

## Summary of CV: Jim A. Field

**Current Position:** Assistant Dean of College of Engineering for Graduate Studies, and Professor of Department of Chemical and Environmental Engineering, University of Arizona, Tucson (USA)

**PhD:** Wageningen University (The Netherlands) Environmental Technology 1989. PhD advisor: Dr. Gatze Lettinga

**Refereed Publications:** Number Journal Publications = 274; Book Chapters = 8; Monographs = 2.

- Elsevier Scopus H index = 62, Google Scholar H index = 76
- Elsevier Scopus Total Citations = 11,729; Google Scholar Total Citations = 17,947

**Research funding ascribed to J. A. Field:**  $\Sigma$  (total funding  $\times$  award credit) = \$9.15 M

**Number of PhD students graduated:** 31 (USA and NL); **MS students graduated:** 31 (USA)

### Service

- Managing Editorial Board Member, *Biodegradation* (2003-present)
- (Co)-director of Dean Carter Binational Center Environmental Health Sciences: Provided ~40 student exchanges and workshops (9 workshops between 2003 and 2014 throughout Mexico)
- PI and (Co)chair of 3 Latin America workshops on Sustainable Mining: Mexico (2014); Peru (2016) and Brazil (2017).
- Active in improving diversity in engineering. UA PI of Two STEM training grants for minorities (NSF bridge to the doctorate training grant, combined = \$2.14 M); and leadership on diversity committees (Chaired college of engineering diversity committee).

### Research Highlights:

- Enhanced biodegradation persistent priority pollutants by sequential microbial successions: anaerobic – aerobic sequences for the biodegradation of organohalogens, nitroaromatics, azo dyes;
- Application of white rot fungi to degrade polycyclic aromatic hydrocarbons (PAH) in soil
- Natural production of priority pollutant analogues (derivatives of chlorophenols) by fungi
- and fungal-bacterial sequences for polycyclic aromatic hydrocarbons (PAH)
- Biodegradation and (bio)transformation of nitro-aromatic and nitro-heterocyclic pollutants and their amine biotransformation products (with an emphasis on explosive compounds)
- Role of microorganisms in the biogeochemical cycling of arsenic and development of arsenic bioremediation strategies
- Bioremediation of heavy metals in acid rock drainage from mining impacted sites by immobilizing metals into non-bioavailable minerals
- Biorecovery of strategic metal(loid)s from waste streams (Cu, Te, Rh, Pt, and Pd)
- Anaerobic ammonium oxidation (anammox) for improving sustainability of nitrogen removal
- Anaerobic biotechnology applications for perchlorate and uranium bioremediation

### Honors:

- International Water Association Fellow (2016-2021)
- Honors College professor (2013-2014)
- Fellow of The Dutch Royal Academy of Sciences (1991-1996)

**Teaching:** Microbiology for Engineers; Bioremediation; Scientific Writing

# Dr. JIM A. FIELD

Assistant Dean of the College of Engineering for Graduate Education  
Professor of the Department of Chemical and Environmental Engineering  
University of Arizona, Tucson, Arizona, Tel. 520-621-2591, email: [jimfield@email.arizona.edu](mailto:jimfield@email.arizona.edu)  
Languages: Fluent in Spanish, Dutch and English (mother tongue)

## 1. Educational Background

Ph.D., Environmental Technology, 1989, Wageningen University, The Netherlands

M.S., Crop and Soil Environmental Sciences, 1983, Virginia Tech, Blacksburg, Virginia, USA

B.S., Crop and Soil Environmental Sciences, 1981, Virginia Tech, Blacksburg, Virginia, USA

## 2. Academic/Professional Work Experience

Assistant Dean of Graduate Education, Nov., 2014 – present College Engineering, University of Arizona.

Department Chair, Nov., 2009 – 2014, Department of Chemical & Environmental Engineering, University of Arizona.

Visiting Professor, Jun. 2007 – Mar. 2008, Dept. Molecular Biology, *Universidad Autónoma de Madrid*, Spain.

Full Professor, July 2004 – present, Department of Chemical & Environmental Engineering, University of Arizona.

Associate Professor, January 2001 – July, 2004, Department of Chemical & Environmental Engineering, University of Arizona.

Assistant Professor, April, 1991 – September, 2000, Division of Industrial Microbiology & Department Environmental Technology, Wageningen University, The Netherlands.

Post Doc., October, 1989 – March, 1991, Department of Chemical Engineering, *Universidad Autónoma de Barcelona*, Spain.

## 3. Awards & Service Appointments

International Water Association Fellow. 2016-2021

International Water Association Anaerobic Digestion Specialist Group Management Committee 2018

Chair of the College of Engineering Inclusiveness Committee. 2016-2017

Graduate Council of the University of Arizona 2015-2017 (Co-Chair in academic year 2016-217)

Academic Leadership Institute Cohort 2017-2018

Search Committee for Vice-Provost of Inclusive Excellence and Senior Diversity Officer. 2016

Strategic Priorities for Faculty Initiatives (SPFI) Selection Committee<sup>1</sup>. 2014- 2016

Honors Professor, Honors College. 2013-2014

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<sup>1</sup> SPFI is a program to hire faculty to improve diversity

Executive Committee UA Superfund Basic Research Program. 2013 – 2016

Steering Committee Heads Up. 2012 – 2014

Chair of Dept. Head Search Committee for Electrical and Computer Engineering 2011 – 2012

Fulbright Specialist, dispatched at *Universidad Santiago de Compostela*, Spain. Jun – Jul 2011

(Co-)Director of the Dean Carter Binational Center for Environmental Health Sciences, a higher education partnership for research collaboration, human capacity training and outreach between the University of Arizona, 11 universities/institutes in Mexico and *CONACyT*. Provided ~40 student exchanges and workshops (9 workshops between 2003 and 2014 throughout Mexico) 2003 – 2014.

Editorial Board Biodegradation (international peer reviewed journal). 2003 – present

Co-Recipient of the 2001 Lettinga Award 2001

Fellow of The Dutch Royal Academy of Sciences (KNAW, Koninklijke Nederlandse Akademie van Wetenschappen). 1991-1996

## **Peer Reviewed Journal Publications**

**Statistics:** peer reviewed journal publications = 274; H index, Elseviers (Scopus) = 62; H index, Google Scholar = 76; Total citations = 11,729 and 17,947 for Scopus and Google Scholar, respectively.

1. Li G, Field JA, Zeng C, Madeira CL, Nguyen CH, Jog KV, Speed D, Sierra-Alvarez R. 2020. Diazole and triazole inhibition of nitrification process in return activated sludge. *Chemosphere : in press*.
2. Madeira CL, Jog KV, Vanover ET, Brooks MD, Taylor DK, Sierra-Alvarez R, Waidner LA, Spain JC, Krzmarzick MJ, Field JA. 2019. Microbial enrichment culture responsible for the complete oxidative biodegradation of 3-amino-1,2,4-triazol-5-one (ATO), the reduced daughter product of the insensitive munitions compound 3-nitro-1,2,4-triazol-5-one (NTO). *Environ Sci Technol : in press*.
3. Nguyen CH, Field JA, Sierra-Alvarez R. 2019. Microbial toxicity of gallium- and indium-based oxide and arsenide nanoparticles. *Journal of Environmental Science and Health, Part A : in press*.
4. Madeira CL, Kadoya WM, Li G, Wong S, Sierra-Alvarez R, Field JA. 2019. Reductive biotransformation as a pretreatment to enhance in situ chemical oxidation of nitroaromatic and nitroheterocyclic explosives. *Chemosphere* 222:1025-1032.
5. Kadoya WM, Sierra-Alvarez R, Jagadish B, Wong S, Leif A, Mash EA, Field JA. 2019. Coupling Reactions between Reduced Intermediates of Insensitive Munitions Compound Analog 4-Nitroanisole. *Chemosphere* 222:789-796
6. Fernandez-Gonzalez N, Sierra-Alvarez R, Field JA, Amils R, Sanz JL. 2019. Adaptation of granular sludge microbial communities to nitrate, sulfide and/or p-cresol removal. *International Microbiology* 22(3):305-316.
7. Gonzalez-Estrella J, Field JA, Ober CK, Sierra-Alvarez R. 2019. Stability and microbial toxicity of HfO<sub>2</sub> and ZrO<sub>2</sub> nanoparticles for photolithography. *Green Materials* 7(3):109-117
8. Simon-Pascual A, Sierra-Alvarez R, Field JA. 2019. Platinum(II) reduction to platinum nanoparticles in anaerobic sludge. *Journal of Chemical Technology & Biotechnology* 94:468-474.
9. Kadoya WM, Sierra-Alvarez R, Wong S, Abrell LM, Mash Jr. EA, Field JA. 2018. Evidence of Anaerobic Coupling Reactions between Reduced Intermediates of 4-Nitroanisole. *Chemosphere* 195:372-380.
10. Khatiwada R, Abrell L, Guangbin L, Root RA, Sierra-Alvarez R, Field JA, Chorover J. 2018. Adsorption and oxidation of 3-nitro-1,2,4-triazole-5-one (NTO) and its transformation product (3-amino-1,2,4-triazole-5-one, ATO) at ferrihydrite and birnessite surfaces. *Environmental Pollution* 240:200-208.

11. Khatiwada R, Olivares C, Abrell L, Root RA, Sierra-Alvarez R, Field JA, Chorover J. 2018. Oxidation of reduced daughter products from 2,4-dinitroanisole (DNAN) by Mn(IV) and Fe(III) oxides. *Chemosphere* 201:790-798.
12. Khatiwada R, Root RA, Abrell L, Sierra-Alvarez R, Field JA, Chorover J. 2018. Abiotic reduction of insensitive munition compounds by sulfate green rust. *Environmental Chemistry* 15:259-266.
13. Madeira CL, Field JA, Simonich MT, Tanguay RL, Chorover J, Sierra-Alvarez R. 2018. Ecotoxicity of the insensitive munitions compound 3-nitro-1,2,4-triazol-5-one (NTO) and its reduced metabolite 3-amino-1,2,4-triazol-5-one (ATO) *J Haz Materials* 343:340-346.
14. Ramos-Ruiz A, Field JA, Sun W, Sierra-Alvarez R. 2018. Gallium arsenide (GaAs) Leaching Behavior and Surface Chemistry Changes in Response to pH and O<sub>2</sub> Waste Management. *Waste Management* 77:1-9.
15. Simon-Pascual A, Sierra-Alvarez R, Ramos-Ruiz A, Field JA. 2018. Reduction of platinum(IV) ions to elemental platinum nanoparticles by anaerobic sludge. *Journal of Chemical Technology & Biotechnology* 93:1611-1617.
16. Zeng C, Nguyen C, Boitano S, Field JA, Shadman F, Sierra-Alvarez R. 2018. Cerium dioxide (CeO<sub>2</sub>) nanoparticles decrease arsenite (As(III)) cytotoxicity to 16HBE14o- human bronchial epithelial cells. *Environmental Research* 164:452-458.
17. Ayala-Parra P, Liu Y, Sierra-Alvarez R, Field JA. 2018. Pretreatments to Enhance the Anaerobic Biodegradability of *Chlorella protothecoides* Algal Biomass. *Environmental Progress* 37: 418-424.
18. Ayala-Parra P, Liu Y, Field JA, Sierra-Alvarez R. 2017. Nutrient recovery and biogas generation from the anaerobic digestion of waste biomass from algal biofuel production. *Renewable Energy* 108:410-416.
19. Gonzalez-Estrella J, Li G, Neely SE, Puyol D, Sierra-Alvarez R, Field JA. 2017. Elemental copper nanoparticle toxicity to anaerobic ammonium oxidation and the influence of ethylene diamine-tetra acetic acid (EDTA) on copper toxicity. *Chemosphere* 184:730-737.
20. Li G, Carvajal-Arroyo JM, Sierra-Alvarez R, Field JA. 2017. Mechanisms and control of NO<sub>2</sub><sup>-</sup> inhibition of anaerobic ammonium oxidation (anammox). *Water Environment Research* 89 330-336.
21. Madeira CL, Speet SA, Nieto CA, Abrell L, Chorover J, Sierra-Alvarez R, Field JA. 2017. Sequential anaerobic-aerobic biodegradation of emerging insensitive munitions compound 3-nitro-1,2,4-triazol-5-one (NTO). *Chemosphere* 167:478-484.
22. Moreno-Ramírez D, Veal L, Field JA, Baker PB, Gandolfi AJ, Maier RM. 2017. Transferable Training Modules: Building Environmental Education Opportunities with and for Mexican Community Health Workers (Promotores de Salud). *Family & Community Health* 40:306-315.
23. Olivares C, Madeira C, Sierra-Alvarez R, Kadoya W, Leif A, Chorover J, Field J. 2017. Environmental fate of <sup>14</sup>C radiolabeled 2,4-dinitroanisole in soil microcosms. *Environ Sci Technol* 51:13327–13334.
24. Ramos-Ruiz A, Sesma-Martin J, Sierra-Alvarez R, Field JA. 2017. Continuous reduction of tellurite to recoverable tellurium nanoparticles using an upflow anaerobic sludge bed (UASB) reactor. *Water Research* 108:189-196.
25. Ramos-Ruiz A, Wilkening JV, Field JA, Sierra-Alvarez R. 2017. Leaching of cadmium and tellurium from cadmium telluride (CdTe) thin-film solar panels under simulated landfill conditions. *Journal of Hazardous Materials* 336:57-64.
26. Zeng C, Gonzalez-Alvarez A, Orenstein E, Field JA, Shadman F, Sierra-Alvarez R. 2017. Ecotoxicity assessment of ionic As(III), As(V), In(III) and Ga(III) species potentially released from novel III-V semiconductor materials. *Ecotoxicology and Environmental Safety* 140:30-36.
27. Ayala-Parra P, Sierra-Alvarez R, Field JA. 2016. Treatment of acid rock drainage using a sulfate-reducing bioreactor with zero-valent iron. *J Haz Materials* 308:97-105.
28. Ayala-Parra P, Sierra Alvarez R, Field JA. 2016. Algae as an electron donor promoting sulfate reduction for the bioremediation of acid rock drainage *Journal of Hazardous Materials* 317:335–343.

29. Gonzalez-Estrella J, Gallagher S, Sierra-Alvarez R, Field JA. 2016. Iron Sulfide Attenuates the Methanogenic Toxicity of Elemental Copper and Zinc Oxide Nanoparticles and their Soluble Metal Ion Analogs. *Sci Tot Environ* 548-549:380-389.
30. Li G, Sierra-Alvarez R, Vilcherrez D, Weiss S, Gill C, Krzmarzick M, Abrell L, Field J. 2016. Nitrate reverses severe nitrite inhibition of anaerobic ammonium oxidation (Anammox) activity in continuously-fed bioreactors. *Environ Sci Technol* 50:10518-10526.
31. Li G, Vilcherrez D, Carvajal-Arroyo JM, Sierra-Alvarez R, Field JA. 2016. Exogenous nitrate attenuates nitrite toxicity to anaerobic ammonium oxidizing (anammox) bacteria. *Chemosphere* 144:2360-2367.
32. Ochoa-Herrera V, Field JA, Luna-Velasco A, Sierra-Alvarez R. 2016. Microbial toxicity and biodegradability of perfluorooctane sulfonate (PFOS) and shorter chain perfluoroalkyl and polyfluoroalkyl substances (PFASs). *Environmental Science: Processes & Impacts* 18:1236-1246.
33. Olivares C, Sierra-Alvarez R, Abrell L, Chorover J, Simonich M, Tanguay R, Field J. 2016. Zebrafish embryo toxicity of anaerobic biotransformation products from the insensitive munitions compound 2,4-dinitroanisole (DNAN). *Environmental Toxicology and Chemistry* 35:2774-2781.
34. Olivares CI, Abrell L, Khatiwada R, Chorover J, Sierra-Alvarez R, Field JA. 2016. (Bio)transformation of 2,4-dinitroanisole (DNAN) in Soils. *J Haz Materials* 304:214-221.
35. Olivares CI, Field JA, Simonich M, Tanguay RL, Sierra-Alvarez R. 2016. Arsenic (III, V), indium (III), and gallium (III) toxicity to zebrafish embryos using a high-throughput multi-endpoint in vivo developmental and behavioral assay. *Chemosphere* 148:361-368.
36. Olivares CI, Sierra-Alvarez R, Alvarez-Nieto C, Abrell L, Chorover J, Field JA. 2016. Microbial toxicity and characterization of DNAN (bio)transformation product mixtures. *Chemosphere* 154:499-506.
37. Olivares CI, Wang J, Silva Luna CD, Field JA, Abrell L, Sierra-Alvarez R. 2016. Continuous treatment of the insensitive munitions compound N-methyl-p-nitro aniline (MNA) in an upflow anaerobic sludge blanket (UASB) bioreactor. *Chemosphere* 144:1116-1122
38. Pat-Espadas AM, Field JA, Otero-Gonzalez L, Razo-Flores E, Cervantes FJ, Sierra-Alvarez R. 2016. Recovery of palladium(II) by methanogenic granular sludge. *Chemosphere* 144:745-753.
39. Pat-Espadas AM, Field JA, Razo-Flores E, Cervantes FJ, Sierra-Alvarez R. 2016. Continuous removal and recovery of palladium in an upflow anaerobic granular sludge bed (UASB) reactor. *Journal of Chemical Technology & Biotechnology* 91 1183-1189.
40. Ramos-Ruiz A, Field JA, Wilkening JV, Sierra-Alvarez R. 2016. Recovery of Elemental Tellurium Nanoparticles by the Reduction of Tellurium Oxyanions in a Methanogenic Microbial Consortium. *Environmental Science & Technology* 50:1492-1500.
41. Ramos-Ruiz A, Zeng C, Sierra-Alvarez R, Teixeira LH, Field JA. 2016. Microbial toxicity of ionic species leached from the II-VI semiconductor materials, cadmium telluride (CdTe) and cadmium selenide (CdSe). *Chemosphere* 162:131-138.
42. Rodriguez-Freire L, Moore SE, Sierra-Alvarez R, Root RA, Chorover J, Field JA. 2016. Arsenic remediation by formation of arsenic sulfide minerals in a continuous anaerobic bioreactor. *Biotechnology and Bioengineering* 113:522-530.
43. Gonzalez-Estrella J, Puyol D, Gallagher SJS-A, R., Field JA. 2015. Elemental copper nanoparticle toxicity to different trophic groups involved in anaerobic and anoxic wastewater treatment processes. *Sci Tot Environ* 512-513:308-315.
44. Gonzalez-Estrella J, Puyol D, Sierra-Alvarez R, Field JA. 2015. Role of biogenic sulfide in attenuating zinc oxide and copper nanoparticle toxicity to acetoclastic methanogenesis. *J Haz Materials* 283:755-763.
45. Krzmarzick M, Khatiwada R, Olivares C, Abrell L, Sierra-Alvarez R, Chorover J, Field JA. 2015. Biotransformation and Degradation of the Insensitive Munitions Compound, 3-nitro-1,2,4-triazol-5-one (NTO), by Soil Bacterial Communities. *Environmental Science & Technology* 49:5681-5688.

46. Linker BR, Khatiwada R, Perdrial N, Abrell L, Sierra R, Field JA, Chorover J. 2015. Adsorption of novel insensitive munitions compounds at clay mineral and metal oxide surfaces. *Environmental Chemistry* 12:74-84.
47. Otero-Gonzalez L, Field JA, Calderon IAC, Aspinwall CA, Shadman F, C. Z, Sierra-Alvarez R. 2015. Fate of fluorescent core-shell silica nanoparticles during simulated secondary wastewater treatment. *Water Research* 77:170-178.
48. Rodriguez-Freire L, Moore SE, Sierra-Alvarez R, Field JA. 2015. Adaptation of a methanogenic consortium to arsenite inhibition. *Water, Air, & Soil Pollution* 226:414.
49. Zeng C, Ramos-Ruiz A, Field JA, Sierra-Alvarez R. 2015. Cadmium telluride (CdTe) and cadmium selenide (CdSe) leaching behavior and surface chemistry in response to pH and O<sub>2</sub>. *Journal of Environmental Management* 154:78-85.
50. Zeng C, Ramos-Ruiz A, Field JA, Sierra-Alvarez R. 2015. Response to the comments on "Cadmium telluride leaching behavior: Discussion of Zeng et al. (2015)". *Journal of Environmental Management* 164:65-66.
51. Carvajal-Arroyo JM, Puyol D, Li G, Lucero-Acuña A, Sierra-Alvarez R, Field JA. 2014. Pre-exposure to Nitrite in the Absence of Ammonium Strongly Inhibits Anammox. *Water Research* 48:52-60.
52. Carvajal-Arroyo JM, Puyol D, Li G, Sierra-Alvarez R, Field JA. 2014. The intracellular proton gradient enables anaerobic ammonia oxidizing (anammox) bacteria to tolerate NO<sub>2</sub>- inhibition. *Journal of Biotechnology* 192A:265-267.
53. Carvajal-Arroyo MJ, Puyol D, Li G, Sierra-Alvarez R, Field JA. 2014. The role of pH on the resistance of resting- and active anammox bacteria to NO<sub>2</sub>- inhibition. *Biotechnol Bioeng* 111:1949-1956.
54. Carvajal Arroyo JM, Puyol D, Li G, Swartwout A, Sierra-Alvarez R, Field JA. 2014. Starved anammox cells are less resistant to NO<sub>2</sub>- inhibition. *Water Research* 65:170-176.
55. Jagadish B, Field JA, Chorover J, Sierra-Alvarez R, Abrell L, Mash EA. 2014. Synthesis of <sup>13</sup>C and <sup>15</sup>N labeled 2,4-dinitroanisole. *Journal of Labelled Compounds and Radiopharmaceuticals* 57:434-436.
56. Li G, Puyol DC-A, J. M., Sierra-Alvarez R, Field JA. 2014. Inhibition of anaerobic ammonium oxidation by heavy metals. *Journal of Chemical Technology & Biotechnology* 90:830-837.
57. Maier RM, Díaz-Barriga F, Field JA, Hopkins J, Klein B, Poulton MM. 2014. Socially responsible mining: the relationship between mining and poverty, human health and the environment. *Rev Environ Health* 29:83-89.
58. Otero-Gonzalez L, Barbero I, Field JA, F. S, Sierra-Alvarez R. 2014. Stability of alumina, ceria, and silica nanoparticles in municipal wastewater. *Water Science and Technology* 70:1533-1539.
59. Otero-Gonzalez L, Field JA, Sierra-Alvarez R. 2014. Fate and long-term inhibitory impact of ZnO nanoparticles during high-rate anaerobic wastewater treatment. *Journal of Environmental Management* 135:110-117.
60. Otero-Gonzalez L, Field JA, Sierra-Alvarez R. 2014. Inhibition of anaerobic wastewater treatment after long-term exposure to low levels of CuO nanoparticles. *Water Research* 58:169-168.
61. Puyol D, Carvajal-Arroyo JM, Li G, Dougless A, Fuentes-Velasco M, Sierra-Alvarez R, Field JA. 2014. High pH (and not free ammonia) is responsible for anammox inhibition in mildly alkaline solutions with excess of ammonium. *Biotechnol Let* 36:1981-1986.
62. Puyol D, Carvajal Arroyo JM, Sierra-Alvarez MR, Field JA. 2014. Nitrite (not free nitrous acid) is the main inhibitor of the anammox process at common pH conditions. *Biotechnology letters* 36:547-551.
63. Puyol D, Carvajal JM, Garcia B, Sierra-Alvarez R, Field JA. 2014. Kinetics and thermodynamics of anaerobic ammonium oxidation process using *Brocadia* spp. dominated mixed cultures. *Water Science and Technology* 69:1682-1688.

64. Rodriguez-Freire L, Sierra-Alvarez R, Root R, Chorover J, Field JA. 2014. Biomineralization of arsenate to arsenic sulfides is greatly enhanced at mildly acidic conditions. *Water Research* 66:242-253.
65. Banihani QH, Field JA. 2013. Treatment of high-strength synthetic sewage in a laboratory-scale upflow anaerobic sludge bed (UASB) with aerobic activated sludge (AS) post-treatment. *Journal of Environmental Science and Health Part a-Toxic/Hazardous Substances & Environmental Engineering* 48:338-347.
66. Gonzalez-Estrella J, Sierra-Alvarez R, Field JA. 2013. Toxicity assessment of inorganic nanoparticles to acetoclastic and hydrogenotrophic methanogenic activity in anaerobic granular sludge. *Journal of Hazardous Materials* 260:278-285.
67. Liang J, Olivares C, Field JA, Sierra-Alvarez R. 2013. Microbial toxicity of the insensitive munitions compound, 2,4-dinitroanisole (DNAN), and its aromatic amine metabolites. *Journal of Hazardous Materials* 262:281-287.
68. Martínez-Hernández S, Sun W, Sierra-Alvarez R, Field JA. 2013. Toluene–nitrite inhibition synergy of anaerobic ammonium oxidizing (anammox) activity. *Process Biochemistry* 48:926-930.
69. Miles SL, Sun W, Field JA, Gerba CP, Pepper IL. 2013. Survival of infectious prions during anaerobic digestion of municipal sewage sludge and lime stabilization of class B biosolids. *Journal of Residuals Science and Technology* 10:69-75.
70. Olivares C, Liang J, Abrell L, Sierra-Alvarez R, Field JA. 2013. Pathways of reductive 2,4-dinitroanisole (DNAN) biotransformation in sludge. *Biotechnol Bioeng* 110:1595-1604.
71. Otero-González L, García-Saucedo C, Field JA, Sierra-Álvarez R. 2013. Toxicity of TiO<sub>2</sub>, ZrO<sub>2</sub>, Fe<sub>0</sub>, Fe<sub>2</sub>O<sub>3</sub>, and Mn<sub>2</sub>O<sub>3</sub> nanoparticles to the yeast, *Saccharomyces cerevisiae*. *Chemosphere* 93:1201-1206.
72. Puyol D, Carvajal JM, Garcia B, Sierra-Alvarez R, Field JA. 2013. Kinetic characterization of *Brocadia* spp.-dominated anammox cultures. *Bioresource Technology* 139:94-100.
73. Sun W, Luna-Velasco A, Sierra-Alvarez R, Field JA. 2013. Assessing protein oxidation by inorganic nanoparticles with enzyme-linked immunosorbent assay (ELISA). *Biotechnol Bioeng* 110:694-701.
74. Carvajal-Arroyo JM, Sun W, Sierra-Alvarez R, Field JA. 2012. Inhibition of anaerobic ammonium oxidizing (Anammox) enrichment cultures by substrates, metabolites and wastewater constituents. *Chemosphere* 91:22-27.
75. Gómez-Rivera F, Field JA, Brown D, Sierra-Alvarez R. 2012. Fate of cerium dioxide (CeO<sub>2</sub>) nanoparticles in municipal wastewater during activated sludge treatment. *Bioresource Technology* 108:300-304.
76. Otero-Gonzalez L, Sierra R, Boitano SA, Field J. 2012. Application and validation of an impedance based real time cell analyzer to measure the toxicity of nanoparticles impacting 16HBE14o- lung epithelial cells. *Environmental Science & Technology* 46:10271–10278.
77. Rodriguez-Freire L, Sun W, Sierra-Alvarez R, Field JA. 2012. Flexible bacterial strains that oxidize arsenite in anoxic or aerobic conditions and utilize hydrogen or acetate as alternative electron donors. *Biodegradation* 23:133-143. 3604901,
78. Tapia-Rodriguez A, Luna-Velasco A, Sierra-Alvarez R, Field JA. 2012. Toxicity of uranium to microbial communities in anaerobic biofilms. *Water Air Soil Pollut* 223 3859-3868.
79. Field JA, Luna-Velasco A, Boitano SA, Shadman F, Ratner BD, Barnes C, Sierra-Alvarez R. 2011. Cytotoxicity and physicochemical properties of hafnium oxide nanoparticles. *Chemosphere* 84:1401-1407.
80. Garcia C, Field JA, Otero-Gonzalez L, Sierra-Alvarez R. 2011. Low toxicity of HfO<sub>2</sub>, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and CeO<sub>2</sub> nanoparticles to the yeast, *Saccharomyces cerevisiae*. *Journal of Hazardous Materials* 192:1572-1579.
81. Halalshah M, Kassab G, Yazajeen H, Qumsieh S, Field J. 2011. Effect of increasing the surface area of primary sludge on anaerobic digestion at low temperature. *Bioresource Technology* 102:748-752.

82. Luna-Velasco A, Field JA, Cobo-Curiel A, Sierra-Alvarez R. 2011. Inorganic nanoparticles enhance the production of reactive oxygen species (ROS) during the autoxidation of L-3,4-dihydroxyphenylalanine (L-Dopa). *Chemosphere* 85:19-25.
83. Ochoa-Herrera V, León G, Banihani Q, Field JA, Sierra-Alvarez R. 2011. Toxicity of copper(II) ions to microorganisms in biological wastewater treatment systems. *Science of The Total Environment* 412–413:380-385.
84. Sun W, Banihani Q, Sierra-Alvarez R, Field JA. 2011. Stoichiometric and molecular evidence for the enrichment of anaerobic ammonium oxidizing bacteria from wastewater treatment plant sludge samples. *Chemosphere* 84:1262-1269.
85. Sun WJ, Sierra-Alvarez R, Field JA. 2011. Long term performance of an arsenite-oxidizing-chlorate-reducing microbial consortium in an upflow anaerobic sludge bed (UASB) bioreactor. *Bioresource Technology* 102:5010-5016. 3081540,
86. Tapia-Rodriguez A, Tordable-Martinez V, Sun W, Field JA, Sierra-Alvarez R. 2011. Uranium bioremediation in continuously fed upflow sand columns inoculated with anaerobic granules. *Biotechnol Bioeng* 108:2583-2591.
87. Chairez M, Luna-Velasco A, Field JA, Ju XM, Sierra-Alvarez R. 2010. Reduction of bromate by biogenic sulfide produced during microbial sulfur disproportionation. *Biodegradation* 21:235-244.
88. Halalsheh MM, Abu Rumman ZM, Field JA. 2010. Anaerobic wastewater treatment of concentrated sewage using a two-stage upflow anaerobic sludge blanket- anaerobic filter system. *Journal of Environmental Science and Health Part a-Toxic/Hazardous Substances & Environmental Engineering* 45:383-388.
89. Halalsheh MM, Muhsen HH, Shatanawi KM, Field JA. 2010. Improving solids retention in upflow anaerobic sludge blanket reactors at low temperatures using lamella settlers. *Journal of Environmental Science and Health Part a-Toxic/Hazardous Substances & Environmental Engineering* 45:1054-1059.
90. Luna-Velasco A, Sierra-Alvarez R, Castro B, Field JA. 2010. Removal of nitrate and hexavalent uranium from groundwater by sequential treatment in bioreactors packed with elemental sulfur and zero-valent iron. *Biotechnol Bioeng* 107:933-942.
91. Sierra-Alvarez R, Cortinas I, Field JA. 2010. Methanogenic Inhibition by roxarsone (4-hydroxy-3-nitrophenylarsonic acid) and related aromatic arsenic compounds. *J Haz Materials* 175:352-358.
92. Sun W, Milner L, Sierra-Alvarez R, Field JA. 2010. Anaerobic oxidation of arsenite linked to chlorate reduction. *Applied and Environmental Microbiology* 76:6804-6811.
93. Sun W, Sierra-Alvarez R, Field JA. 2010. The role of denitrification on arsenite oxidation and arsenic mobility in an anoxic sediment column model with activated alumina. *Biotechnol Bioeng* 107 786-794. 4518441,
94. Sun W, Sierra-Alvarez R, Hsu I, Rowlette P, Field JA. 2010. Anoxic oxidation of arsenite linked to chemolithotrophic denitrification in continuous bioreactors. *Biotechnology and Bioengineering* 105:909-917. 4532337,
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### Refereed Book Chapters

- Field JA. 2016. Natural Production of Organohalide Compounds in the Environment. *In* Adrian L, Löffler FE (ed), *Organohalide-Respiring Bacteria*. Springer-Verlag, Berlin. pp 7-30.
- Olivares, C. I.; Abrell, L.; Chorover, J.; Simonich, M.; Tanguay, R. L.; Sierra-Alvarez, R.; Field, J. A., 2016. Identifying Toxic Biotransformation Products of the Insensitive Munitions Compound, 2,4-Dinitroanisole (DNAN), Using Liquid Chromatography Coupled to Quadrupole Time-of-Flight Mass Spectrometry (LC-QToF-MS). *In* J. E. Drewes and T. Letzel (ed), *Assessing Transformation Products of Chemicals by Non-Target and Suspect Screening – Strategies and Workflows Volume 1*, American Chemical Society;; Vol. 1241, p 133-145.

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- Field, J. A. and G. Lettinga. 1992. Biodegradation of tannins. *In*: H. Sigel (ed.), Metal Ions in Biological Systems. Volume 28: Degradation of Environmental Pollutants by Microorganisms and their Metalloenzymes, Marcel Dekker, Inc., N.Y. pp. 61-97.
- Field, J. A. and G. Lettinga. 1992. Toxicity of tannic compounds to microorganisms. *In*: R. W. Hemingway and P. E. Laks (eds). Plant Polyphenols. Plenum Press, N.Y. 673-692

## Monographs

- Field, J. A. and R. Sierra-Alvarez. 2007. Biodegradability of chlorinated aromatic compounds. Science Dossier 12. Eurochlor, Brussels, Belgium, ([www.eurochlor.org](http://www.eurochlor.org)), pp. 1-126.
- Field, J. A. and R. Sierra-Alvarez. 2004. Biodegradability of chlorinated solvents and related chlorinated aliphatic compounds. Science Dossier 8. Eurochlor, Brussels, Belgium, ([www.eurochlor.org](http://www.eurochlor.org)), pp. 1-100.

## Selected Conference Presentation from the Last 5 years

- Field J. A., Methanogenic Granular Sludge for Priority Inorganic Pollutants. Anaerobic Treatment of High-Strength Industrial and Agricultural Wastes. Marquette University Sept 10-11, 2019 [Keynote].
- Field J. A.<sup>2</sup>, Methanogenic granular sludge for the bioremediation and biorecovery of priority inorganic pollutants. International Water Association Biofilms (IWA) Biofilms: Granular Sludge System Conference. 2018. Delft, The Netherlands, March 18-21st 2018 [ORAL] [BEST PRESENTATION AWARD].
- Field J. A., Simon-Pascual A, Zhu K., Sierra-Alvarez R. 2017 Recovery of platinum group metals (PGM) utilizing anaerobic microbial consortia. *In*: Proceedings of the 15th International Water Association (IWA) World Conference on Anaerobic Digestion, Oct. 17-20, 2017; Beijing, China. pp. 1-4. [ORAL]
- Field J. A., Ramos Ruiz A, Simon Pascual A, Zhu K, Sierra Alvarez R. 2017 Recovery of Critical Metal and Metalloid Resources by Anaerobic Processes; 2017 The 14th International Water Association, Leading Edge Conference on Water and Wastewater Technologies. Innovative technology solutions to address challenges at the water-energy-food interface, May 29th – June 2nd 2017; Florianópolis, Brazil [KEYNOTE]
- Field J. A., Rodriguez-Freire L, Sierra-Alvarez R. 2017 Bioremediación anaerobia de aguas contaminadas con arsénico 2017; Simposio Internacional: Río Tinto, aspectos fundamentales y aplicados de un análogo terrestre de Marte, Madrid, Spain, June 6-7, 2017. [ORAL].

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<sup>2</sup> Underline indicates who presented

- Field J. A., Sierra-Alvarez R, Ayala P. Novel electron donors for bioremediation of acid rock drainage; 2017; Water Reuse Monitoring and Treatment Technologies, Recife, Brazil. May 17th –19th [ORAL]
- Madeira C. L., Chorover J., Sierra-Alvarez R., Field J. A. 2017. Battelle Fourth International Symposium on Bioremediation and Sustainable Environmental Technologies. May 22nd – May 25th, 2017. Miami, Florida [ORAL].
- Field, J. A. Biotransformation and biodegradation of insensitive munitions compounds in soil. Keynote talk for Environmental Chemistry Session, Microbial and Molecular Tools to Determine the Fate and Biotransformation of Emerging Contaminants at 252<sup>nd</sup>. American Chemical Society National Meeting in Philadelphia, PA, August 21-25, 2016. [KEYNOTE].
- Field, J. A. Elimination of heavy metals and sulfur with sulfate reducing bacteria in a permeable reactive barrier permeable with zero valent iron. Developing a Pan American Hub for Environmentally and Socially Compatible Mining. Pontificia Universidad Católica de Perú (PUCP) March 7-9, 2016, Lima, Perú. [INVITED TALK].
- Field, J.A, Sierra-Alvarez, R., Krzmarzick, M., Madeira, C.L., Olivares, C.I., Chorover, J., Abrell, L. Biotransformation pathways dictating the fate in soil of insensitive munition compounds, 2,4-dinitroanisole (DNAN) and 3-nitro-1,2,4-triazole-5-one (NTO). 2016 Society of Industrial Microbiology and Biotechnology Annual Meeting. New Orleans, LA. July 27, 2016. [ORAL]
- Olivares, C. I.; Madeira, C. L.; Abrell, L.; Chorover, J.; Sierra-Alvarez, R.; Field, J. A., Environmental fate of 14C-ring labeled 2,4-dinitroanisole (DNAN) in anaerobic saturated soils. In 250th American Chemical Society National Meeting, Boston, MA., USA, 2015. [ORAL]
- Olivares, C. I.; Abrell, L.; Sierra-Alvarez, R.; Chorover, J.; Field, J. A., Characterization of products of 2,4-dinitroanisole (DNAN) microbial biotransformation and their inhibitory impact to microorganisms. In *250th American Chemical Society National Meeting*, Boston, MA., USA, 2015. [ORAL].
- Olivares, C. I.; Sierra-Alvarez, R.; Abrell, L.; Chorover, J.; Field, J. A., Biotransformation and Microbial Toxicity of 2,4-Dinitroanisole (DNAN). In Society of Environmental Toxicology and Chemistry North America 35TH Annual Meeting, Vancouver, B.C., Canada, 2014. [ORAL]
- Olivares, C. I.; Abrell, L.; Simonich, M.; Chorover, J.; Sierra-Alvarez, R.; Tanguay, R. L.; Field, J. A., Coupling biotransformation of 2,4-dinitroanisole (DNAN) in anaerobic soil microcosms to a multidimensional toxicity assay using zebrafish embryos. In Society of Environmental Toxicology and Chemistry North America 36th Annual Meeting, Salt Lake City, UT., USA, [ORAL]
- Field, J. A., R. Sierra-Alvarez, A. Ramos. Biorefinery for critical elements: Recovery of elemental tellurium nanoparticles from waste streams containing tellurate and tellurite harnessing microbial reduction catalyzed by anaerobic granular sludge. Environmental Technology for Impact, April 29-30<sup>th</sup>, 2015, Wageningen, The Netherlands. [ORAL].
- Field, J. A. C. Leite Madeira; W. Kadoya; S. Speet; R. Sierra-Alvarez, L. Abrell, J. Chorover; and M. Krzmarzick. Biodegradation of insensitive munitions compound, 3-nitro-1,2,4-triazol-5-one (NTO), to mineral products via 3-amino-1,2,4-triazol-5-one (ATO) as the central intermediate. SERDP and ESTCP Webinar Series #34, Insensitive Munitions: Environmental Health Criteria, Fate and Transport, June 2nd, 2016. [INVITED TALK]
- Field, J. A. R. Sierra-Alvarez, C. Olivares, S. Cameron, M. Krzmarzick, H. Amezcua Garcia, C. Alvarez Nieto, L. Abrell, J. Chorover, R. Khatiwada and John Coffey II. Biotransformation of Insensitive Munition Compounds in Soil Microbial Cultures. JANNAF Interagency Propulsion Committee. 61<sup>st</sup> JANNAF Propulsion Meeting (JPM), 42<sup>nd</sup> Structures and Mechanical Behavior (SMBS), 38<sup>th</sup> Propellant and Explosives Development and Characterization (PEDCS), 29<sup>th</sup> Rocket Nozzle Technology (RNTS), 27<sup>th</sup> Safety and Environmental Protection (SEPS), Charleston, SC 19 – 22 May 2014 [ORAL].

Field, J. A. Anaerobic biotransformation of inorganic pollutants: Reducing environmental risk and recovering critical elements. 13<sup>th</sup> World Conference: Anaerobic Digestion 2013, Santiago de Compostela, Spain, June 25-28, 2013. [KEYNOTE].

Field, J. A. Anaerobic biotransformation of inorganic contaminants: Eating inorganic minerals without air to clean the environment. IWA-Mexico's Young Water Professional Conference, San Luis Potosi, Mexico from April 24th-26th, 2013. [PLENARY]

## Research Funding

### Statistics:

Total funding ascribed to Dr. J. A Field:  $\Sigma(\text{total funding} \times \text{fraction award credit}) = \underline{\$ 9,150,887}$

Total ascribed to Dr. J.A. Field from 1991 to 2000 (The Netherlands) = **\$ 2,168,890**

Total ascribed to Dr. J.A. Field from Jan. 2001 to Dec. 2018 (USA) = **\$ 6,981,977**

## Selected Research Projects (in the USA)

*Table continued from previous page*

<b>Award Credit</b>	<b>Title (dates)</b>	<b>Funding Source</b>	<b>Budget</b>
<b>Role %</b>			<b>U.S. \$</b>
PI 40	Complete Biodegradation of Insensitive High Explosive Compounds. Department of Defense, SERDP program. 05/1/2019-04/30/22	SERDP-DoD	1,125,180
PI 40	High Rate Degradation of 3-Nitro-1,2,4-triazol-5-one (NTO) to Environmentally Benign End Products in Sequential Reducing-Oxidizing Reactive Mineral Packed Bed Reactors. Department of Defense, SERDP program. 05/1/2019-04/30/22.	SERDP-DoD	678,000
PI 60	LSAMP Bridge to the Doctorate: (University of Arizona, Western Alliance to Expand Student Opportunities) (6/30/2018 – 7/1/2020)	HRD-NSF	1,075,000
CoPI 50	Evaluation of the Nitrification Inhibition of Treated Effluents. Global Foundries. (10/15/2017-6/30/2019)	Global Foundries	144,600
CoPI 40	Mechanisms of nitrification inhibition by azoles: A framework to promote azole detoxification, biodegradation and green chemistry (01/01/2018-12/31/2018)	Semiconductor Research Corporation	269,997
PI 40	Environmental, Safety & Health Properties of "Onium" Photoacid Generators and Their Photodegradation Products (04/01/2018-03/31/2020)	Semiconductor Research Corporation	403,567

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<b>Award Credit</b>	<b>Title (dates)</b>	<b>Funding Source</b>	<b>Budget</b>
<b>Role %</b>			<b>U.S. \$</b>
CoPI 30	Remediation of Per- and Polyfluoroalkyl Contaminated Groundwater Using Cationic Hydrophobic Polymers as Ultra-High Affinity Sorbents. Department of Defense, SERDP program. 05/-1/2018-12/31/2020	SERDP-DoD	1,211,467
CoPI 2.8	Risk and Remediation of Metal-Mining Wastes (08/01/2017 – 07/31/2019)	NIEHS-NIH Superfund	3,281,401
PI 60	Collaborative Research: WERF: GOALI: Bioaugmentation-Enhanced Anammox for Mainstream Nitrogen Removal (08/01/2017-07/31/2020)	CBET-NSF	250,000
PI 60	Anammox Pilot Testing (05/01/2017 – 09/30/2018)	Pima County	141,234
PI 90	Bridge to Doctorate: WAESO LSAMP, Self-Efficacy and Academic Community for Underrepresented Minority Student Success (09/01/2016 – 08/31/2018).	HRD-NSF	1,068,500
PI 50	Graduate Student Mobility for Water Quality and Reuse in the Americas (12/01/2016 – 11/30/2017)	Partners in America 100K	25,000
PI 50	Developing a Pan American Hub for Environmentally and Socially Compatible Mining. (01/01/2016 – 12/31/ 2017	R13-NIH	30,500
PI..40	Oligomers Derived from Emerging Nitroaromatic Pollutants in Anaerobic Environments: Mechanisms, Fate and Toxicity (08/15/2015 - 07/31/ 2018).	CBET-NSF	330,000
PI 50	Environmentally and Socially Responsible Mining for the Protection of Vulnerable Populations and Surrounding Environment in Latin America (04/07/2014 – 04/06/2015)	R13-NIH	37,203
PI 60	Improving the Reliability of Anaerobic Ammonium Oxidation (ANAMMOX) as an N-Removal Technology through a Mechanistic Understanding of Irreversible Nitrite Inhibition (4/1/2013 – 3/31/2016)	CBET-NSF	340,370
PI 40	Interaction of Microbial and Abiotic Processes in Soil Leading to the (Bio)Conversion and Ultimate Attenuation of New Insensitive Munitions Compounds (03/1/12-02/09/17)	SERDP-DoD	1,041,000

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<b>Award Credit</b>	<b>Title (dates)</b>	<b>Funding Source</b>	<b>Budget</b>
<b>Role %</b>			<b>U.S. \$</b>
CoPI 20	Role of Mineral Genesis, Dissolution, and Sorption on Arsenic Fate in Contaminated Sites (4/1/2010 – 3/31/2015)	NIEHS-NIH Superfund	1,947,000
PI 50	Outreach Core to Underrepresented Groups in the US-Mexico Border Region (4/1/2010 – 3/31/2015)	NIEHS-NIH Superfund	514,988
PI 50	Landfill Leachate Treatment: Anammox combined with Advanced Oxidation (07/10-06/13)	US-Egypt Science Collaboration – USDA	90,000
PI 20	Environmental Safety and Health (ESH) Impacts of Emerging Nanoparticles and Byproducts from Semiconductor Manufacturing. (04/09-04/12)	Semiconductor Research Cooperation	1,020,000
PI 100	Anaerobic Sewage Treatment for Sustainable Water Reclamation in Jordan (07/01/06-06/31/08)	International Arid Lands Consortium USDA	87,993
CoPI 50	Chemolithotrophic Denitification as the Missing Link in the Arsenic Biogeochemical Cycle (09/01/05 - 8/31/07)	USGS-NIWR 104G	121,163
CoPI 50	U.S.-Mexico Binational Center for Environmental Science and Toxicology: Collaborative Projects, Educational Materials and Outreach Program (02/015/06 - 02/15/09)	U.S. EPA STAG	962,200
CoPI 50	U.S.-Mexico Binational Center for Environmental Science and Toxicology: Collaborative Projects, Educational Materials and Outreach Program (02/015/06 - 02/15/09)	U.S. EPA EPM	496,000
CoPI 50	U.S.-Mexico Higher Education Partnership in Environmental Science and Toxicology (07/01/04 - 06/31/07)	TIES-USAID	300,000
PI 34	Agricultural Chemicals as a Major Non-Point Source of Arsenic: Microbial Transformation of Organic Arsenicals. (2002-2004)	USGS-NIWR 104G	153,164
PI 50	Sulfide as the Main Electron Donor for Denitrification of Petroleum Refinery Effluents- A Novel Approach for Simultaneous Removal of S, N, & C. (2001-2004).	NSF US-Mexico Collaborative Projects	112,284

## Teaching

### **Courses, Enrollment and TCE are presented in Table starting on the next page**

#### **Courses Taught: International Training**

Getting ready to write a scientific article. Workshop at *Universidad de Santiago de Compostela* (Spain), on June 14<sup>th</sup>, 2011

Acid Mine Drainage: Characterization, Remediation and Health Effects. Feb 8-10, 2010, Taxco, Mexico

Priority of Health Effects and Management of Contaminants in Southern Sonora. October 27-28, 2008, Ciudad de Obregon, Mexico

Health Effects and Remediation of Mine Tailings. June 4-6, 2007, Faculty of Medicine of the *Universidad Autonoma de San Luis Potosi*, San Luis Potosi, Mexico

Environmental Sciences and Toxicology: The Lagunera Region. November 13-15, 2006, Gomez Palacio, Durango, Mexico and Torreon, Coahuila, Mexico

Fate, Toxicity and Remediation of Heavy Metals, Univ. Sonora, Hermosillo, Mexico, December 2005

Advances in Environmental Toxicology and Environmental Sciences, CICESE, Ensenada, Mexico March 2005

Recent Advances in Toxicology. Sept. 22-23, 2004, Mexico City, Mexico

Water Reuse Course for Visiting Jordanian Scientists, December 2003 at the University of Arizona

Bioremediation Course, *Universidad de Valladolid*, Valladolid Spain, December 2002

Anaerobic Treatment Coffee Wastewater, Matagalpa (5 weeks), Nicaragua, 1990

Anaerobic Workshop, *Universidad de Valle*, Cali, Colombia 1987.

## Enrollments and Teaching Course Evaluations of Dr. Jim Field's Teaching at the University of Arizona<sup>†</sup>

### Part A. Fall Semester Courses

Term	Course	Title	Enrollment	Overall Rating Teaching Effectiveness*	Overall Rating Course
Fall 2002	CHEE-450-001	Introduction to Biotechnology	12	2.92	2.92
Fall 2002	ENGR-102-008	Introduction to Engineering	43	3.23	3.03
Fall 2003	CHEE-450-001	Introduction to Biotechnology	21	4.06	3.44
Fall 2003	ENGR-102-013	Introduction to Engineering	46	3.95	3.71
Fall 2004	CHEE-577A-001	Microbiology for Engineers	14	4.23	4.00
Fall 2004	ENGR-102-006	Introduction to Engineering	42	3.93	3.43
Fall 2005	CHEE-450-001	Introduction to Biotechnology	37	3.84	3.59
Fall 2005	CHEE-577R-001	Microbiology for Engineers	11	4.78	4.33
Fall 2006	CHEE-477R-001	Microbiology for Engineers	11	4.27	4.00
Fall 2008	CHEE-477R-001	Microbiology for Engineers	47	4.30	3.89
Fall 2009	CHEE-477R-001	Microbiology for Engineers	57	4.47	3.86
Fall 2010	CHEE-477R-001	Microbiology for Engineers	64	3.70	3.38
Fall 2011	CHEE-477R-001	Microbiology for Engineers	56	3.63	3.29
Fall 2012	CHEE-477R-001	Microbiology for Engineers	65	3.73	3.36
Fall 2013	CHEE-477R-001	Microbiology for Engineers	67	3.77	3.50
Fall 2013	HNRS-195I-015	Special Topics in Science	11	ND*	ND
Fall 2014	CHEE-477R-001	Microbiology for Engineers	74	3.73	3.43
Fall 2014	HNRS-195I-014	Special Topics in Science	15	3.91	3.18
Fall 2015	CHEE-477R-001	Microbiology for Engineers	70	3.49	3.16
Fall 2016	CHEE-477R-001	Microbiology for Engineers	49	2.73	2.22
Fall 2016	CHEE-577R-001	Microbiology for Engineers	10	4.50	4.25
Fall 2017	CHEE-477R-001	Microbiology for Engineers	47	3.98	3.40
Fall 2017	CHEE-577R-001	Microbiology for Engineers	12	4.5	4.25
Fall 2018	CHEE-477R-001	Microbiology for Engineers	46	4.16	ND
Fall 2018	CHEE-577R-001	Microbiology for Engineers	4	5.0	ND

\*ND = no data, scale 1-5;

<sup>†</sup> Graduate student committee responsibilities are listed after MS students advised;



## Enrollments and Teaching Course Evaluations of Dr. Jim Field's Teaching at the University of Arizona

### Part B. Spring Semester Courses

Term	Course	Title	Enrollment	Overall Rating Teaching Effectiveness	Overall Rating Course
Spr 2003	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	11	4.33	4.17
Spr 2004	CHEE-542-001	Bioremediation of Inorganic Contaminants	8	4.67	4.33
Spr 2004	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	5	4.33	3.92
Spr 2005	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	12	3.60	4.00
Spr 2005	SWES-440-001	Biodegradation of Poll. in Soil and Groundwater	21	4.89	4.56
Spr 2006	CHEE-473-001	Biodegradation of Hazardous Organic Compounds	9	4.67	4.42
Spr 2006	CHEE-542-001	Bioremediation of Inorganic Contaminants	13	4.20	4.00
Spr 2007	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	6	4.63	4.25
Spr 2009	CHEE-473-001	Biodegradation of Hazardous Organic Compounds	8	4.67	4.50
Spr 2009	CHEE-542-001	Bioremediation of Inorganic Contaminants	8	4.40	4.20
Spr 2011	CHEE-473-001	Biodegradation of Hazardous Organic Compounds	6	4.80	4.00
Spr 2011	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	5	4.23	3.77
Spr 2012	CHEE-510-001	Logistics of Writing a Manuscript for Engineering	13	4.67	4.33
Spr 2012	CHEE-542-001	Bioremediation of Inorganic Contaminants	9	4.44	3.89
Spr 2013	CHEE-510-001	Logistics of Writing a Manuscript for Engineering	11	4.83	4.33
Spr 2013	CHEE-573-001	Biodegradation of Hazardous Organic Compounds	6	5.00	4.67
Spr 2014	CHEE-510-001	Logistics of Writing a Manuscript for Engineering	6	4.50	4.10
Spr 2015	CHEE-510-001	Logistics of Writing a Manuscript for Engineering	15	4.50	4.10

† Graduate student committee responsibilities are listed after MS students advised

## Graduate Student Advising

### PhD students graduated

1. De Jong, E. Physiological Roles and Metabolism of Fungal Aryl Alcohols. December 1<sup>st</sup>, 1993. Wageningen University.
2. Kato, M. T. The Anaerobic Treatment of Low Strength Soluble Wastewaters. June 10<sup>th</sup>, 1994. Wageningen University.
3. Florencio, L. Fate of Methanol in Anaerobic Bioreactors. June 10<sup>th</sup>, 1994. Wageningen University.
4. Razo-Flores, E. Biotransformation and Biodegradation of N-Substituted Aromatics in Methanogenic Granular Sludge. September 19<sup>th</sup>, 1997. Wageningen University.
5. Kotterman, M. Polycyclic Aromatic Hydrocarbon Degradation by the White Rot Fungus *Bjerkandera* sp. strain BOS55. October 4<sup>th</sup>, 1998. Wageningen Agricultural University.
6. Mester, T. Role of Manganese and Veratryl Alcohol in the Ligninolytic System of *Bjerkandera* sp. Strain BOS55. September 9<sup>th</sup>, 1998. Wageningen University.
7. Kortekaas, S. Sequenced Anaerobic-Aerobic Treatment of Hemp Pulping Wastewaters. November 4<sup>th</sup>, 1998. Wageningen University.
8. Teunissen, P. The role of natural chlorinated hydroquinone metabolites in ligninolytic fungi. June 16<sup>th</sup>, 1999. Wageningen University.
9. Van Eekert, M. Transformation of chlorinated compounds by methanogenic granular sludge. June 21<sup>st</sup>, 1999. Wageningen University.
10. ten Have, R. Lignin peroxidase mediated biotransformations useful in the biocatalytic production of vanillin. 2000, Wageningen University
11. Tan, N. Integrated and sequential anaerobic/aerobic biodegradation of azo dyes. 2001, Wageningen University
12. Hage, A. Biocatalytic conversions by white rot fungi: exploring the reductive system. 2001, University of Amsterdam
13. van der Zee, F. Anaerobic azo dye reduction. 2002, Wageningen University.
14. Cervantes-Carrillo, Quinones as electron acceptors and redox mediators for the anaerobic biotransformation of priority pollutants. 2002, Wageningen University
15. Guerrero, C. The role of redox mediators on the anaerobic degradation of chlorinated solvents. 2004, University of Arizona
16. Cortinas Lopez, I. Microbial Transformation of Arsenic and Organoarsenic Compounds in Anaerobic Environments. 2007. University of Arizona
17. Sun, W. Anoxic Oxidation of Arsenite. 2008, University of Arizona
18. Ochoa, V. Removal of Perfluorooctane Sulfonate (PFOS) and Related Compounds from Industrial Effluents. 2008. University of Arizona
19. Banihani, Q. Anaerobic - Aerobic Treatment of Domestic Sewage for the Removal of Carbonaceous and Nitrogenous Contaminants. 2009, University of Arizona

20. Gamez Grijalva, V.M. Biological and Physical-Chemical Methods for Treatment of Semiconductor Manufacturing Effluents. 2009. University of Arizona.
21. Gomez-Rivera, F. "Removal of Inorganic Oxide Nanoparticles during Activated Secondary Sludge Treatment and during the Bioremediation of Landfill Leachate". 2010. University of Arizona.
22. Tapia-Rodriguez, A. Anaerobic Bioremediation of Hexavalent Uranium in Groundwater. 2011. University of Arizona
23. Carvajal-Arroyo, J.M. Treatment of Nitrogen Nutrient Using Anaerobic Ammonium Oxidation (ANAMMOX) bioreactors. University of Arizona, 2013.
24. Otero-Gonzalez, L. Mechanisms and screening of nanotoxicity. 2014. University of Arizona.
25. Rodriguez Freire, L. The Role of Microorganisms in the Biogeochemical Cycle of Arsenic in the Environment. 2014. University of Arizona.
26. Gonzalez Estrella, J. Toxicity nanoparticles to biological wastewater treatment processes. University of Arizona. 2014. University of Arizona.
27. Olivares-Martinez, C. Biotransformation of insensitive munitions compounds. University of Arizona. 2015
28. Ramos-Ruiz, A. Fate of emerging semiconducting materials in landfills. University of Arizona. 2016
29. Guangbin, Li. Toxicity mechanisms of Anaerobic Ammonium Oxidation (ANAMMOX). University of Arizona. 2016
30. Ayala, P.A. Passive treatment of acid mine drainage. University of Arizona. 2016.
31. Chao Zeng, Potential Environmental and Health Risks from Engineered Nanoparticles and III-V Materials Used in the Semiconductor Industry. University of Arizona. 2016

#### PhD students current

- Madeira, C. Biotransformation and biodegradation of nitro-aromatic and nitro-heterocyclic compounds and their amines. University of Arizona
- Chi Nguyen. Environmental Safety and Health Aspects III-V semiconducting materials
- Kadoya W. Adduct formation during anaerobic biotransformation of nitroaromatic pollutants.
- Nivrutti Lakhey, Anammox
- Kalyani Vikas Jog. Biodegradation of Azoles
- Youngjae Yu. Transformation of explosive compounds by soil minerals

#### MS students graduated (list is for USA only; approximately 30 Ir. Candidates in The Netherlands)

1. Brady, L. Stimulation of azo dye biotransformation with redox mediators. 2002. University of Arizona.
2. Cortinas-Lopez, I. Microbial Transformation and Mobilization of Arsenate under Landfill Conditions. 2004. University of Arizona.
3. Karri, S.L. Bioremediation of Heavy Metals Using Sulfate Reducing Bacteria. 2004. University of Arizona.
4. Francis, J. Anaerobic biotransformation of chloroform. 2005. University of Arizona
5. Howard, B.R. Zero-Valent Iron as an Electron Donor for the Biological Treatment of Acid Mine Drainage Using Sulfate-Reducing Bacteria. 2006. University of Arizona.
6. Ochoa Herrera, V.L. Removal of Perfluorooctane Sulfonate (PFOS) by Sorption onto Activated

- Carbon and onto Wastewater Treatment Sludge. 2006. University of Arizona.
7. Sun, W. Anoxic Oxidation of Arsenite to Arsenate Linked to Denitrification. 2006, University of Arizona.
  8. Trujillo Silva, M.A. Chemolithotrophic reduction of perchlorate with reduced sulfur compounds as electron donors. 2006. University of Arizona.
  9. Chairez Llamas, M.C. Application of elemental sulfur as electron donor for the remediation of water contaminated with nitrate and bromate. 2006. University of Arizona.
  10. Gamez Grijalva, V.M. Recovery of heavy metals from wastewater by means of a sulfate reducing bioreactor and a crystallization reactor. 2006. University of Arizona.
  11. Byrnes, D.J. Microbial competition for elemental sulfur used as electron donating substrate for perchlorate reduction. 2007. University of Arizona.
  12. Carvajal-Kottmann, D.I. Bioremediation of manganese in acid mine drainage. 2008. University of Arizona.
  13. Leon-Garcia, G.L. Inhibitory impact of fluoride and copper ions on biological wastewater treatment systems. 2008. University of Arizona.
  14. Tapia-Rodriguez, A. Bioremediation of hexavalent uranium plumes in groundwater. 2009. University of Arizona.
  15. Gomez-Rivera, F. "Anaerobic Biodegradation of Benzene, Toluene, m-Xylene and cis-DCE." 2009. University of Arizona.
  16. Swanson, C. Investigation of anaerobic biodegradability of municipal primary settled solids. 2009. University of Arizona.
  17. Rodríguez-Freire, L. Metabolic characterization of chemolithotrophic arsenite-oxidizing nitrate-reducing bacterial strains. 2010. University of Arizona.
  18. Rodriguez, M. Impact of Wastewater Components on the Aggregation Behavior of Nanoparticles in Chemomechanical Planarization (CMP) Slurries. 2011. University of Arizona.
  19. Barbero-Ortega, I. Environmental, safety and health impacts of emerging nanoparticles from semiconductor manufacturing. 2011. University of Arizona.
  20. Carvajal-Arroyo, J.M. Assessment of inhibition of the ANAMMOX process. Improvement of biomass retention in ANAMMOX bioreactors. 2012. University of Arizona.
  21. Otero-Gonzalez, L. Application and validation of an impedance-based real time cell analyzer to measure the toxicity of nanoparticles impacting 16HBE14o- lung epithelial cell. 2012. University of Arizona.
  22. Ramos-Ruiz, A. Fate of gallium arsenide in mixed municipal waste landfills. Univ. of Arizona, 2013
  23. Liu, Yuanzhe. Biodegradation of algae biomass, University of Arizona. 2014
  24. Zeng, Chao. Corrosion of discarded photovoltaic cells in landfills, University of Arizona. 2014
  25. Speet, S. Biodegradation of Insensitive Munitions Compounds, University of Arizona. 2015
  26. Vilcherez, D. Anaerobic ammonium oxidation, University of Arizona. 2015
  27. Orenstein, E. Leaching of arsenic from electronic waste. University of Arizona. 2015
  28. Madeira, C. Biotransformation explosive compounds. University of Arizona. 2015
  29. Kechen Zhu. Biorecovery of Rhodium 2017
  30. Kadoya, W. Oligomer formation during nitroaromatic reduction 2017
  31. Alvaro Simon-Pascual Biorecovery of Platinum 2018
  32. Kalyani Vikas Jog. Biodegradation/Toxicity of Azoles 2018
  33. Nivrutti Lakhey. Anammox 2018

### MS students current

- Derek Swartzendruber, Combined partial nitrification and anammox mainstream
- Kelly Umlauf, bioreduction antimony
- Erica Vanover, biodegradation and microbial toxicity of azoles
- Mallory McMurry, Anammox bioreactors

### Graduate student committee responsibilities

Dr. Jim A. Field serves on the graduate committees of students he advises or co-advises and typically one to three additional students from the Department of Chemical and Environmental Engineering or other departments across campus. For example in addition to his current graduate students, in calendar year 2018, he was also on the committees of the following students:

- Bincong Zhang, PhD student of Dr. Kim Ogden in the Environmental Engineering program
- Valentino Dhiyu Asmoro, Professional Science Masters of Dr. Joel Cuello in the GIDP Applied Biosciences Program
- Aiden Richard Foster, Professional Science Masters of Dr. Ian Pepper in the GIDP Applied Biosciences Program

Dr. Jim A. Field also provides service to the graduate programs by serving on the Graduate Council (since 2015)

### **Post Doctoral Advising Since Arriving at UA**

1. Dr. F. van der Zee 2002 Azo Dye Biodegradation (*now at* Biothane, The Netherlands)
2. Dr. R. Bersitain 2004-2005 Chemolithotrophic Denitrification (*now lecturer at* Universidad Autonoma Metropolitana, Mexico City, Mexico)
3. Dr. Margarita Salazar 2004 Perchlorate Bioreduction (*now at* Novozymes, Denmark);
4. Dr. Xiumin Ju 2005-2006 Perchlorate Bioreduction (*now at* Westland Resources, Tucson);
5. Dr. Antonia Luna 2006 & 2008-2010 Uranium bioreduction and (*now faculty at* CIMAV, Chihuahua, Mexico);
6. Dr. Johanna Santamaria 2006-2007 Perchlorate Bioreduction (*now faculty at* Universidad de Bogotá Jorge Tadeo Lozano, Colombia)
7. Dr. W. Sun 2007-2010 Arsenic bioremediation (*now faculty at* Southern Methodist University)
8. Dr. S. Martinez 2011 Anaerobic Ammonia Oxidation (*now at* Instituto de Biotecnología y Ecología Aplicada (INBIOTECA), Universidad Veracruzana, Mexico).
9. Dr. J. Liang 2011 Biodegradation of explosives (*now faculty at* Xian Jiatong Univ., China);
10. Dr. D. Puyol 2012-2013 Anaerobic Ammonia Oxidation (*now faculty at* of Chemical and Environmental Engineering, Universidad de Rey Juan Carlos, Mostoles, Madrid, Spain).
11. Dr. M. Krzmarzick 2012-2013 Biodegradation of Explosives (*now faculty at* Oklahoma State Univ.)
12. Dr. S. Cameron. 2013-2014 Biodegradation of Explosives (*now at* U.S. EPA)
13. Dr. Guangbin Li 2016-2018. Anammox (*in progress, will become faculty at* University of Maryland in 2019)
14. Dr. Adriana Ramos-Ruiz. Biorecovery of Tellurium 2016-2017 (*now between* employment)
15. Dr. Xi-Zhi Niu. Environmental Safety and Health Characteristics of Onium compounds (*in progress*)

## Conference Organization (Recent Examples)

- 2018 Scientific committee “International Water Association Biofilms (IWA) Biofilms: Granular Sludge System Conference. 2018. Delft, The Netherlands, March 18-21st 2018”
- 2017 Conference Session Chair. E6. Insensitive Munitions: Characterization, Fate, and Transport. Fourth International Symposium on Bioremediation and Sustainable Environmental Technologies (Battelle). May 22nd – May 25th, 2017. Miami, Florida.
- 2017 Co-Chairman “Workshop on Water Reuse in Recife Brazil,” May 17th-19th, 2017, Recife Brazil
- 2017 Scientific Committee “15<sup>th</sup> IWA World Conference on Anaerobic Digestion (AD-15), Oct 7<sup>th</sup> – 20<sup>th</sup>, 2017, Beijing, China
- 2016 Co-Chairman, “Developing a Pan American Hub for Environmentally and Socially Compatible Mining.” March 6-9th, 2016. Lima, Peru.
- 2015 Scientific committee, “14<sup>th</sup> World Congress on Anaerobic Digestion” Nov. 15<sup>th</sup>-18<sup>th</sup>, Viña del mar, Chile
- 2014 Co-Chairman, “Latin American Conference on Compatible Mining: Protecting Vulnerable Populations and the Surrounding Environment” Sep 8-10, 2014, San Luis Potosi, Mexico
- 2013-2014 Scientific Committee. “*XI Workshop and Latin American Symposium on Anaerobic Digestion*” (DAAL) Nov. 2014. La Habana, Cuba.
- 2013 Session CoChair. Developing a Framework for Socially Responsible Mining. Conference of the Pacific Basin Consortium for Environment and Health. 24-27 September 2013. Honolulu, Hawaii, USA. [
- 2013 Scientific Committee of 13th World Congress on Anaerobic Digestion, Recovering (Bio) Resources for the World, June 25-28, 2013, Santiago de Compostela, Spain

## Disclosures and Patents

UA17-086 – 2016-September - Disclosure- High-rate Treatment of 3-Nitro-1,2,4-triazol-5-one (NTO) and Other Munitions Compounds, Field (34%) / Sierra-Alvarez (33%) / Chorover (33%). This patent is now provisional US Patent Application No. 62482987.

UA13-072 – 2013 Sorbent for Removal of Perflourinated Compounds From Water, Sierra-Alvarez (50%) / Field (50%)

UA06-093 - 2006-Jun-30 -Use of Zero Valent Iron as an Electron Donor for Sulfate Reduction to Treat Acid Rock Drainage, Field (50%) / Sierra-Alvarez (50%)

UA04-089 -2004-Jun-01- (Active) Perchlorate Removal from Ground- and Irrigation Water, Sierra-Alvarez (50%) / Field (50%)

USA Pat. No. 4,765,901, 1987 (Field 100%) Method for treating wastewater.