**Chen Zhou, Ph.D.**

Biodesign Swette Center for Environmental Biotechnology

Arizona State University

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(480) 634-3755

# EDUCATION

**Ph.D.** Environmental Engineering, **Arizona State University** (2011-2014)

**M.S.E.** Environmental Engineering, **Arizona State University** (2007-2011)

**B.E.** Environmental Science, **Nanjing University**, China (2003-2007)

# ACADEMIC EXPERIENCE

***Assistant Research Scientist****,* 11/2016 – Present **Arizona State University**

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| --- | --- |
| * Project: | Synergistic Reductive Dechlorination of 1,1,1-Trichloroethane and Trichloroethene and Aerobic Biodegradation of 1,4-Dioxane |
| Duration: | 05/2017 – 04/2018 |
| Funder: | U.S. Department of Defense (DOD)  Strategic Environmental Research and Development Program (SERDP) |
| My role: | Leading researcher |

***Postdoctoral Research Associate***, 05/2014 – 11/2016 **Arizona State University**

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| * Project: | Biofilm-supported recovery of precious metals from waste streaming and subsequent applications to water treatment |
| Duration: | 03/2015 – |
| Funder: | Arizona State University Swette Funds |
| My role: | Leading researcher |

***Graduate Research Assistant***, 05/2008 – 04/2014 **Arizona State University**

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| * Project: | Using Sulfate for Enhanced Natural Attenuation of BTEX Source Mass Reduction |
| Duration: | 03/2013 – 01/2015 |
| Funder: | Chevron |
| My role: | Leading researcher |
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| * Project: | Assessing the Role of Iron Sulfides in the Long Term Sequestration by Sulfate-Reducing Bacteria (SRB) |
| Duration: | 08/2009 – 08/2012 |
| Funder: | U.S. Department of Energy (DOE) Subsurface Biogeochemical Research (SBR) |
| My role: | Leading researcher |
|  |  |
| * Project: | Assessing the Role of Iron Sulfides in the Long Term Sequestration by SRB |
| Duration: | 08/2009 – 08/2012 |
| Funder: | U.S. Department of Energy (DOE) Subsurface Biogeochemical Research (SBR) |
| My role: | Leading researcher |
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| * Project: | Optimizing the Sustainability of Treatment Processes for Nitrate Removal in Inland Communities |
| Duration: | 07/2008 – 03/2009 |
| Funder: | City of Glendale |
| My role: | Assistant researcher |
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| * Project: | Evaluation of the Hydrogen-Based Membrane Biofilm Reactor (MBfR) for Treatment of NDMA and Co-contaminants |
| Duration: | 03/2008 – 04/2008 |
| Funder: | NASA |
| My role: | Leading researcher |
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| * Project: | Fate modeling of PCB in wastewater treatment in along the Fox River, Wisconsin |
| Duration: | 05/2008 – 04/2009 |
| Funder: | Sidley Austin Brown & Wood LLP |
| My role: | Consultant |

***Graduate Teaching Assistant***, 08/2007 – 05/2008 **Arizona State University**

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| * Course: | CEE361 Introduction to Environmental Science and Engineering |
| Duration: | 08/2007 – 05/2008 (2 semesters) |

# PROFESSIONAL EXPERIENCE

***Chief Research Officer****,* 11/2017 – Present **Precient Technologies, LLC**

* Co-founder of the company providing innovative technologies for precious metal recovery and wastewater treatment.
* Responsible for detailed implementation of Research and Development (R&D) strategic programs.

# PUBLICATIONS

# Peer-Reviewed Journal Articles

*- As first and/or corresponding (\*) author:*

1. Long, M.; Ilhan, Z.E.; Xia, S.\*; Zhou, C.**\***; Rittmann, B.E. 2018. Complete dechlorination and mineralization of pentachlorophenol (PCP) in a H2-based membrane biofilm reactor (MBfR). ***Water Research*** ,144: 134-144
2. Liu, Z.; Zhou, C.**\***; Ontiveros-Valencia, A.; Luo, Y.H.; Long, M.; Xu, H.; Li, A.; Rittmann, B.E. Continuous Benzene Removal through Aerobic Benzene Activation Followed by Denitrification-Coupled Degradation in a O2-based Membrane Biofilm Reactor. ***Biotechnology & Bioengineering***, 115(8): 1988-1999. (cover paper)
3. Li, A.; Liu, Z.; Xu, X.; Zhou, Y.; Zhou, D.; Zhou, C.**\***; Tang, Y.; Ma, F.; Rittmann, B.E. 2018. Direct Solid-State Evidence of H2-Induced U(VI) Reduction by Extracellular Polymeric Substances (EPS). ***Biotechnology & Bioengineering***, 115(7): 1685-1693. (cover paper)
4. Ontiveros-Valencia, A.; Zhou, C.**\***; Ilhan, Z.E.; de Saint Cyr, L.C.; Krajmalnik-Brown, R.; Rittmann, B.E. 2017. Total electron acceptor loading and composition affect hexavalent uranium reduction and microbial community structure in a Membrane Biofilm Reactor. ***Water Research***, 125:341-349.
5. Zhou, C.**\***; Zhou, Y.; Rittmann, B.E. 2017. Electron donor regulates electron flow for dissimilatory sulfate and FeIII reductions and biogenic iron-sulfide crystallization with *Desulfovibrio vulgaris*. ***Water Research***, 119: 91-101.
6. Zhou, C.**\***; Wang, Z.; Ontiveros-Valencia, A.; Long, M.; Lai, C.Y.; Zhao, H.P.; Xia, S.; Rittmann, B.E. 2017. Coupling of Pd nanoparticles and denitrifying biofilm promotes H2-based nitrate removal with greater selectivity towards N2. ***Applied Catalysis B: Environmental***, 206: 461−470.
7. Zhou, C.**\***; Wang, Z.; Marcus, A.K.; Rittmann, B.E. 2016. Biofilm-Enhanced Continuous Synthesis and Stabilization of Palladium Nanoparticles (PdNPs). ***Environmental Science: Nano***, 3: 1396−1404.
8. Zhou, C.**\***; Ontiveros-Valencia, A.; Wang, Z.; He-Ping, Z.; Maldonado, J.; Krajmalnik-Brown, R.; Rittmann, B.E. 2016. Palladium recovery in a H2-based membrane biofilm reactor: formation of Pd(0) nanoparticles through enzymatic and autocatalytic reductions. ***Environmental Science & Technology***, 50(5): 2546−2555.
9. Zhou, C.**\***; Liu, Z.; Pataranutaporn, P.; Vannela, R.; Hayes, K.F.; Rittmann, B.E. 2015. Biogenic nano-particulate iron sulfide produced through sulfate and Fe(III)-(hydr)oxide reductions by *Desulfovibrio vulgaris*. ***RSC Advances***, 5 (122): 100750–100761.
10. Zhou, C.; Ontiveros-Valencia, A.; de Saint Cyr, L.C.; Zevin, A.S.; Carey, S.E.; Krajmalnik-Brown, R.; Rittmann, B.E. 2014. Uranium removal and microbial community in a H2-based membrane biofilm reactor. ***Water Research***, 64(1): 255–264.
11. Zhou, C.**\***; Vannela, R.; Hyun, S.; Hayes, K.F.; Rittmann, B.E. 2014. Growth of *Desulfovibrio vulgaris* when respiring U(VI) and characterization of biogenic uraninite.***Environmental Science & Technology***, 48(12): 6928–6937.
12. Zhou, C.**\***; Vannela, R.; Hayes, K.F.; Rittmann, B.E. 2014. Effect of growth conditions on microbial activity and iron-sulfide production by *Desulfovibrio vulgaris*. ***Journal of Hazardous Materials***, 272: 28–35.

*- As co-author:*

1. Ontiveros-Valencia, A.; Zhou, C.; Zhao, H.P.; Krajmalnik-Brown, R.; Tang, Y.; Rittmann, B.E. 2018. Managing microbial communities in membrane biofilm reactors. *Applied Microbiology and Biotechnology*, (accepted).
2. Cui, X.; Huo, M.; Chen, C.; Yu, Z.; Zhou, C.; Li, A.; Qiao, B.; Zhou, D.; Crittenden, J.C. 2018. [Low concentrations of Al(III) accelerate the formation of biofilm: Multiple effects of hormesis and flocculation](https://www.researchgate.net/publication/324415583_Low_concentrations_of_AlIII_accelerate_the_formation_of_biofilm_Multiple_effects_of_hormesis_and_flocculation?_sg=1z5ShYmoRNhIw242-nXi-xLW790BE0LR3W3kWBTvMqSUIMd5w667wXVllZz1w8mhqRPCPNZKN-TP8EvwSN0Pn7gzj1D6YZ3IhFUaoOGo.jA_dze4iARyxc0GVTeRv_6p-e0neJbXSr-n_rP7xGCSqt6GZo7BTlodQnwphIxyqIKzZuO-l0GTVp9NFM8uMmQ). *Science of the Total Environment*, 634: 516-524.
3. Wu, Q.; Zhang, X.; Liu, C.; Zhou, C. 2018. The de-industrialization, re-suburbanization and health risks of brownfield land reuse: Case study of a toxic soil event in Changzhou, China. *Land Use Policy*, 74: 187-194.
4. Zhou, Y.; Lai, Y.S.; Eustance, E.; Straka; Zhou, C.; Xia, S.; Rittmann, B.E. 2017. How myristyltrimethylammonium bromide enhances biomass harvesting and pigments extraction from *Synechocystis* sp. PCC 6803. ***Water Research***, 126:189-196.
5. Wu, Y.; Li, Y.; Ontiveros-Valencia, A.; Ordaz-Díaz, L.; Liu, J.; Zhou, C.; Rittmann, B.E. Enhancing denitrification using a novel in situ membrane biofilm reactor (isMBfR). ***Water Research***, 119:234-241.
6. Zhou, Y.; Nguyen, B.T.; Zhou, C.; Straka, L.; Lai, Y.S.; Xia, S.; Rittmann, B.E., 2017. The distribution of phosphorus and its transformations during batch growth of Synechocystis. ***Water Research***, 122:355-362.
7. Zhou, Y.; Zhang, J.; Zhang, Z.; Zhou, C.; Lai, Y.S.; Xia, S. 2017. Enhanced performance of short-time aerobic digestion for waste activated sludge under the presence of cocoamidopropyl betaine. ***Chemical Engineering Journal***, 320:  494–500.
8. Long, M.; Zhou, C.; Xia, S.; Guadiea, A. 2017. Concomitant Cr(VI) Reduction and Cr(III) Precipitation with Nitrate in a Methane/Oxygen-based Membrane Biofilm Reactor. ***Chemical Engineering Journal***, 315: 58–65.
9. Li, X.; Dai, L.; Zhang, C.; Zeng, G.; Liu, Y.; Zhou, C.; Xu, W.; Wu, Y.; Tang, X.; Liu, W.; Lan, S. 2017. Enhanced biological stabilization of heavy metals in sediment using immobilized sulfate reducing bacteria beads with inner cohesive nutrient. ***Journal of Hazardous Materials***, 324: 340–347.
10. Liu, C.; Song, W.; Zhou, C. 2017. Unsuccessful Urban Governance of Brownfield Land Redevelopment: A Lesson from the Toxic Soil Event in Changzhou, China. ***Sustainability***, *9*(5):824.
11. Zhou, Y.; Nguyen, B.T.; Lai, Y.S.; Zhou, C.; Xia, S.; Rittmann, B.E. 2016. Using flow cytometry to evaluate thermal extraction of EPS from *Synechocystis* sp. PCC 6803.***Algal Research***, 20: 276–281.
12. Lai, C.Y.; Wen, L.L.; Shi, L.D.; Zhao, K.K.; Wang, Y.Q.; Yang, X.; Rittmann, B.E; Zhou, C.; Tang, Y.; Zheng, P.; Zhao, H.P., 2016. Selenate and Nitrate Bioreductions Using Methane as the Electron Donor in a Membrane Biofilm Reactor. ***Environmental Science & Technology***, 50(18): 10179–10186.
13. Lai, C.Y.; Zhang, Y.; Chen, J.; Wen, L.; Shi, L.; Rittmann, B.E.; Zhou, C.; Tang, Y.; He-Ping Zhao, H.; Zheng, P. 2016. Bio-reduction of Chromate in a Methane-Based Membrane Biofilm Reactor. ***Environmental Science & Technology***,50(11): 5832–5839.
14. Wu, Q.; Zhao, X.; Sun, J.; Ma, Z.; Zhou, C. 2016. Locked Post-Fossil Consumption of Urban Decentralized Solar Photovoltaic Energy: A Case Study of an On-grid Photovoltaic Power Supply Community in Nanjing, China. ***Applied Energy***, 172: 1–11.
15. Xia, S.; Xu, X.; Zhou, C.; Wang, C.; Zhou, L.; Rittmann, B.E. 2016. Direct delivery of CO2 into a Hydrogen-based membrane biofilm reactor and model development. ***Chemical Engineering Journal***, 290: 154–160.
16. Wen, L.; Zhang, Y.; Pan, Y.; Wu, W.; Meng, S.; Zhou, C.; Tang, Y.; Zheng, P.; Zhao, H. 2015. The roles of methanogens and acetogens in dechlorination of trichloroethene using different electron donors. ***Environmental Science and Pollution Research***, 22 (23): 19039–19047.
17. Tang, Y.; Ontiveros‐Valencia, A.; Feng, L.; Zhou, C.; Krajmalnik‐Brown, R.; Rittmann, B.E. 2013. A biofilm model to understand the onset of sulfate reduction in denitrifying membrane biofilm reactors. ***Biotechnology and bioengineering***, 110(3): 763–772.
18. Tang, Y.; Zhou, C.; Van Ginkel, S. W.; Ontiveros-Valencia, A.; Shin, J.; Rittmann, B.E. 2011. Hydrogen-permeation coefficients of the fibers used in H2-based membrane biofilm reactors. ***Journal of Membrane Science***, 407–408: 176–183.
19. Tang, Y.; Ziv-El, M.; Meyer, K.; Zhou, C.; Shin, J.H.; Ahn, C.H.; McQuarrie, J.; Candelaria, D.; Swaim, P.; Scott, R.; Rittmann, B.E., 2012. Comparing heterotrophic and hydrogen-based autotrophic denitrification reactors for effluent water quality and post-treatment. ***Water Science and Technology: Water Supply***, 12(2): 227–233.
20. Vijayaraghavan, K.; Van Ginkel, S.; Torres, C.I.; Lee, H.S.; Parameswaran, P.; Zhou, C.; Rittmann, B.E., 2012. Effect of pH and Hydraulic Retention Time on Fermentation Product Distribution and Subsequent Treatment in Microbial Electrolysis Cell. ***TIDEE: TERI Information Digest on Energy and Environment***, 11(3): 355.
21. Tang, Y.; Ziv-El, M.; Zhou, C.; Shin, J.H.; Ahn, C.H.; Meyer, K.; McQuarrie, J.; Candelaria, D.; Friese, D.; Swaim, P.; Scott, R.; Rittmann, B.E. 2011. Using carrier surface loading to design heterotrophic denitrification reactors. ***Journal of American Water Works Association****,* 103(3): 68–78.
22. Tang, Y.; Zhou, C.; Ziv-El, M.; Rittmann, B. E. 2011. A pH-control model for heterotrophic and hydrogen-based autotrophic denitrification. ***Water Research***, 45(1): 232–240.
23. Tang, Y.; Ziv-El, M.; Zhou, C.; Shin, J.H.; Ahn, C.H.; Meyer, K.; Candelaria, D.; Friese, D.; Overstreet, R.; Scott, R.; Rittmann, B.E. 2010. Bioreduction of nitrate in groundwater using a pilot-scale hydrogen-based membrane biofilm reactor. ***Front. Environ. Sci. Engin. China****.*, 4(3): 280–285.
24. Van Ginkel, S.; Zhou, C.; Lien, M.; Rittmann, B. E. 2010. Hydrogen-Based Nitrate and Selenate Bioreductions in Flue-Gas Desulfurization Brine. ***Journal of Environmental Engineering***, 137(1): 63–68.

# Patents

1. Chen Zhou, Bruce E. Rittmann, Zhaocheng Wang, Aura Ontiveros-Valencia, Rosa Krajmalnik-Brown, Andrew Marcus. Methods of recovering platinum group metals from waste streams, PCT/US2017/016179 (filing date Feb 2, 2017, publishing date Aug 10, 2017)

* **Professional Services**

Served as a frequent reviewer for the following journals:

***Journal of American Chemistry Society (JACS)***, ***Applied Catalysis B: Environmental***, ***Environmental Science and Technology (ES&T)***, ***Water Research***, ***ACS Applied Materials & Interfaces, ACS Sustainable chemistry & engineering***, ***Environmental Science: Nano***, ***Journal of Membrane Science***, ***Langmuir***, ***Journal of Hazardous Materials***, ***Biodegradation***, etc.

# CONFERENCE PRESENTATIONS

1. Zhou, C.; Wang, Z.; Rittmann, B.E. Coupling of Pd nanoparticles and denitrifying biofilm promotes H2-based nitrate removal with greater selectivity towards N2. **253rd American Chemistry Society (ACS) National Meeting**, San Francisco, California, April 2-6, 2017.
2. Zhou, C.; Wang, Z.; Rittmann, B.E. Recovery of Palladium nanoparticles (PdNPs) and in situ application to water treatment — Pd-biofilm versus Pd-film on H2-delivering membranes. Oral presentation in the **5th IWA Regional Conference on Membrane Technology**, Kunming, Yunnan Province, China, 22 – 24 August, 2016.
3. Zhou, C.; Rittmann, B.E.; Ontiveros-Valencia, A.; Krajmalnik-Brown, R. Biofilm enhanced continuous nano-Pd recovery from waste streams. Poster presentation in **Leading Edge Technology Conference of International Water Association**, Jerez de la Frontera, Spain, June 13-16, 2016.
4. Zhou, C.; Rittmann, B.E.; Wang, Z.; Ontiveros-Calencia, A.; Krajmalnik-Brown, R. Biofilm as a versatile stabilizer and promoter for Pd nanoparticle (PdNP) recovery and catalytic denitrification. **TechConnect World Innovation Conference and Expo**, Washington, DC; May 23-25, 2016.
5. Zhou, C., Rittmann, B.E., Krajmalnik-Brown, R. Bioremediating Uranium in Water Using the Membrane Biofilm Reactor (MBfR).  Oral presentation in **Uranium Contamination Remediation Conference**, Cameron, AZ (Navajo nation), Dec 12, 2015.
6. Zhou, C., Ontiveros-Valencia, A., de Saint Cyr, L., Krajmalnik-Brown, R., Ravindhar Vannela, R., Rittmann, B.E., Bioreduction of U(VI) by *Desulfovibrio vulgaris* using a H2-based membrane biofilm reactor (MBfR). Oral presentation at **9th International Water Association (IWA) Biofilm Reactors conference**, Paris, France, May 28 – 31, 2013.
7. Bi, Y., Zhou, C., Hayes, K.F., Carpenter, J., Rittmann, B.E., Vannela, R., Davis, J.A. Bargar, J., Kukkadapu, R.K. Assessing the Role of Iron Sulfides in the Long Term Sequestration of Uranium by Sulfate Reducing Bacteria. Poster co-presented at the **U.S. Department of Energy Subsurface Biogeochemical Research Annual Meeting**, Washington D.C., April 30 –May 2, 2012.
8. Zhou, C., Vannela, R., Rittmann, B.E., Clancy, T., Upadhyaya, G., and Hayes, K.M., Investigating the versatile contributions of a *Desulfovibrio vulgaris* strain, a sulfate-reducing bacterium, to U(VI) bioremediation, poster presented at the **U.S. Department of Energy Subsurface Biogeochemical Research Annual Meeting**, Washington D.C., April 26 - 28, 2011.
9. Zhou, C., Vannela, R., and Rittmann, B.E., Investigating the versatile contributions of *Desulfovibrio vulgaris* strain, a sulfate-reducing bacterium, to uranium bioremediation, posters presented at the **1st Graduate Research Symposium**, School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, AZ, Mar 10, 2011.

**AWARDS AND HONORS**

2012 Winner, Biodesign Travel Grant, Arizona State University, USA

2011 Medalist, SSEBE Graduate Research Symposium, School of Sustainable Engineering and the Built Environment, Arizona State University, USA

2011 Student Travel Fellowship, U.S. Department of Energy (DOE) Subsurface Biogeochemical Research (SBR) 6th Annual Principal Investigator (PI) Meeting. Washington, D.C., USA