

CURRICULUM VITAE

Tracy L. Thatcher

Assistant Professor
Civil and Environmental Engineering
California Polytechnic State University
San Luis Obispo, CA 93407

EDUCATION

- Ph.D. Civil and Environmental Engineering, University of California, Berkeley, May 1996
- M.S. Civil and Environmental Engineering, University of California, Berkeley, 1991
- B.S. Chemical Engineering, University of California, Davis, 1984

PROFESSIONAL EXPERIENCE

Assistant Professor, Cal Poly San Luis Obispo, Civil and Environmental Engineering,
September 2005 to present

Teaching courses in environmental engineering with a specialization in air quality.

Participation on department committees, as needed. Current activities include faculty ENVE representative on the student fee initiative committee, co-advisor to the student chapter of the Society of Environmental Engineers and co-advisor to the student chapter of the Society of Women Engineers. Course list:

ENVE 325: Environmental Air Quality (3), Fall 2005, 2006

ENVE 331: Introduction to Environmental Engineering (4) Fall 2005, 2006

CE 591: Graduate Seminar (1) Fall 2005, 2006

ENVE 324: Introduction to Air Pollution (4) Winter 2006

ENVE 411: Air Pollution Control (3) Winter 2006

ENVE 426: Air Quality Measurements (3) lab section Winter 2006

Funded Projects: LNG Interchangability Field Study (40K, 2006 -2007, PIGR),
ENVE331 course development grant (5K, 2005 - 2006, Calpoly CTL)

Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA 94720. 1998-August 2005

Research areas focus on experimental studies of gas and particle transport into and within buildings. Recent projects include the following:

Development of the Large Indoor Facility for Tracer Gas Experiments- received an Outstanding Performance Award for work on this project;

Project manager for 'A Predictive Model of Indoor Concentrations of Outdoor PM-2.5 in Homes', a project focusing on experiments in a residence to investigate the impact of particle size and composition on the transport of particles indoors, resulting in 4 peer reviewed articles and numerous scientific presentations to date - received an Outstanding Performance Award for work on this project.

Led the project to develop an analysis of the Factors Affecting the Concentration of Outdoor Particles Indoors - received an Outstanding Performance Award for work on this project.

Developed the capabilities to use Laser Induced Fluorescence (LIF) techniques for visualizing air flow in scale models and applied them to the problem of pollutant transport in large indoor spaces.

Project manager for an experimental study in Salt Lake City, UT, investigating the effectiveness of collective protection for a commercial building.

Co-PI for a current project developing an interactive computer program to assist building owners to assess and reduce their vulnerability to a ChemBio attack.

Project manager for the indoor component of Joint Urban 2003, an interdisciplinary, multi-agency effort to study air flow and pollutant transport within a complex urban environment. The indoor component focused on 4 commercial buildings within the downtown core.

Participated in the development of and proposal writing for a successfully funded project to investigate the transport and fate of chemical and biological agents in the indoor environment.

University of California, Berkeley, Lecturer, Fall 1996-Spring 1998.

Engineering 11: Introduction to Environmental Engineering and Science, Spring 1998.

Civil and Environmental Engineering 115: Water Chemistry, Fall 1997.

Civil and Environmental Engineering 111: Environmental Engineering, Fall 1996 and Spring 1997

University of California, Berkeley, Graduate Student Instructor

Civil and Environmental Engineering 111: Environmental Engineering, Spring 1995

Civil and Environmental Engineering 216: Hazardous and Industrial Waste Treatment, Spring 1994

Graduate Student Researcher, University of California, Berkeley, CA 94720. 1990-1996.

Research focused on particle deposition within the indoor environment.

Guest Researcher, Lawrence Livermore National Laboratory, Livermore, CA 94550. Summer 1993. Designed and performed a study of particle transport, deposition, and resuspension in a residence.

Environmental Engineer, Hewlett-Packard Company, San Jose Components Group, 1987-1990, Cupertino Site, 1985-1987. Responsible for wastewater treatment, air pollution control, environmental monitoring, and chemical use reduction for a mixed use facility with semiconductor manufacturing, fabrication, and office spaces.

University of California, Santa Cruz Extension, Co-Instructor, *Computer Applications in Environmental Engineering*, 1987.

CALPOLY COMMITTEES

Environmental Engineering Faculty Representative for the Student Fee Initiative oversight committee (2005)

Advisor Society of Environmental Engineers (co-advisor 2005, 2006)

Co-advisor Society of Women Engineer (2005)

Teaching Development Activities

Recipient of a Course Development Grant from the Calpoly Center for Teaching and Learning for the enhancement of ENVE 331. The focus of this project is the development of hands-on activity modules and worksheets to enhance the learning experience in ENVE 331.

Participation in workshops by the CalPoly Center for Teaching and Learning including an all day workshop for new faculty, "Fostering Critical Thinking in Your Classes", and

workshops on developing learning outcomes, assessment techniques, and active learning techniques.

PROFESSIONAL COMMITTEES AND RECOGNITION

Full Member, Air Resources Board Research Screening Committee, April 2003 - present, the Research Screening Committee is a legislatively mandated group which provides scientific review of projects and research plans and must approve proposals before they can be sent by the staff to the Air Resources Board.

Award for Excellence in Technology Transfer, 'Minimizing Casualties from a Chem/Bio Attack: Preparation, Training, and Response Resources', DOE's Federal Laboratory Consortium, 2004

Registered Professional Civil Engineer, State of California, License Number C58360

Chair, Indoor Aerosols Working Group, American Association of Aerosol Research, 2002

Outstanding Performance Award, Lawrence Berkeley National Laboratory, Winter 2000, Fall 2001, Spring 2002

Department of Energy, Environmental Restoration and Waste Management Fellow, 1991 - 1995

Outstanding Graduate Student Instructor Award, UC Berkeley, 1995-96.

PEER REVIEWER

Aerosol Science and Technology
Atmospheric Environment
Chemosphere
Environmental Science and Technology
Health Effects Institute
Indoor Air
Journal of Architectural Engineering
Journal of the Air and Waste Management Association
National Institute of Standards (Internal Reports)

PUBLICATIONS

Thatcher, T. L. (2006) Indoor Air Quality in Energy Efficient Housing, *Journal of Green Building*, V1 N2: 32-38.

Jayaraman, B. , Finlayson, E.U., Sohn,M.D., **Thatcher, T.L.**, Price, P.N., Wood, E.E., Sextro, R.G., and Gadgil, A.J. (2006) Tracer gas transport under mixed convection conditions in an experimental atrium: Comparison between experiments and CFD predictions, *Atmospheric Environment* V40:5236–5250

Thatcher, T. L., Wilson, D.J., Wood, E.E., Craig, M.J., and Sextro, R.G. (2004) Pollutant Dispersion in a Large Indoor Space : Part 1 – Scaled experiments using a water-filled model with occupants and furniture, *Indoor Air*, V14: 258-271. LBNL/PUB 50248

Finlayson, E.U., Gadgil, A.J., **Thatcher, T.L.**, and Sextro, R.G. (2004) Pollutant dispersion in a large indoor space Part 2 - Computational Fluid Dynamics (CFD) predictions and

comparison with a scale model experiment for isothermal flow, *Indoor Air*, V14: 272-283. LBNL/PUB 50105

- Thatcher, T. L.** , Lunden, M. M., Revzan, K. L., Sextro, R. G., and Brown, N. J.(2003) A concentration rebound method for measuring particle penetration and deposition in the indoor environment, *Aerosol Science and Technology* V37:847-864. LBNL/PUB 51631
- Lunden, M.M., Revzan, K. L., Fisher, M.L., **Thatcher, T.L.**, Littlejohn, D., Hering, S.V., and Brown, N.J. (2003) The Transformation of Outdoor Ammonium Nitrate Aerosols in the Indoor Environment, *Atmospheric Environment*, V37:5633-5644 , LBNL/PUB 52795
- Lunden, M.M., **Thatcher, T.L.**, Hering, S.V., and Brown, N.J., (2003) The use of time- and chemically-resolved particulate data to characterize the infiltration of outdoor PM-2.5 into a residence in the San Joaquin Valley, *Environmental Science and Technology*, V37:4724-4732. LBNL/PUB 52221
- Thatcher, T.L.**, Lai, A.C.K., Moreno-Jackson, R., Sextro, R.G., and Nazaroff, W.W. (2002) Effects of Room Furnishings and Air Speed on Particle Deposition Rates Indoors, *Atmospheric Environment*, V36(N11), 1811-1819. LBNL-48414.
- Fischer, M.L., Price, P.N. , **Thatcher, T.L.**, Schwalbe, C.A., Craig, M.J., Wood, E.E., Sextro, R.G., and Gadgil, A.J. (2001) Rapid Mapping of Tracer Gas Concentrations in Air, *Atmospheric Environment*, V35(N16):2837-2844. LBNL-44820
- Lai, A.C.K., **Thatcher, T.L.**, and Nazaroff, W. W.(2000) Inhalation Transfer Factors for Air Pollution Health-Risk Assessment, *Journal of the Air & Waste Management Association*. **50**, 1688-1699. LBNL-43712
- Thatcher, T. L.** and Nazaroff, William W (1997) Effect of Small-Scale Obstructions and Surface Textures on Particle Deposition from Natural Convection Flow, *Aerosol Science and Technology*, **27**, 709-725.
- Thatcher, T. L.** and Nazaroff, William W (1996) Particle Deposition from Natural Convection Flow onto Smooth Surfaces, *Aerosol Science and Technology* , **25**, 359-374.
- Thatcher, T L** and Layton, David W (1995) Deposition, Resuspension, and Penetration of Particles within a Residence, *Atmospheric Environment*, **29**, 1487-1497.

REPORTS (not published elsewhere)

- Black, D.R.; **Thatcher, T.L.**; Delp, W.W.; Derby, E.A.; Chang, S-C; and Sextro, R.G. (2003) Data Summary Report of Commercial Building Experiments in Salt Lake City, UT from May 17 to June 10, 2002, LBNL/PUB-53810.
- Price, P. N.; Sohn, M. D.; Gadgil, A. G.; Delp, W.; Lorenzetti, D. M.; Finlayson, E. U.; **Thatcher, T. L.**; Sextro R. G.; Derby, E. A.; Jarvis, S. A. (2002) Protecting Buildings From a Biological or Chemical Attack: actions to take before and during a release, LBNL/PUB-49932, <http://securebuildings.lbl.gov/>.

- Price, P. N.; Delp, W.; Sohn, M. D.; **Thatcher, T. L.**; Lorenzetti, D. M.; Sextro, R. G.; Gadgil, A. G.; Derby, E.; Jarvis, S. (2002) Advice for first responders to a building during a chemical or biological attack, LBNL/PUB-867.
- Thatcher, T.L.**, McKone, T.E., Fisk, W.J., Sohn, M.D., Delp, W.W., Riley, W.J., and Sextro, R.G. (2001) Factors affecting the concentration of outdoor particles indoors (COPI): Identification of data needs and existing data, LBNL-49321
- Lunden, M.M., **Thatcher, T.L.**, Littlejohn, D., Fischer, M.L., Kirchstetter, T.W., Brown, N.J., Hering, S., and Stolzenburg, M. (2001) Building a predictive model of indoor concentrations of outdoor PM-2.5 in homes, LBNL-48929
- Thatcher, T.L.** and Daisey, J.M. (2000) Reducing mortality from urban terrorist releases of chemical and biological agents: I. Filtration for ventilation systems in commercial buildings, LBNL-44350
- Thatcher, T.L.**, Sextro, R.G., and Ermak, D. (2000) Database of physical, chemical, and toxicological properties of chemical and biological (CB) warfare agents for modeling airborne dispersion in and around buildings, LBNL-45475
- Gadgil, A.G., Finlayson, E.U., Fischer, M.L., Price, P.N., **Thatcher, T.L.**, Craig, M.J., Hong, K.H., Housman, J., Schwalbe, C.A., Wilson, D., Wood, E.E., and Sextro, R.G. (2000) Pollutant transport and dispersion in large indoor spaces: A status report for the large space effort of the Interiors Project, LBNL-44791.

PEER REVIEWED CONFERENCE PAPERS

- Jayaraman, B., Finlayson, E. U., Wood, E. E., **Thatcher, T. L.**, Sohn, M. D., Price, P. N., Sextro, R. G., and Gadgil, A. J. (2005) Comparison between experiments and CFD predictions of mixed convection flows in an atrium, Proceedings of Indoor Air 2005, Beijing, China, LBNL-57100.
- Thatcher, T. L.**, Lunden, M. M., Sextro, R. G., Brown, N. J. and Hering, S. V., (2002) The Effect Of Penetration Factor, Deposition, And Environmental Factors On The Indoor Concentration Of PM2.5 Sulfate, Nitrate, And Carbon, Proceedings of Indoor Air 2002, Monterey, CA.
- Hering, S.V., Lunden, M.M., Kirchstetter, T.W., **Thatcher, T.L.**, Revzan, K.L., Sextro, R.G., Brown, N.J., Watson, J. and Chow, J.: Indoor, Outdoor And Regional Profiles Of PM2.5 Sulfate, Nitrate And Carbon, Proceedings of Indoor Air 2002, Monterey, CA, 2002.
- Lunden, M.M., **Thatcher, T.L.**, Littlejohn, D., Fischer, M.L., Hering, S., Sextro, R.G., and Brown, N.J.: The Transformation Of Outdoor Ammonium Nitrate Aerosols In The Indoor Environment, Proceedings of Indoor Air 2002, Monterey, CA, 2002.
- McKone, T., **Thatcher, T.**, Fisk, W., and Sextro, R.: Factors Affecting the Concentration of Outdoor Particles Indoors: Existing Data and Data Needs, Proceedings of Indoor Air 2002, Monterey, CA, 2002.
- Sextro, R.G., Lorenzetti, D.M., Sohn, M.D., and **Thatcher, T.L.**: Modeling The Spread Of Anthrax In Buildings, Proceedings of Indoor Air 2002, Monterey, CA, 2002.

Fischer, M.L., Lunden, M.M., **Thatcher, T.L.**, Sextro, R.G., and Brown, N.J.: Predicting Indoor PM_{2.5} of Outdoor Origin: Testing a Transient Size-Resolved Model Using Intensive Measurements From a Residence, Proceedings of Indoor Air 2002, Monterey, CA, 2002.

Thatcher, T.L., Nazaroff, W.W., and Sextro, R.G.: Determining transfer factors for outdoor aerosol plumes entering buildings. Indoor Air '99 Proceedings, 1999. LBNL-43711

Thatcher, T.L., Fischer, M.L., Price, P.N., Fisk, W.J., Gadgil, A.J., and Sextro, R.G.: Measuring dispersion of gases in a large scale indoor environment using an open path tunable diode laser. Indoor Air '99 Proceedings, 1999. LBNL-42714

Lai, A.C.K., **Thatcher, T.L.**, and Nazaroff, W.W.: Inhalation transfer factors for assessing human health risks from air pollutant sources. Indoor Air '99 Proceedings, 1999. LBNL-43712

Sippola, M.R., Nazaroff, W.W., and **Thatcher, T.L.**: Particle deposition in ventilation system ducts. Indoor Air '99 Proceedings, 1999. LBNL-42710

CONFERENCE ABSTRACTS

Lunden, M.M., **Thatcher, T.L.**, Littlejohn, D., Fischer, M.L., Kirchstetter, T.W., Revzan, K.L., Sextro, R.G., Brown, N.J., Stolzenburg, M.R., and Hering, S.: Time-Resolved Determination Of Indoor - Outdoor Concentration Relationships For PM_{2.5} Nitrate, Sulfate And Carbon. 6-th International Aerosol Conference 2002 Taipei, Taiwan

Thatcher, T.L., Lai, A.C.K., Moreno-Jackson, R., Sextro, R.G., and Nazaroff, W.W.: Experimental Determination Of Size Resolved Particle Deposition Rates As A Function Of Room Furnishing And Room Air Velocity, American Association of Aerosol Research Conference, 2000.

Thatcher, T.L., Lunden, M.M., Fischer, M.L., Fine, J.D., Kirchstetter, T.W., Hering, S., Sextro, R.G., and Brown, N. J.: Concentration Rebound Method For Measuring Particle Penetration Into A Residence. American Association of Aerosol Research Conference, 2000.

Lunden, M.M., Fischer, M.L., Fine, J.D., **Thatcher, T.L.**, Kirchstetter, T.W., Hering, S., Sextro, R.G., and Brown, N. J.: A Predictive Model Of Indoor Concentrations Of Outdoor Pm-2.5 In Homes. American Association of Aerosol Research Conference, 2000.

Layton, David W. and **Thatcher, Tracy L.**: Movement of Outdoor Particles to the Indoor Environment: An Analysis of the Arnhem Lead Study. Paper and Presentation at the Air and Waste Management Association Annual Meeting, 1995

T.L. Thatcher, Experimental Study of the Effect of Surface Roughness on Particle Deposition from Buoyancy Driven Flow, Air and Waste Management Association Annual Meeting, 1995

Thatcher, Tracy L. and Nazaroff, William W, Experimental Study of the Effect of Surface Roughness on Particle Deposition from Buoyant Flow, American Association for Aerosol Research Annual Meeting, 1994

Xu, Mindi; Sextro, Rich; Nematollahi, Matty; Gadgil, Ashok; Nazaroff, William; and **Thatcher, Tracy**, Determination of ETS Particle Density from Measuring Electrical Mobility and Aerodynamic Size, American Association for Aerosol Research Annual Meeting, 1993

Thatcher, Tracy L. and Nazaroff, William W, Experimental Study of Particle Deposition from Natural Convection Flow onto Smooth Surfaces, American Association for Aerosol Research Annual Meeting, 1992