
- Co-convener. Organizational meetings of the Faculty of Organismal, Integrative and Systems Biology in the School of the Life Sciences (2002-2003)
- Chair, SoLS Search Committee for positions in Biogeochemistry and Microbial Ecology (2003)
- Member SoLS Search Committee for 3 positions in Bioenergy (2006)
- Mentor, Mountain State Alliance for Minority Graduate Education. (Organization seeking to facilitate the enrollment and success of minority students in graduate programs in science and engineering), ongoing
- Organizer: CLAS Interdisciplinary Faculty Seminar Series: Biotic/abiotic Interactions in Biogeochemical Cycling (2001-2002).
- Organization of Institute's Expeditions to Mexico, MPI, (1997, 1998)
- Host of sabbatical researchers
 - Dr. A. López-Cortés (CIBNOR, Mexico). Exchange scientist, 1998, 1999
 - Prof. S. Golubic (Boston Univ., USA) Sabbatical, 1999
 - Prof. Ferdinand Schanz, Univ. of Zurich, Switzerland (Sept, 2001)
 - Prof. Laurie Caslake (Lafayette College), 2008-2009
 - Prof. Pilar Mateo (University of Madrid), 2008
 - Chongfeng, Bu (Northwest A/F University, Yangling, China), 2010
 - Prof. Weibo Wang (Wuhan Botanical Garden) 2013
 - Xiaobing Zhao, (Chinese Academy of Sciences, Urumqi, Xinjiang) 2014

Community & Outreach

- Board of Directors, McDowell Sonoran Conservancy (2016-2019)
- Co-PI in Project “Minority Graduate Education at Mountain State Alliance” to enhance successful graduate education of minority students, funded by NSF (2004-2009)
- Development of public-oriented science outreach web-pages:
 - Geomicro Home: <http://lswweb.la.asu.edu/fgarcia-pichel>
 - Desert Microbe Webpage and Database: <http://lswweb.la.asu.edu/fgarcia-pichel/dsm/>
- Collaboration on outreach book on the ecology of the Cuatro Ciénegas Basin Biosphere Reserve sponsored by the National Geographic Society (2004)
- Instructor in, The Great Desert, a training workshop with field studies for high school teachers (U. New Mexico; July 13-19, 2003; www.lpi.usra.edu/education/EPO/desert2003/index.html)
- Faculty. Marine Biological Lab, Woods Hole. MA. Microbial Diversity Course. Summer 2004
- Instructor in, Life at the Extremes, a training workshop with field studies for high school teachers (by Lunar and Planetary Institute; July 13-19, 2005; www.lpi.usra.edu/education) (2005)
- Podcast: http://askabiologist.asu.edu/podcasts/content_logs/vol22_log_aab_podcast.html
http://askabiologist.asu.edu/podcasts/content_logs/vol38_log_aab_podcast.html
<http://www.sciencemag.org/content/340/6140/1595.2.full>

Media Interviews

BBC’s Science Today (aired, Sept 2001)

KVVA-Radio (in Spanish; aired Feb, 2003)

Local Telemundo TV Channel (in Spanish) “Risks from bacteria in playgrounds”

Science Friday, NPR (<http://www.sciencefriday.com/segment/03/29/2013/the-secret-life-of-the-sonoran-desert.html>)

Australian Broadcasting Corporation (<http://www.abc.net.au/rn/scienceshow/stories/2010/2811699.htm>)

New York Times, http://www.nytimes.com/2014/09/23/science/on-warmer-planet-range-of-soil-microbes-may-change.html?_r=0

KJZZ-Radio Phoenix, <http://kjzz.org/content/257729/microbes-adapt-heat-sun-changing-color>