

CURRICULUM VITAE
BENJAMIN G. PETRI, M.S., E.I.T.

PhD Candidate, Environmental Science and Engineering Division,
Colorado School of Mines, Golden, Colorado, USA

OFFICE ADDRESS

Department of Civil and Environmental Engineering
Colorado School of Mines,
Chauvenet Hall 160
Golden, CO, 80401
Cell Phone: (303) 715-8211
Email: bpetri@mymail.mines.edu

HOME ADDRESS

14365 Foothill Rd.
Golden, CO 80401
Cell Phone: (303) 715-8211

EDUCATION:

- COLORADO SCHOOL OF MINES – Golden, Colorado
Pursuing a PhD in Environmental Science and Engineering Anticipated Completion: May 2012
(comprehensive exam passed in July, 2011, proposal defended July 2012)
Dissertation topic: Effect of soil moisture dynamics on the soil vapor intrusion pathway: process
understanding and improved modeling. Advisor: Dr. Tissa Illangasekare
- COLORADO SCHOOL OF MINES – Golden, Colorado
M.S. in Environmental Science and Engineering May 2006
Thesis: “Impacts of Subsurface Permanganate Delivery Parameters on Dense Nonaqueous
Phase Liquid Mass Depletion Rates”. Advisor: Dr. Robert Siegrist
- COLORADO SCHOOL OF MINES – Golden, Colorado
B.S. in Environmental Engineering May 2003
Minor in Public Affairs for Engineers from the McBride Honors Program

QUALIFICATIONS AND SKILLS:

- Experienced problem solver within the field of subsurface contaminant transport and remediation
- Expertise in the field of subsurface vapor intrusion and assessment of the vapor intrusion risk pathway.
- Expert on the use of oxidation technologies for degradation of organic contaminants, especially *in situ* chemical oxidation (ISCO)
- Performer of scientific and engineering analyses of complex subsurface systems, including solute transport, contaminant mass-transfer, multiphase flow, and groundwater modeling.
- Experienced in laboratory experimentation, including experiment design, sampling, and quantitative physical and chemical analysis
- Excellent technical writing skills and experience
- Project management skills including preparation of reports, presentations and deliverables for research funding agencies
- Experienced user of Microsoft Excel, Word, PowerPoint, SYSTAT 12, Adobe Illustrator, Adobe Photoshop, Acrobat, COMSOL Multiphysics, AutoCAD (v2002).
- Co-designed, constructed and operated a pilot scale water treatment facility within the City of Golden Water Treatment Plant (2004)
- Management of a student computer lab and associated functions, including writing proposals, budgeting, troubleshooting and maintaining equipment (2003-2005)

WORK EXPERIENCE:

- PhD Student – Colorado School of Mines, June 2009 – Present
- Research Associate – Colorado School of Mines, January 2006 – May 2009

- Research assistantship and thesis research, Colorado School of Mines, June 2003 – December 2005
- Student computer lab manager – Colorado School of Mines, September 2003 – May 2005
- Engineering intern at J.R. Harris & Company, a structural engineering firm, part-time 2000 – 2002
- Administrative assistant at the Colorado Outward Bound School, summers of 1996, 1997, 1998

HONORS, AFFILIATIONS, CERTIFICATIONS AND PROFESSIONAL ACTIVITIES:

- Representative – CSM Graduate Student Association (current)
- Representative – CSM Technology Fee Committee (current)
- Student Mentor – Graduate Experience Mentoring Program (current)
- Member – Student Committee for Civil and Environmental Engineering (current)
- Treasurer - Sustainable Remediation Forum (SURF) student chapter (2012-present)
- Member - American Geophysical Union (current)
- Member - American Chemical Society (current)
- Member - Environmental Science and Engineering Seminar Series Organizing Committee (2011-2012)
- Completed the Interstate Technology and Regulatory Council's "Vapor Intrusion Classroom Training" (Denver, October 3-4, 2011).
- Member of the team that won the Strategic Environmental Research and Development Program project of the year award (2005)
- Emergency Medical Technician (EMT-basic) and Wilderness EMT, 2005
- Student Committee of the Environmental Science and Engineering Division (2004-2005)
- Completed the McBride Honors Program for Engineers – Colorado School of Mines (2003)
- Four year honor roll and on the Dean's list 6 semesters (undergraduate)
- Certified Engineer-in-Training, State of Colorado (2002)

PUBLICATIONS:

- Petri, B; Sauck, C; Sakaki, T; Illangasekare, T; Christ, J. (2012) "Effects of fluid phase distribution on mass-transfer from entrapped non-aqueous phase liquids in the vadose zone contributing to vapor intrusion" *Environ. Sci. Technol. (In preparation)*.
- Krembs, F J; Siegrist, R L; Crimi, M L; Furrer R; Petri, B G. (2010) "ISCO for Groundwater Remediation: Analysis of Field Applications and Performance." *Groundwater Monitoring and Remediation*. 30(4), p 42-53.
- Petri, B G; Watts, R J; Teel, A L; Huling, S G; Brown, S A. (2011) "Chapter 2: Fundamentals of ISCO using Hydrogen Peroxide." In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Petri, B G; Thomson, N R; Uranowicz, M A. (2011) "Chapter 3: Fundamentals of ISCO using Permanganate." In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Petri, B G; Watts, R J; Tsitonaki, A L; Crimi, M L; Thomson, N R; Teel, A L. (2011) "Chapter 4: Fundamentals of ISCO using Persulfate." In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Clayton, W C; Petri, B G; Huling, S G. (2011) "Chapter 5: Fundamentals of ISCO using Ozone." In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume

in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).

- Munakata-Marr, J; Sorenson, K S; Petri, B G; Cummings, J. (2011) “Chapter 7: Principles of Combining ISCO with other *In Situ* Remedial Approaches.” In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Crimi, M L; Simpkin, T J; Palaia, T A; Petri, B G; Siegrist, R L. (2011) “Chapter 9: Systematic Approach for Site-Specific Engineering of ISCO.” In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Simpkin, T J; Palaia T A; Petri, B G; Smith, B A. (2011) “Chapter 11: Oxidant Delivery Approaches and Contingency Planning.” In: *In Situ Chemical Oxidation for Remediation of Contaminated Groundwater*; Siegrist, R L; Crimi M L; Simpkin T J. (eds). Springer Science and Business Media, LLC, New York, New York. A volume in SERDP/ESTCP Remediation Technology Monograph Series, C.H. Ward (Series ed).
- Tsitonaki, A; Petri, B; Crimi, M; Mosbæk, H; Siegrist, R.L; Bjerg, P L. (2010) “In Situ Chemical Oxidation of Contaminated Soil and Groundwater Using Persulfate: A Review.” *Critical Reviews in Environmental Science and Technology*, 40(1) p 55-91.
- Petri, B. G., Siegrist, R. L., Crimi, M. L., (2008) “Effects of groundwater velocity and permanganate concentration on DNAPL mass depletion rates during in situ oxidation” *Journal of Environmental Engineering*, 134(1) p 1-13.
- Siegrist, R., Crimi, M., Munakata-Marr, J., Illangasekare, T., Lowe, K., Van-Cuyk, S., Dugan, P., Heiderscheidt, J., Jackson, S., Petri, B., Sahl, J., Seitz, S. (2006). *Reaction and Transport Processes Controlling In Situ Chemical Oxidation of DNAPLs*. Final report to SERDP for project CU-1290, November 1, 2006. 235 pg. <http://www.estcp.org/viewfile.cfm?Doc=ER%2D1290%2DFR%2Epdf>.

CONFERENCE PRESENTATIONS:

- Petri, B; Sauck, C; Illangasekare, T; Sakaki, T; Christ, J. (2012) “Effects of Vadose Zone Soil Moisture Dynamics on the Vapor Intrusion Exposure Pathway: Development of New Conceptual Models and Implications for Sustainability.” Sustainable Remediation Forum SURF-19 Meeting, San Diego, CA, January 31 – February 2, 2012.
- Petri, B; Sauck, C; Illangasekare, T; Sakaki, T; Christ, J. (2011) “Effects of Vadose Zone Soil Moisture Dynamics on the Mass-Transfer and Transport of Volatile Compounds: Investigations Using Physical Models at Multiple Scales,” American Geophysical Union 2011 Fall Meeting, San Francisco, CA, December 5-9, 2011.
- Illangasekare, T; Sakaki T; Christ, J; Petri, B; Sauck, C; Schulte, P; Cihan, A; Smits, K; Lee, Y; Shannon, L; Putman, B. (2011) “Vapor Intrusion into Subsurface Structures - An Improved Understanding for Guideline Development Through Physical and Numerical Modeling” Partners in Environmental Technology: Technical Symposium and Workshop, SERDP-ESTCP, Washington DC. November 29 - December 1, 2011.
- Petri, B; Illangasekare, T; Sakaki, T; Christ, J; Sauck, C. (2011) “Effect of Source Conditions on Mass-Transfer from Nonaqueous Phase Liquids to Soil Gas in the Vadose Zone” Fall 2011 National Meeting and Expo, American Chemical Society, Denver, CO, August 28 – September 1, 2011.
- Petri, B; Illangasekare, T; Sakaki, T; Christ, J; Sauck, C. (2011) “Experimental and Numerical Investigation of Mass-Transfer Rate for Prediction of Vapor Generation from NAPLs for the Evaluation of the Vapor-to-Indoor Air Exposure Pathway,” MODFLOW and More 2011, Colorado School of Mines, Golden Colorado, June 5-8, 2011.
- Illangasekare, T; Sakaki, T; Christ, J; Petri, B; Sauck, C; Cihan, A; Schulte, P. (2010) “Vapor Intrusion from Entrapped NAPL Sources and Groundwater Plumes: Process Understanding and Improved Modeling Tools for Pathway Assessment” Partners in Environmental Technology:

Technical Symposium and Workshop, SERDP-ESTCP, Washington DC. November 30 - December 2, 2010.

- Petri, B; Illangasekare, T; Christ, J; Sakaki, T; Sauck, C. (2010) "Vapor Generation from Entrapped Sources of Non Aqueous Phase Liquids (NAPL) in the Unsaturated Zone" Flow and Transport in Permeable Media (Gordon Research Conferences), Bates College, Lewiston, Maine, July 10-16, 2010.
- Petri, B; Crimi, M; Munakata-Marr, J; Siegrist, R; Krembs, F; Lowe, K; Palaia, T; Simpkin, T. (2010) "A Protocol for Site-Specific Screening of In Situ Chemical Oxidation for Groundwater Remediation." Seventh International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 24-27, 2010.
- Petri, B; Illangasekare, T; Sakaki, T; Sauck, C; Christ, J. (2010) "Evaluation of Volatilization from NAPL Sources under Low Velocities with Implications for the Vapor Intrusion Pathway" AGU Hydrology Days 2010, Colorado State University, Fort Collins Colorado, March 22-24, 2010.
- Illangasekare, T H; Sakaki, T; Christ, J; Petri, B; Cihan, A. (2009) "Vapor Intrusion from Entrapped NAPL Sources and Groundwater Plumes: Process Understanding and Improved Modeling Tools for Pathway Assessment." Partners in Environmental Technology: Technical Symposium and Workshop, SERDP-ESTCP, Washington, DC, December 2009.
- Siegrist, R; Crimi, M; Munakata-Marr, J; Illangasekare, T; Palaia, T; Simpkin, T; Petri, B; Krembs, F; Lowe K; Ng, G; Singletary, M. (2008) "In Situ Chemical Oxidation for Ground Water Remediation: Responses to Project Managers' Frequently Asked Questions" Partners in Environmental Technology: Technical Symposium and Workshop, SERDP-ESTCP, Washington, DC, December 2008.
- Petri, B. G., Siegrist, R. L., Crimi, M. L., (2008) "Implications of the Scientific Literature for Field Applications of ISCO" Sixth International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 18-21 2008.
- Petri, B., Crimi, M., Siegrist, R., Krembs, F., Illangasekare, T., Munakata-Marr, J., Lowe, K., Simpkin, T., Palaia, T., Ng, G., Ruiz, N., Singletary, M. (2008) "Development of a Protocol and Decision Support Tools for Screening ISCO Technologies for Groundwater Remediation." Sixth International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 18-21 2008.
- Siegrist, R., Crimi, M., Munakata-Marr, J., Illangasekare, T., Palaia, T., Simpkin, T., Petri, B., Krembs, F., Lowe k., Ng, G., Singletary, M. (2007) "In Situ Chemical Oxidation for Groundwater Remediation: Technology Practices Manual," Partners in Environmental Technology: Technical Symposium and Workshop, SERDP-ESTCP, Washington, DC, December 2007.
- Petri, B., Siegrist, R., Crimi, M., Krembs, F. (2007) "A Survey of Remediation Professional Views on the Ability of ISCO to Meet Remediation Goals within Typical Project Constraints" Fifth International Conference on Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater, Niagara Falls, New York, September 2007.
- Petri, B., Siegrist, R., Crimi, M. (2007) "The State of the Science: A Cumulative Review ISCO Related Literature," Fifth International Conference on Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater, Niagara Falls, New York, September 2007.
- Petri, B.G., Siegrist, R.L. and Crimi, M. L. "Impacts of Permanganate Flushing Parameters on Mass Transfer from Dense Nonaqueous Phase Liquid Residuals," Fourth International Conference on Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater, Chicago, Illinois, October 2005.
- Petri, Benjamin G, Siegrist, Robert L, and Crimi, Michelle L. "Mass Transfer Impacts of Oxidant Flushing Parameters During In Situ Chemical Oxidation of DNAPLs", Third International Conference on Oxidation and Reduction Technologies for In Situ Treatment of Soil and Groundwater, San Diego, California, October 2004.

- Petri, B. G., Siegrist, R. L. and Crimi, M. L. “Mass Transfer Impacts of Oxidant Flushing Velocity during In Situ Chemical Oxidation of DNAPLs” AWWA/WEF student chapter conference, Golden, Colorado, May 2004.

SHORT COURSES:

- Crimi, M; Krembs, F; Petri, B; Siegrist, R; Simpkin, T; Unger, M. (2009) “Principles and Practices of In Situ Chemical Oxidation.” Partners in Environmental Technology: Technical Symposium and Workshop, Washington, DC, December 2008. 3 PD credits
- Siegrist, R; Crimi, M; Simpkin, T; Petri, B; Krembs, F. (2008) “Technical Practices to Enable Successful Application of In Situ Chemical Oxidation (ISCO) for Site Remediation.” 2008 AFCEE Technology Transfer Workshop, Air Force Center for Engineering and the Environment, San Antonio, Texas, March 25-28, 2008.

REFERENCES:

- Dr. Tissa Illangasekare. AMAX Distinguished Chair and Professor, Civil and Environmental Engineering Dept., Colorado School of Mines – Doctorate of Philosophy Advisor – 303-384-2126 – tillanga@mines.edu
- Dr. Kathleen Smits – Assistant Professor, Civil and Environmental Engineering Dept., Colorado School of Mines – 719-200-7648 – ksmits@mines.edu
- Dr. Robert Siegrist, Division Director and Professor, Environmental Science and Engineering, Colorado School of Mines – Master Degree Advisor and Supervisor – 303-384-2158 – siegrist@mines.edu
- Dr. Michelle Crimi, Assistant Professor, Biology, Clarkson University – Master Degree Advisor – 423-439-7066 – mcrimi@clarkson.edu

OTHER INTERESTS:

- Whitewater rafting, kayaking, hiking and skiing
- Domestic and International travel
- Art, reading, and current events