

## PRATHAP PARAMESWARAN

Swette Center for Environmental Biotechnology  
Biodesign Institute at Arizona State University  
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### Education:

- Ph.D. Environmental Engineering, Arizona State University (2010)
- M.S. Environmental Engineering, Illinois Institute of Technology (2005)
- B.Tech. Chemical Engineering, Coimbatore Institute of Technology (2003)

### Professional appointments:

- Renewable bioenergy capture from waste biomass coupled with pre-treatment in anaerobic digestion and Microbial Electrochemical Cells (MXCs). **Associate Research Scientist**, Swette Center for Environmental Biotechnology, Biodesign Institute at Arizona State University (07-01-12 to present)
- Pre-treatment of biomass wastes for increased energy capture through microbial electrochemical systems and anaerobic digestion. **Postdoctoral research associate**, Swette Center for Environmental Biotechnology, Biodesign Institute at Arizona State University (05-17-2010 to 06-30-12)
- Ecological Interactions in microbial electrochemical systems that enhance electron recovery. **Graduate Research Associate**, Center for Environmental Biotechnology, Biodesign Institute at Arizona State University (01-2006 to 04-23-2010)
- Environmental Chemistry (ENVE 501). **Teaching Assistant**, Illinois Institute of Technology (Fall 2005)
- Design and installation of anaerobic retention basins for biosolids destruction. **Summer Intern** - Research, Sheaffer International LLC, Glen Ellyn, IL (05-2005 to 08-2005)
- Biosolids mineralization in an anaerobic-aerobic combined reactor system. **Graduate Research Assistant**, Illinois Institute of Technology (01-2004 to 04-2005)
- Total internal water cycle and water footprint reduction in the **Executive Trainee** – Environmental division, Seshasayee Paper and Boards, India (06-2003 to 12-2003)

### Awards:

- Young Investigator presentation, 112<sup>th</sup> National General Meeting of American Society for Microbiology at San Francisco, USA (2012)

- Corporate Student Activities travel grant award, 107<sup>th</sup> National General Meeting of American Society for Microbiology at Boston, USA (2008)
- University Graduate Fellowship from the Block Grant Program, Graduate College, Arizona State University (Spring 2007)
- Graduate travel grant, Green Chemistry summer school, American Chemical Society (2005)
- Outstanding graduate student award, Illinois Institute of Technology (2005)

**Professional Organizations:**

- International Water Association (IWA)
- American Society for Microbiology (ASM)
- Engineers Without Borders (EWB)
- Association of Environmental Engineering and Science Professors (AEESP)
- American Chemical Society (ACS)

**Publications (25 total):**

**h – index: 13 i10 - index: 15**

*Journals/Book chapter(s) (number of citations)*

- **Parameswaran P.** and P.R. Anderson. 2005. Biosolids mineralization in an anaerobic-aerobic combined reactor system Water Research 41(12): 2739-2747. (3)
- **Parameswaran P.**, C.I. Torres, H.S. Lee, R. Krajmalnik-Brown, and B.E. Rittmann. 2009. Syntrophic Interactions among anode respiring bacteria (ARB) and non-ARB in a biofilm anode: Electron balances. Biotechnology and Bioengineering 103(3): 513-523. (62)
- **Parameswaran P.**, H. Zhang, C.I. Torres, B.E. Rittmann, and R. Krajmalnik-Brown. 2010. Microbial community structure in a biofilm anode fed with a fermentable substrate: The significance of hydrogen scavengers. Biotechnology and Bioengineering 105(1): 69-78. (47)
- **Parameswaran P.**, C.I. Torres, H.S. Lee, B.E. Rittmann, and R. Krajmalnik-Brown. 2011. Hydrogen consumption in microbial electrochemical systems (MXCs): The role of homo-acetogenic bacteria Bioresource Technology 105: 263-271. (20)

- **Parameswaran P.**, C.I. Torres, D.W. Kang, B.E. Rittmann, and R. Krajmalnik-Brown. 2011. The role of homoacetogenic bacteria as efficient hydrogen scavengers in microbial electrochemical cells (MXCs). Water Science and Technology 65(1): 1-6. (2)
- **Parameswaran P.**, B.E. Rittmann. 2012. Feasibility of anaerobic co-digestion of pig waste and paper sludge. Bioresource Technology 124: 163-168. (2)
- **Parameswaran P.**, T. Bry, S. Popat, B.G. Lusk, B.E. Rittmann, C.I. Torres. 2013. Kinetic, electrochemical, and microscopic characterization of the thermophilic, anode-respiring bacterium *Thermincola ferriacetica*. Environmental Science and Technology 47(9): 4934-4940. (2)
- Lee H.S., **P. Parameswaran**, C.I. Torres, A.K. Marcus, and B.E. Rittmann. 2008. Evaluation of energy conversion efficiencies in microbial fuel cells utilizing fermentable and non-fermentable substrates Water Research 42(6-7):1501-1510. (137)
- Lee I.S., **P. Parameswaran**, J. Alder, and B.E. Rittmann. 2010. Feasibility of focused pulsed treated waste activated sludge as a supplemental electron donor for denitrification Water Environment Research 82(12): 2316-2324. (6)
- Zhang H., **P. Parameswaran**, J. Badalamenti, B.E. Rittmann, and R. Krajmalnik-Brown. 2011. Integrating high throughput pyrosequencing and quantitative real-time PCR to analyze complex microbial communities Book chapter in Methods in Molecular Biology: Microbial Ecology Section. 733(3): 107-128. (11)
- Lee I.S., **P. Parameswaran**, and B.E. Rittmann. 2011. Effect of Solids Retention Time on methanogenesis in anaerobic digestion of thickened mixed sludge. Bioresource Technology 102(22): 10266-10272. (10)
- Garcia-Peña E.I.P., **P. Parameswaran**, D.W. Kang, M. Canul-Chan, and R. Krajmalnik-Brown. 2011. Anaerobic digestion and co-digestion processes of vegetable and fruit residues: Process and microbial ecology. Bioresource Technology 102(20): 9447-9455. (22)
- Delgado A.G., **P. Parameswaran**, D. Fajardo-Williams, R.U. Halden, R. Krajmalnik-Brown. 2012. Role of bicarbonate as a pH buffer and electron sink in microbial dechlorination of chloroethenes. Microbial Cell Factories 11(1): 128 – 139. (1)

- Miceli J.F., **P. Parameswaran**, D.W. Kang, R. Krajmalnik-Brown, C.I. Torres. 2012. Enrichment and analysis of anode respiring bacteria from diverse anaerobic inocula. Environmental Science and Technology 46(18): 10349-10355. (4)
- Mahmoud M., **P. Parameswaran**, C.I. Torres, B.E. Rittmann. 2013. Fermentation pre-treatment of landfill leachate for enhanced electron recovery in a microbial electrolysis cell (MEC). Bioresource Technology
- Torres C.I., A.K. Marcus, **P. Parameswaran**, and B.E. Rittmann. 2008. Kinetic experiments for evaluating the Nernst-Monod model for Anode Respiring Bacteria (ARB) in a biofilm anode Environmental Science and Technology 42(17): 6593-6597. (125)
- Salerno M.B., H.S. Lee, **P. Parameswaran**, and B.E. Rittmann. 2009. Using a Pulsed Electric Field as a Pretreatment for Improved Biosolids Digestion and Methanogenesis. Water Environment Research 81(8):831-839. (3)
- Torres C.I., R. Krajmalnik-Brown, **P. Parameswaran**, A.K. Marcus, G. Wanger, Y.A. Gorby, and B.E. Rittmann. 2009. Selecting anode respiring bacteria based on anode potential: phylogenetic, electrochemical, and microscopic characterization. Environmental Science & Technology 43(24): 9519-9524 (98)
- Lee H.S., C.I. Torres, **P. Parameswaran**, and B.E. Rittmann. 2009. Fate of H<sub>2</sub> in an Upflow Single-Chamber Microbial Electrolysis Cell Using a Metal-Catalyst-Free Cathode. Environmental Science & Technology 43(20):7971-7976. (52)
- Zhang H., J.E. Banaszak, **P. Parameswaran**, J. Alder, R. Krajmalnik-Brown, and B.E. Rittmann. 2009. Focused-Pulsed sludge pre-treatment increases the bacterial diversity and relative abundance of acetoclastic methanogens in a full-scale anaerobic digester. Water Research 43(18):4517-4526. (27)
- Ziv-El M., S.C. Papat, **P. Parameswaran**, DW Kang, A Polasko, RU Halden, R Krajmalnik-Brown. 2012. Using electron balances and molecular techniques to assess trichloroethene-induced shifts to a dechlorinating microbial community. Biotechnology and Bioengineering 109(9): 2230-2239. (2)
- Torres C.I., A.K. Marcus, H.S. Lee, **P. Parameswaran**, R. Krajmalnik-Brown, and B.E. Rittmann. 2010. A kinetic perspective on extracellular electron transfer by anode-respiring bacteria. FEMS Microbiology Reviews 34(1):3-17. (82)

- Choi S., H.S. Lee, Y. Yang, **P. Parameswaran**, Torres C.I., Rittmann B.E., Chae J. 2011. A  $\mu$ L-scale micromachined microbial fuel cell having high power density. Lab on a Chip 11(6): 1110-1117. (22)
- Zhang H., J.K. DiBaise, A. Zuccolo, D. Kudrna, M. Braidotti, Y.S. Yu, **P. Parameswaran**, M.D. Crowell, R. Wing, B.E. Rittmann and R.Krajmalnik-Brown. 2009. Human gut microbiota in obesity and after gastric bypass. Proceedings of the National Academy of Sciences of the United States of America 106(7):2365-2370. (408)

### *Selected Conference Proceedings*

- **Parameswaran P.**, R. Krajmalnik-Brown, and B.E. Rittmann. 2008. “16S rRNA fingerprinting of archaea reveals the significance of non-acetoclastic pathways during the anaerobic digestion of high ammonium wastes” in the Proceedings of the 108<sup>th</sup> ASM General Meeting. Boston, MA.
- **Parameswaran P.**, C.I. Torres, R. Krajmalnik-Brown, and B.E. Rittmann. 2008. “Syntrophic interactions determine electron flow from ethanol to electricity at the anode of a microbial fuel cell” in the Proceedings of the 12<sup>th</sup> conference of the International Society for Microbial ecology, Cairns, Australia.
- **Parameswaran P.**, H. Zhang, C.I. Torres, B.E. Rittmann, and R. Krajmalnik-Brown. 2008. “Community structure in a biofilm anode fed with ethanol: The significance of hydrogen scavengers” in the Proceedings of the 2<sup>nd</sup> International Microbial Fuel Cell Conference at Gwangju, Republic of South Korea.
- **Parameswaran P.**, C.I. Torres, D. Kang, B.E. Rittmann, and R. Krajmalnik-Brown. 2010. “The role of homo-acetogenic bacteria as efficient hydrogen scavengers in microbial electrochemical systems” in the Proceedings of the IWA/WEF Biofilm Reactor Technology Conference at Portland, Oregon, USA.
- **Parameswaran P.**, C.I. Torres, B.E. Rittmann, and R. Krajmalnik-Brown. 2011. “Effect of high concentration of ammonium N on biofilm anode fed with fermentable substrate” in the Proceedings of the 241<sup>st</sup> ACS National Meeting at Anaheim, California, USA.
- **Parameswaran P.**, J.M. Alder, S. Van Ginkel, and B.E. Rittmann. 2011. “Focused Pulsed (FP) treatment for internal utilization of carbon from waste activated sludge (WAS) for denitrification and anaerobic digestion” in the Proceedings of the 84<sup>th</sup> Arizona Water Association Conference at Glendale, Arizona, USA.

- **Parameswaran P.**, T. Bry, S.C. Ayyappan, B.E. Rittmann, C.I. Torres. 2012. Characterization of the thermophilic, anode respiring bacterium (ARB) *Thermincola ferriacetica* in the biofilm anode of a microbial electrolysis cell (MEC). Proceedings of the 112<sup>th</sup> General Meeting of the American Society for Microbiology (ASM) at San Francisco, USA.
- **Parameswaran P.**, C.I. Torres, B.E. Rittmann. 2013. Pulsed Electric Field (PEF) as a pre-treatment for enhanced electron recovery from Waste Activated Sludge. Association of Environmental Engineering & Science Professors (AEESP) 50<sup>th</sup> anniversary conference at Colorado School of Mines, Golden, CO.

### Patent applications

S.C. Popat, **P. Parameswaran**, C.I. Torres, B.E. Rittmann. Microbial electrolysis cells and methods for production of chemical products. U.S. Provisional Patent Application # 61/616, 893; filed: 03/28/2012. Licensed exclusively for Arbsource, LLC.

**P. Parameswaran**, C.I. Torres, B.E. Rittmann, S.C. Popat, R. Krajmalnik-Brown. “Membrane Biofilm Reactors (MBfRs) for high volumetric production rate of valuable products from gaseous substrates using biofilms” IP in process.

### Current Research Projects

- Co-PI - “Modeling wastewater sludge hydrolysis aided by high temporal resolution measurements through microbial electrochemistry” 2013- 2016. National Science Foundation Award No: CBET – 135884. Total funds: \$ 318, 391
- Co-PI - “Novel pre-treatment of microalgae biomass to enhance lipid extraction” 2012-2014 Total funds: \$ 1,25,000
- Project lead and co-PI - “Focused – Pulsed (FP) pre-treatment technology for sustainable energy and resource capture from waste organic streams” Total funds: \$ 72,104
- Technical lead - “Thermophilic anode respiring bacteria (ARB) - characterization and applications”

### Teaching experience:

- CEE 598 – Advanced Environmental Biotechnology: Bioremediation – module on methanogenesis and acetogenesis – Spring 2008 and 2010
- CEE 598 – Fuel cells and Biofuel cells – module on electrode reaction kinetics and coulombic efficiency – Fall 2011

- CEE 361 – Introduction to Environmental Engineering – module on air quality control and regulation – Spring 2012, Fall 2013 & Spring 2014.

### **Professional services:**

- Treasurer, Engineers Without Borders – Arizona State University chapter (08-2007 to 08-2009). Managed three different accounts for the chapter, interacting directly with EWB national to ensure smooth flow of funds; besides wise and planned spending of allotted funds. Another key responsibility was to keep the paper work towards all liabilities in place.
- Technical team lead for the water distribution system team for the Sustainable water project in the village of Tsuraku, Ecuador. Was involved in the design, development and implementation of the new water distribution system for the project
- Graduate Professional Students Association (GPSA)
- Reviewer for Environmental Science & Technology, Biotechnology and Bioengineering, Bioresource Technology, Water Research.

### **Technical Skills**

Computer Software and Programming: Windows XP, MS Office, LabView.

Analytical Techniques: liquid and gas chromatography, ion chromatography, reduction gas analysis, atomic absorption spectroscopy (AAS), spectrophotometry, electrochemical potentiometric techniques.

Microscopy techniques: UV-Vis Microscopy, confocal microscopy, Scanning Electron Microscopy.

Molecular Biology Techniques: DNA/RNA extraction, PCR and QPCR, t-RFLP, DGGE, and clone libraries.

**Languages Spoken:** Fluent in English and slightly in French.