
JORDAN PECCIA, PH.D., P.E.

Yale University, Department of Chemical Engineering, Environmental Engineering Program
P.O. Box 208286, New Haven, CT
203-432-4385 (phone), 203-432-4387 (fax), E-mail: jordan.peccia@yale,
web: www.eng.yale.edu/peccialab/

EDUCATION

- Ph.D.** Environmental Engineering
University of Colorado at Boulder, December 2000
Dissertation Title: "The Response of Airborne Bacteria to Ultraviolet Germicidal Radiation"
Advisor: Dr. Mark Hernandez
- M.S.** Environmental Engineering
Center for Biofilm Engineering, Montana State University at Bozeman, May 1995
Thesis Title: "The Bioavailability of Selected Aromatic Hydrocarbons: An Extension from Saturated to Unsaturated Soils", Advisor: Dr. Alfred Cunningham
- B.S.** Mechanical Engineering
Montana State University at Bozeman, May 1993

ACADEMIC EXPERIENCE

- July 2008-** **Associate Professor.** Environmental Engineering Program, Department of Chemical Engineering, Yale University, New Haven CT.
- 2008** **Visiting Fellow.** Cambridge University, Cambridge, UK. Wolfson College and Visiting Scholar, European Bioinformatics Institute, European Molecular Biology Laboratory, Hinxton England.
- 2005-2008** **Assistant Professor.** Environmental Engineering Program, Department of Chemical Engineering, Yale University, New Haven CT.
- 2001 - 2005** **Assistant Professor.** Department of Civil and Environmental Engineering, Arizona State University, Tempe, AZ.
- 2000 - 2001** **Post Doctoral Researcher.** Department of Civil and Environmental Engineering, University of Wisconsin at Madison.
- 1996 - 2000** **Ph.D. Graduate Research Assistant.** Department of Civil, Environmental, and Architectural Engineering, University of Colorado at Boulder.
- 1993 – 1995** **MS Graduate Research Assistant.** Center for Biofilm Engineering, Bozeman, MT. .

INDUSTRY EXPERIENCE

1995 - 1996 Consulting Engineer. Conoco Inc., Houston, TX

1995 Research Engineer. Department of Chemical Engineering, University of the Witwatersrand, Johannesburg, Republic of South Africa.

1993 Consulting Engineer. RPA Engineering, Helena, MT.

PRINCIPAL AREAS OF RESEARCH AND TEACHING

The Peccia lab at Yale University uses biotechnology tools and fundamental engineering principles to investigate microbial processes in the environment. We have two research thrusts. First, we are applying engineering and molecular biology tools to study the human exposures and sustainability associated with the land application of sewage sludge (biosolids). Our work in this area includes extensive field studies to track sources and assess exposure, a national survey of pathogen content and *in vitro* respiratory toxicity in biosolids, and laboratory experiments to understand the fundamental mechanisms that contribute to pathogen inactivation and energy production for the sustainable design of waste anaerobic digesters. Our second thrust to understand the dynamics and ecology of airborne biological material. We are developing functional binding molecules (aptamers) to advance the measurement of indoor and outdoor allergens, and we are using DNA-based microbial ecology techniques to track and quantify pathogen exposure via the airborne route. Peccia teaches undergraduate and graduate courses in environmental engineering. Courses taught include graduate Water Chemistry and, Molecular Biology Applications to Environmental Engineering, Biological Processes for Environmental Engineers, and undergraduate Introduction to Environmental Engineering.

AWARDS, REGISTRATIONS, AND AFFILIATIONS

Awards:

- Teaching Excellence Award, Fulton School of Engineering, Arizona State University (2 recipients out of 200 faculty) (2005)
- CAREER Award, National Science Foundation (2004)
- ASCE-ASU Civil Engineering Instructor of the Year (2004)
- ASCE fellow and mentor for the Excellence in Civil Engineering Education teaching workshop (2003)
- AEESP/CH2MHILL Outstanding Environmental Engineering Doctoral Thesis Award (2001)
- Graduate School University Fellowship, University of Colorado (1999)
- Graduate Assistance in the Areas of National Need Fellowship, University of Colorado (1997)

Registration: •Licensed Engineer in Training, State of Montana (1994)
•Licensed Professional Engineer, State of Montana (2003)

Affiliations: •Association of Environmental Engineering and Science Professors (AEESP)
•Water and Environment Federation (WEF)
•American Society for Microbiology (ASM)

ARCHIVAL PEER-REVIEWED PUBLICATIONS

Published:

24. Low, S.-Yang, Hill, J., **Peccia, J.**, (2008) "DNA Aptamers Bind Specifically and Selectively to (1→3)-β-D-glucans" Accepted *Biochemical and Biophysical Research Communications*.
23. Viau, E. and **Peccia, J.** (2008). "A survey of wastewater indicators and human pathogen genomes in biosolids produced by Class A and Class B stabilization treatments. Accepted *Applied and Environmental Microbiology*.
22. **Peccia, J.**, Milton, D., Reponen, T., Hill J. (2008). "Feature: The role of environmental engineering and science in the prevention of airborne biological disease", *Environmental Science and Technology*, 42: 4631-4637.
21. Baertsch, C., Paez-Rubio, T., Viau, E., **Peccia, J.** (2007) "Source tracking aerosols released from land-applied class B biosolids during high wind events, *Applied and Environmental Microbiology*, **73**, 4522-4531.
20. Low, S.Y., Paez-Rubio, T., Baertsch, C., Kucharski, M., **Peccia, J.** (2007) "Off-site exposure to respirable aerosols produced during the disk-incorporation of class B biosolids" *Journal of Environmental Engineering*. **133**.
19. Paez-Rubio, T., Ramarui, A., Sommer, J., Xin, H., Anderson, J. and **Peccia, J.** (2007) "Emission Rates and Characterization of Aerosols Produced During the Spreading of Dewatered Class B Biosolids" *Environmental Science and Technology*, **41**, 3537-3544.
18. **Peccia, J.**, Hernandez, M. (2006) "Incorporating Polymerase chain reaction-based identification, population characterization, and quantification of microorganisms into aerosol science: A review" *Atmospheric Environment*, **40**: 3941-3961.
17. Rittmann, B.E., Haunser, M, Loeffler, F., Love N.G., Muyzer G., Okabe S., Oerther D.B., **Peccia J.** Raskin R., Wagner M. (2006) "A vista for microbial ecology and environmental biotechnology" *Environmental Science and Technology*, **40**:1096-1103.
16. Paez-Rubio, T., Xin, H., Anderson J., **Peccia, J.** (2006). "Particulate matter composition and emission rates from the disk incorporation of class B biosolids into soil" *Atmospheric Environment*. **36**: 7034-7045.
15. Xu, P., E. Kujundzic, **J. Peccia**, M. Schafer, M. Hernandez, S.L. Miller (2005). "Impact of environmental factors on upper-room air ultraviolet germicidal irradiation for inactivating airborne microorganisms" *Environmental Science and Technology*. **39**: 9656-9664.
14. Perez-Feito, R, **J. Peccia**, and D. Noguera (2005) "Comparison between direct Microscopy and flow cytometry for quantifiable rRNA-based population analysis in activated sludge." *Water Environment Research*. **78**: 181-188.

13. Paez-Rubio, T, E. Viau, S. Romero-H., **J. Peccia** (2005). Source bioaerosol concentration and rDNA-based identification of microorganisms aerosolized during agricultural wastewater reuse.” *Applied and Environmental Microbiology*: **71**: 804-810.
12. Paez-Rubio, T and **J. Peccia** (2004). “Estimating solar inactivation rates of airborne bacteria” *Journal of Environmental Engineering* : **131**: 512-517.
11. Boreson, J., A. M. Dillner, and **J. Peccia** (2004). “Correlating bioaerosol load with PM2.5 and PM10cf concentrations: a comparison between natural desert and urban fringe aerosols.” *Atmospheric Environment*. **38**: 6029-6041.
10. **Peccia, J.** and M. Hernandez (2004). “UV-induced inactivation rates in *Mycobacterium bovis* BCG.”, *Journal of Occupational and Environmental Hygiene*. **1**:430-435.
9. Xu, P., **J. Peccia**, P. Fabian, J. W. Martyny, K.P. Fennelly, M. Hernandez, and S.L. Miller. (2003). Efficacy of ultraviolet germicidal irradiation of upper-room air in inactivating airborne bacterial spore and *Mycobacteria* in full-scale studies. *Atmospheric Environment*. **36**: 405-419.
8. Hung, C.-H, **J. Peccia**, J.L. Zilles, and D. R. Noguera. (2002). Physical enrichment of polyphosphate-accumulating organisms in activated sludge. *Water Environment Research*. **74**: 354-361.
7. Zilles, J.L., **J. Peccia**, D.R. Noguera (2002). Molecular microbial ecology of enhanced biological phosphorous removal in aerated-anoxic Orbal™ processes. *Water Environment Research*. **74**:428-437.
6. Zilles, J.L., **J. Peccia**, M.-W. Kim, C.-H. Huang, D.R. Noguera (2002). Involvement of *Rhodocyclus*-related organisms in phosphorous removal in full-scale wastewater treatment plants. *Applied and Environmental Microbiology*. **68**: 2763-2769.
5. **Peccia, J.**, and M. Hernandez. (2001). Rapid immunoassays for detection of UV-induced cyclobutane pyrimidine dimers in whole bacterial cells. *Applied and Environmental Microbiology*. **68**:2542-2549.
4. Hernandez, M., E.A. Marchand, D. Roberts, and **J. Peccia** (2001). In-situ assessment of active *Thiobacillus* species in corroding concrete sewers using fluorescent RNA probes. *Biodegradation and Biodeterioration* .**49**: 271-276.
3. **Peccia, J.** and M. Hernandez. (2001). Photoreactivation of airborne *Mycobacterium parafortuitum*. *Applied and Environmental Microbiology*. **67**: 4225-4232.
2. **Peccia, J.**, H. Werth, Miller, S. L and M. Hernandez. (2001). Effects of relative humidity on the ultraviolet inactivation of airborne bacteria. *Journal of Aerosol Science and Technology*, **35**: 728-740.

1. **Peccia, J.**, E.A. Marchand, J. Silverstein, and M. Hernandez. (2000). Development and application of small-subunit rRNA probes for the assessment of selected *Thiobacillus* species and members of the genus *Acidiphilium*. *Applied and Environmental Microbiology*, **66**: 3065-3072.

NATIONAL CONFERENCES (Reviewed Proceedings, Abstracts, and Presentations)

Viau, E. and Jordan Peccia “A survey of pathogen indicators and genomes in stabilized biosolids” Water Environment Federation Technology Conference, Chicago, IL, October, 2008, .

Peccia, J. and Baertsch, C. “Molecular biology-based source tracking of biological aerosols”, 8th International congress on Aerobiology, August 21, 2006, Neuchatel, Switzerland.

Baertsch, C. and **Peccia, J.** “Source Tracking of Microbial Aerosols Emitted at Class B Biosolids Land Application Sites” American Society for Microbiology, May 23, 2006, Orlando, FL.

Paez-Rubio, T. **Viau, E.** and **Peccia, J.** “Culture and molecular-based characterization of aerosols emitted during the land application of class B biosolids” American Society for Microbiology, May 23, 2006, Orlando, FL.

Paez,-Rubio, T, Low, S., **Peccia, J.** “The emission rate, biological characterization, and transport of aerosols emitted during the disk incorporation of class B biosolids.” Water Environment Federation Technology Conference, October 24, 2006, Dallas TX.

Paez-Rubio, T., **Peccia, J.** “Quantification of airborne biological contaminants associated with land applied biosolids” Association of Environmental Engineering and Science Professors Conference, July 2005, Potsdam, NY,.

Viau, E., Romero-H., S., **Peccia, J.** “An Assessment of Mexicali Wastewater Sources Available for Agricultural Water Reuse.” 2nd International Symposium on Transboundary Water Management. November 17-19, 2004, Tucson, AZ.

Paez-Rubio, T. and **J. Peccia** “Source flux of microorganisms aerosolized during agricultural wastewater reuse.” AIDIS Congreso Interamericano de Ingenieria Sanitaria Y ambiental August 22-27, 2004 San Juan Puerto Rico.

Calhoun, R.J., J. Fernando, **J. Peccia** “Tracking aerosol plumes: lidar, modeling, and in-situ measurements” Proceedings of the Sensors, Command, Control, Communications, and Intelligence Technologies for the Homeland Security and Homeland Defense. Vol. #5304. April 12 - 16, 2004, Orlando, FL.

Boreson, J. A. Dillner, and **J. Peccia**. “Correlating bioaerosol load with PM2.5 and PM10cf concentrations: a comparison between natural desert and urban fringe aerosols.” Presented at the International State of the Science Workshop on Organic Speciation in Atmospheric Aerosols Research. April 5-7, 2004, Las Vegas, NV.

J. Peccia , T. Paez-Rubio, Justin Boreson, E. Viau, R. Komaragiri. “ASU Bioaerosol Research Group” Presented at the Arizona/New Mexico American Lung Association Research Forum. Tempe, AZ, Feb 7, 2004.

Paez-Rubio, T., E. Viau, **J. Peccia**. Source and fate characterization of microorganisms aerosolized during wastewater reuse. Presented at the 21st Annual Association for Aerosol Research Conference, Anaheim, CA, October 20-24, 2003, Anaheim, CA.

Boreson, J. A. Dillner, and **J. Peccia**. Correlating PM10 and PM2.5 with bioaerosol loading. Presented at the 21st Annual Association for Aerosol Research Conference, October 20-24, 2003, Anaheim, CA .

Paez-Rubio, T. and **J. Peccia**.. Influence of solar radiation on the viability of bacterial bioaerosols. Gordon Conference for Applied and Environmental Microbiology. Connecticut College, New London Connecticut, July 27-August 1, 2003, New London, CT.

Zilles, J.L., **J. Peccia**, C.-H. Hung, and D. R. Noguera . Molecular microbial ecology of enhanced biological phosphorous removal in aerated-anoxic OrbalTM processes. Presented at the “Water Environment Federation 74th Annual Conference”, October 13-17, 2001, Atlanta, GA.

Xu, P, **J. Peccia**, M. Hernandez, and S. Miller. (2000). The efficacy of upper room ultraviolet germicidal irradiation in inactivating airborne microorganisms under incomplete mixing conditions. In: "Proceedings of Engineering Solutions to Indoor Air Quality Problems" Raleigh, NC, July17-19.

Peccia, J., H. Werth, and M. Hernandez. Effects of relative humidity on the UV-induced inactivation of bacterial bioaerosols. *Journal of Aerosol Science* 31 suppl. 1, S959-S960. Presented at the International Aerosol Conference, September, 2000, Dublin, Ireland

Peccia, J. and M. Hernandez. “The Airborne photoreactivation of UV damaged *Mycobacterium* bioaerosols”. Presented at the 19th Annual American Association for Aerosol Research Conference, St Louis, MO, November 6-10, 2000.

Miller, S.L., Xu, P., **Peccia, J.**, Fabian, P. and M. Hernandez. “Effects of ultraviolet germicidal irradiation of room air on airborne bacteria and *Mycobacteria*”. In: Indoor Air '99: Proceedings of the 8th International Conference on Indoor Air Quality and Climate. Edinburgh, Scotland, G. Raw, C. Aizlewood and P. Warren, Eds. 266-270.

Peccia, J. and M. Hernandez. “Development and application of 16S rRNA probes for the assessment of selected *Thiobacillus* and *Acidiphilium* sp.” Presented at the “International Conference of Microbial Ecology”, Halifax, Nova Scotia. July 14-18, 1998.

Peccia, J., W. Zhang, E.J. Bouwer, and A.B. Cunningham. (1997). Influence of soil moisture on the biodegradation of monoaromatic hydrocarbons. In In-situ and On-Site Bioremediation vol. 5. A. Leeson and B. Alleman, Eds. Battelle Press, Columbus OH.

EXTERNAL INVITED TALKS

Peccia, J. Invited Presentation, Johns Hopkins University – Bloomberg School of Public Health, “Applying molecular biology to describe the biological content of indoor air”, January 2009

Peccia, J. Invited Presentation, Peking University – School of Environmental Science, “Molecular biology-based approaches for detecting the origin, type, and allergenic potency of biological aerosols”, December 2008

Peccia, J. Keynote Address, 11th National Environmental Microbiology Symposium of China, “Using molecular biology to track aerosols emitted during the land application of biosolids”, November 2008

Peccia, J. Invited Presentation, University of Florida, “Lung cell toxicity and pathogen content of class A and class B biosolids” August, 2008

Peccia, J. Invited Presentation, Hebrew University, Jerusalem Israel, “Exposure to toxins emitted during the land application of class A and class B biosolids” February, 2008

Peccia, J. Invited Presentation, Zuckerberg Institute for Water Research, Ben Gurion University, Sede Boqer Campus, Israel, “Exposure to pathogens emitted during the land application of class A and class B biosolids, March 2008.

Peccia, J. Invited presentation, MIT Lincoln Labs. “Content and Dynamics of Airborne Biological Material” November 2007, Lincoln MA

Peccia, J. Invited presentation, University of North Carolina- Chapel Hill. “Exposure to pathogens and toxicity from biosolids emitted during land application of class A and class B biosolids” November 2007, Chapel Hill, North Carolina

Peccia, J. Invited presentation, Water Environment Federation Technology Conference “Are biosolids pathogens bugging you?”, San Diego, CA, October 2007

Peccia, J. Invited presentation, University of Massachusetts-Amherst. “A framework for predicting aerosol concentrations emitted during biosolids land application” February, 2006, Amherst, MA.

Peccia, J. Invited presentation, Water Environment Federation Web Seminar, “Biosolids: something in the air” August 23, 2006 ,

Peccia, J. Invited presentation, University of Connecticut Civil and Environmental Engineering “Molecular methods for source tracking biological aerosols” October 2005, Storrs, CT.

Peccia, J. Invited presentation, Lovelace Respiratory Research Institute “Molecular biology approaches for the analysis of bioaerosols”, Albuquerque, NM., May 2004

Peccia, J. Invited presentations, United States Department of Agriculture/U.S. Water Conservation Lab “Microbial aerosols emitted during the land application of biosolids” Phoenix, AZ, November 2004

OTHER SIGNIFICANT PUBLICATIONS

J. Peccia and Paez-Rubio, T. (2007) “Quantification of airborne biological contaminants associated with land applied biosolids” IWA Publishing, London

Viau, E. and **Peccia J.** (2005) “An evaluation of agricultural water reuse practice in the arid U.S.-Mexican border region” Report for the Southwest Center for Environmental Research and Policy. Report W-03-13, http://scerp.org/new/det_research_pub.asp?IdInvestigacion=7090

Paez-Rubio, T., Calhoun, R., and **Peccia, J.** (2004) “Comprehensive literature review on aerosolization, transport, and health impacts of biological aerosols emitted during the land application of biosolids.” Water Environment Research Foundation, October 15, 2004.

Peccia, J. (2004) “Biosolids and Environmental Engineering Education” *The Arizona Water Pollution Control Association Newsletter* **21**: 8.

Lesavoy, G., and **Peccia, J.** (2004) “Air Decontamination” Whole Building Design Guide, National Institute of Building Sciences, Washington D.C..

J. Peccia. (2000). “The Response of Airborne Bacteria to Ultraviolet Germicidal Irradiation”, Doctoral Dissertation, University of Colorado, Boulder.

J. Peccia (1995) “The Bioavailability of Selected Aromatic Hydrocarbons: An Extension from Saturated to Variably Saturated Soils;”, M.S. Thesis, Center for Biofilm Engineering, Montana State University, Bozeman.

RESEARCH GRANTS

Arizona State University, Center for Stress and Adaptation seed grant, “Correlating Bioaerosol with PM_{2.5} and PM₁₀ Concentrations,” \$19,000. PI-**J. Peccia** and A. Dillner (4/01/2002 – 11/30/2003)

Water Environment Research Foundation (WERF). “Quantification of airborne biological contaminants associated with land applied biosolids,” \$320,000. **PI- J. Peccia**, Co-Investigators, R. Calhoun, M. Abbaszadegan ASU, Donald Milton, Harvard University. (9/1/2003 – 9/01/2006)

U.S. EPA and Southwest Center for Environmental Research and Policy (SCERP), “Wastewater inventory and water quality in Mexicali, Mexico: a template for the assessment of water reuse in bi-national rivers” \$75,000 **PI-J. Peccia**, Co-Investigator, P. Fox., subcontract with Socorro Romero Hernandez at the Universidad Autonoma de Baja Mexico. (6/1/2003-12/31/2005)

National Science Foundation CAREER. “Influence of soil morphology, biosolid application rate, and wind velocity on the emission flux of biosolid derived microbial aerosols”, \$408,772. **PI- J. Peccia**, (6/01/04 – 6/01/09)

National Institutes of Health RO3 “Aptamer-based methods to measure environmental allergens: a feasibility study”, \$163,500 **PI-J. Peccia**, B. Leaderer, Yale School of Pub Health, Consultant. (10/01/07 – 10/01/09)

Alfred Sloan Foundation (Invited) “Microbial ecology of the indoor environment” \$594,000, **PI-J. Peccia**, co-PI W. Nazaroff. (6/01/08 – 6/01/11)

State of Connecticut - Connecticut Center for Advanced Technology, Inc. “Gene Discovery in Hydrocarbon Producing Microalgae” \$67,952, **PI-J. Peccia** (12/01/08 – 06/31/09)

STUDENT THESIS SUPERVISION

Masters Degree Students Completed:

Tania Paez-Rubio, MS Environmental Engineering, May 2003. Thesis: “Source and fate characterization of microorganisms aerosolized during wastewater reuse.”

Raghunatha Komaragiri, MS Environmental Engineering, October 2003. Thesis: “The effect of relative humidity on the UV inactivation of airborne viruses.”

Justin Boreson, MS Environmental Engineering, December 2003. Thesis: “Molecular-based characterization of airborne fungal allergens collected in rural and urban locations.

Emily Viau, M.S. Environmental Engineering, December 2004. Thesis: “An evaluation of agricultural water reuse practice in the arid US-Mexico border region”

Carolina Baertsch, MS Environmental Engineering, “Development of DNA microarrays and DNA fingerprinting technology for identification and source tracking of pathogens in biosolidS and air samples.”

Ph.D. Student Completed:

Tania Paez, PhD Environmental Engineering, May 2006 “Quantification of airborne biological contaminants associated with land applied biosolids”

Ph.D. Students in Progress:

Emily Viau, degree expected Fall 2009, “Pathogen content and modes of respiratory toxicity in class A and class B biosolids”

Edmund Low, degree expected Fall 2009, “DNA aptamers for indicating the potency of environmental allergens”

Chris Ziemba, degree expected Fall 2010, “Pathogen inactivation mechanisms and bacterial transcriptome response to stresses in anaerobic digesters”

Kyle Bibby, expected Fall 2012, “Inactivation mechanisms of adenovirus in anaerobic digesters”

Denina Hospodsky, expected Fall 2012, “Origin of biological material in indoor air”