DAVID LEITH

Adjunct Professor – 2012 to present Department of Environmental Sciences and Engineering University of North Carolina Chapel Hill, NC 27599-7431

EDUCATION

- BS in Chemical Engineering with honors, University of Cincinnati, June 1970.
- MS in Chemical Engineering, University of Cincinnati, August 1970.
- ScD in Environmental Health Sciences, Harvard University, June 1975.

EMPLOYMENT

Co-op Engineer, Eastman Kodak, Peabody, MA 1966 - 1970.

Engineer, APT Inc., Riverside, CA 1970 - 1972.

Assistant Professor, Harvard University, 1975 - 1980.

Associate Professor, Harvard University, 1980 - 1985, University of North Carolina, 1984 - 1985.

Professor, University of North Carolina, 1985 – 2012; retired 7/1/2012 Director, Air, Radiation and Industrial Hygiene Program, 1986 – 1994 Director, Environmental Engineering Program, 2007 – 2012 Associate Chair and Director of Graduate Studies, 2009 – 2012

Intern, Colorado State University, 2012 – 2020 (summers)

HONORS

- Bernard G. Greenberg Alumni Endowment Award for excellence in teaching, research and service to the broader public health community, presented by the Dean, School of Public Health, UNC, 2008.
- Distinguished Teaching Award for Post-Baccalaureate Instruction, presented by the Chancellor, UNC, 2005.

Newton Underwood Award for excellence in teaching, presented by the students of the Department of Environmental Sciences and Engineering, UNC, 2003.

- John E. Larsh, Jr. Award for Student Mentorship, presented by the Dean, School of Public Health, UNC, 2001.
- Newton Underwood Award for excellence in teaching, presented by the students of the Department of Environmental Sciences and Engineering, UNC, 1993.

"David L. Swift Memorial Award, 2020," for:

Leith, David, John Mehaffy, Daniel Miller-Lionberg and John Volckens, "Design and Performance of UPAS Inlets for Respirable and Thoracic Mass Sampling," *Journal of Occupational and Environmental Hygiene*, **17** (6): 274-282 (2020).

"Best Engineering Paper in Industrial Hygiene Published During 2000," for: Boundy, Maryanne, David Leith, David Hands, Michael Gressel and G. Edward Burroughs, "Performance of Industrial Mist Collectors Over Time," *Appl. Occup. Environ. Hyg.*, **15** (12): 928-935 (2000). "Best Paper Published in AIHA Journal During 1999," for: Volckens, John, Maryanne Boundy, David Leith and David Hands, "Oil Mist Concentration: A Comparison of Sampling Methods," *Am. Indust. Hyg. Assoc. J.*, **60**: 684-689 (1999).

"Best Paper Published in AIHA Journal during 1996," for: Raynor, Peter C., Steven Cooper, and David Leith, "Evaporation of Polydisperse Multicomponent Droplets," *Am. Indust. Hyg. Assoc. J.*, **57**: 1128-1136 (1996).

"Best Paper Published in App. Occup. Env. Hyg. during 1995," for: McAneny, John J., David Leith and Maryanne G. Boundy, "Volatilization of Mineral Oil Mist Collected on Sampling Filters," *Appl. Occup. Environ. Hyg.*, **10**(9): 783-787 (1995).

"Outstanding Aerosol Paper Award," 1992, for: Plinke, Marc A. E., David Leith, David B. Holstein and Maryanne G. Boundy, "Experimental Examination of Factors that Affect Dust Generation," *Am. Indust. Hyg. Assoc. J.*, **52**: 521-528 (1991).

"Best Paper Published in AIHA Journal during 1990," for: Todd, Lori and David Leith, "Remote Sensing and Computed Tomography in Industrial Hygiene I: Theoretical Basis," *Am. Indust. Hyg. Assoc. J.*, **51**: 224 (1990).

DOCTORAL STUDENTS

Primary advisor to the following doctoral students:

Name	Graduated	From	Now
Michael Ellenbecker,	June 1979,	Harvard	Professor, Univ. Lowell
Thomas Kalinowski,	June 1981,	Harvard	V.P. Erler and Kalinowski, Inc.
David L. Johnson,	May 1985	UNC	Presidential Professor,
(co-advisor with Dr. Pa	rker Reist)		Univ. Oklahoma
distinguished alum	ni award winner		
John L. Koehler,	Nov. 1986	Harvard	Sr. Engineer, Yorke Engineering
Chung-te Lee,	Jan. 1988	UNC	Professor, National Central Univ.
Donna Iozia,	May 1988	UNC	Scientist, U.S. EPA
John A. Dirgo,	June 1988	Harvard	Scientist, Tetra Tech EM
Lori Todd,	May 1990	UNC	Consultant, Chapel Hill NC
G. Ramachandran,	May 1993	UNC	Professor, Johns Hopkins University
Marc Plinke	June 1994	Karlsruhe	CEO, Ceres GS
Peter Raynor	May 1998	UNC	Professor, Univ. Minn.
EPA STAR Fellow	ship recipient		
Jon Thornburg	May 1999,	UNC	Scientist, RTI
Jeff Wagner	May 2000	UNC	EM Specialist, Calif. Health Dept.
EPA STAR Fellow	ship recipient		
Jacky Rosati	Dec. 2002	UNC	Branch Chief, U.S. EPA
Alfredo Armendariz	June 2002	UNC	Scientist, Sierra Club
Royster Fellowship	o recipient		
John Volckens	June 2003	UNC	Professor, Colorado State Univ.
Thomas Peters	June 2004	UNC	Professor, Univ. of Iowa
Nicole Hagan	June 2014	UNC	Scientist, U.S. EPA

Postdoctoral students:

David Nash	2008 to 2010	UNC	Scientist, U.S. EPA
William Funk	2009 to 2010	UNC	Ass't Professor, Northwestern Univ.
Joseph Pedit	2010 to 2012	UNC	UNC

CLASSROOM TEACHING

Academic courses taught at UNC:

ENVR 416:	Aerosol Technology, 4 hours each fall, 1984 – 2010 co-instructor with Dr. Parker C. Reist, 1986-1999 sole instructor 1984-85, 2000-2010
ENVR 516:	Aerosol Technology Lab, 2 hours most springs, 1991 – 2006 sole instructor
ENVR 754:	Air Pollution Control, 3 hours each fall 1986 – 2012 sole instructor
ENVR 150:	Principles and Applications of Environmental Engineering 3 hours each spring, 1998 – 2002 co-instructor with Dr. Phil Singer
ENVR 401:	Unifying Concepts, 2001 – 2009 module on Air Pollution Control
ENVR 411:	Environmental Measurements (Weinberg), 2007 – 2009 two to four two-week modules on air measurements
ENVR 890:	Environmental Risks (Characklis), 2008 – 2009 module on Air Pollution Control
EPID 785:	Environmental Epidemiology (Wing, Engel), 2010, 2012 module on Air Pollution

Academic course taught at Harvard:

EHS 265 c,d: Air and Gas Cleaning, 5 hours, each spring (Harvard), 1975 - 1984

Publications in Journals and Books

Leith, David and William Licht, "The Collection Efficiency of Cyclone Type Particle Collectors--A New Theoretical Approach," *AICHE Symposium Series*, **68** (126): 196 (1972).

Calvert, Seymour, Jhuda Goldshmid, David Leith and Dilip Mehta, <u>Wet Scrubber Handbook</u>, Publication PB 213-016, NTIS, Springfield, VA 1972.

Leith, David and Dilip Mehta, "Cyclone Performance and Design," *Atmos. Environ.*, **7**: 527 (1973).

Calvert, Seymour, Jhuda Goldshmid and David Leith, "Scrubber Performance for Particle Collection," *AICHE Symposium Series* **70** (137): 357 (1974).

Leith, David and Melvin W. First, "Uncertainty in Particle Counting and Sizing Procedures," *Am. Ind. Hyg. Assoc. J.* **37**: 103 - 108 (1976).

Leith, David and Melvin W. First, "Performance of a Pulse-Jet Filter at High Filtration Velocity - I. Particle Collection," *J. Air Poll. Control Assoc.*, **27**: 534 (1977).

Leith, David, Melvin W. First and Henry Feldman, "Performance of a Pulse-Jet Filter at High Filtration Velocity - II. Filter Cake Redeposition," *J. Air Poll. Control Assoc.*, **27**: 636 (1977).

Leith, David and Melvin W. First, "Performance of a Pulse-Jet Filter at High Filtration Velocity - III. Penetration by Fault Processes," *J. Air Poll. Control Assoc.*, **27**: 754 (1977).

Leith, David and Melvin W. First, "Pressure Drop in a Pulse-Jet Fabric Filter," *Filtration and Separation*, **14**: 473 (1977).

Leith, David, Dwight D. Gibson and Melvin W. First, "Performance of Top and Bottom Inlet Pulse-Jet Fabric Filters," *J. Air Poll. Control Assoc.*, **28**: 696 (1978).

Leith, David, Melvin W. First and Dwight D. Gibson, "Effect of Modified Cleaning Pulses on Pulse-Jet Filter Performance," *Filtration and Separation*, **15**: 393 (1978).

Leith, David, "Cyclones" in <u>Environmental Pollution Control Engineering</u>, L.C. Wang and N.C. Pereira, eds., Humana Press, New York, 1979, pp. 61 - 101.

Ellenbecker, Michael J. and David Leith, "Theory for Dust Deposit Retention in a Pulse-Jet Fabric Filter," *Filtration and Separation*, **16**: 624 (1979).

Hinds, William, Melvin W. First and David Leith, "Measurement of Aerosol with Narrow Size Distribution by the Polarization Ratio of Light Scattered at 90[°]," *J. Aerosol Science*, **10**: 437 (1979).

Ellenbecker, Michael J. and David Leith, "Dust Deposit Profiles in a High Velocity Pulse-Jet Fabric Filter," *J. Air Poll. Control Assoc.*, **29**: 1236 (1979).

Ellenbecker, Michael J. and David Leith, "The Effect of Dust Retention in a High Velocity Pulse-Jet Fabric Filter," *J. Powder Technology*, **25**: 147-154 (1980).

Leith, David and Douglas W. Cooper, "Venturi Scrubber Optimization," *Atmos. Environ.*, 14: 657-664 (1980).

Leith, David and Michael J. Ellenbecker, "Theory for Penetration in a Pulse-Jet Cleaned Fabric Filter," *J. Air Poll. Control Assoc.*, **30**: 877 (1980).

Leith, David and Michael J. Ellenbecker, "Theory for Pressure Drop in a Pulse-Jet Cleaned Fabric Filter," *Atmos. Environ.* **14**: 845 (1980).

Ellenbecker, Michael J., David Leith and John M. Price, "Impaction and Particle Bounce," *J. Air Poll. Control Assoc.*, **30**: 1224 (1980).

Leith, David, "Cyclones" in <u>Handbook of Multiphase Systems</u>, Gad Hetsroni, ed., McGraw Hill, New York, 1981, pp. 9-89 to 9-97.

Ellenbecker, Michael J. and David Leith, "Dust Removal from Non-Woven Fabrics," *Filtration and Separation*, **18**: 316-320 (1981).

Kalinowski, Thomas W. and David Leith, "Aerosol Filtration by a Cocurrent Moving Granular Bed: Penetration Mechanisms," *Environment International*, **6**: 379 (1981).

Sundstrom, George and David Leith, "High Efficiency Collection of Fly Ash in a Parallel Flow Filter," *Filtration and Separation*, **19**: 34 (1982).

Leith, David and Michael J. Ellenbecker, "Effect of Dust Size Distribution on the Collection Efficiency of Pulse-Jet Fabric Filters," *J. Air Poll. Control Assoc.*, **32**: 740 (1982).

Leith, David and Michael J. Ellenbecker, "Dust Emission Characteristics of Pulse-Jet-Cleaned Fabric Filters," *Aerosol Science and Technology*, **1**: 401 (1982).

Kalinowski, Thomas W. and David Leith, "Aerosol Filtration by a Cocurrent Moving Granular Bed: Penetration Theory," *Environ. Sci. Technol.*, **17**: 21 (1983).

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Koehler, John L. and David Leith, "Pressure Drop in a Pulse-Jet Cleaned Fabric Filter: Theory Calibration," *Atmos. Environ.*, **17**: 1909 (1983).

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Leith, David and Kenneth P. Martin, Jr., "Precision of Particle Concentration Measurements Determined by Counting," *Am. Ind. Hyg. Assoc. J.*, **45**: 242 (1984).

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Leith, David, Kenneth P. Martin and Douglas W. Cooper, "Liquid Utilization in a Venturi Scrubber", *Filtration and Separation*, **22**: 191 (1985).

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Leith, David, John A. Dirgo and Wayne T. Davis, "Control Devices: Centrifugal Force and Gravity, Filtration, and Dry Flue Gas Scrubbing", in <u>Air Pollution</u>, Vol VII, 3rd ed., Arthur C. Stern, ed., Academic Press, New York, 1986.

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Johnson, David L., David Leith and Parker C. Reist, "Drag on Non-Spherical, Orthotropic Aerosol Particles", *Journal of Aerosol Science*, **18**: 87 (1987).

Koehler, John L., Henry A. Feldman and David Leith, "Gas-Borne Liquid Flow Rate in a Venturi Scrubber with Two Different Liquid Injection Arrangements", *Aerosol Science and Technology*, 7: 15 (1987).

Templin, Bobby R. and David Leith, "Effect of Operating Conditions on Pressure Drop in a Pulse-Jet Cleaned Fabric Filter", *Chemical Engineering Progress, Plant Operations/Progress*, 7: 215 (1988).

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Iozia, Donna Lee and David Leith, "Cyclone Optimization", *Filtration and Separation*, **26**: 272 (1989).

Caminiti, S.P., P.J. Fracica, C.A. Piantadosi, D.H. Leith, and S.L. Young, "Aerosol Delivery of Natural Surfactant for the Treatment of Hyperoxic Lung Injury in Baboons" (abstract), *American Review of Respiratory Disease* **141** (4): A931 (1990).

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Todd, Lori and David Leith, "Remote Sensing and Computed Tomography in Industrial Hygiene I: Theoretical Basis", *Am. Indust. Hyg. Assoc. J.*, **51**: 224 (1990).

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Boundy, Maryanne G., David Leith, and Michael R. Knowles, "Dispersion and Size Distribution of Amiloride by Metered Dose and Dry Powder Inhalers", *Journal of Aerosol Medicine*, **3**: 233-241 (1990).

Kamens, Richard, Chung-te Lee, Russell Wiener, and David Leith, "A Preliminary Study to Characterize Indoor Particles in Three Homes", *Environ. Sci. Technol.*, **25A**: 939-948 (1991).

Kessler, Marc and David Leith, "Flow Measurement and Efficiency Modelling of Cyclones for Particle Collection", *Aerosol Science and Technology*, **15**: 8-18 (1991).

Ramachandran, G., David Leith, John Dirgo, and Henry Feldman, "Cyclone Optimization Based on a New Empirical Model for Pressure Drop", *Aerosol Science and Technology*, **15**: 135-148 (1991).

Plinke, Marc A. E., David Leith, David B. Holstein and Maryanne G. Boundy, "Experimental Examination of Factors that Affect Dust Generation", *Am. Indust. Hyg. Assoc. J.*, **52**: 521-528 (1991).

Plinke, Marc A. E., Ralf Maus and David Leith, "Experimental Examination of Factors that Affect Dust Generation Using the Heubach and MRI Testers", *Am. Indust. Hyg. Assoc. J.*, **53**: 325-330 (1992).

Ramachandran, G. and David Leith, "Extraction of Aerosol Size Distributions from Multispectral Light Extinction Data", *Aerosol Science and Technology*, **17**: 303-325 (1992).

Cawley, Brian and David Leith, "A Bench-top Apparatus to Examine Factors that Affect Dust Generation", *Applied Occupational and Environmental Hygiene*, **8**: 624-631 (1993).

Ramachandran, G., David Leith and Lori Todd, "Extraction of Spatial Aerosol Distributions from Multispectral Light Extinction Measurements with Computed Tomography", *Journal of the Optical Society of America A*, **11**: 144-154 (1994).

Plinke, Marc A. E., David Leith, Randall G. Goodman, and Friedrich Löffler, "Particle Separation Mechanisms in Flow of Granular Material", *Particulate Science and Technology*, **12**: 71-87 (1994).

Plinke, Marc A.E., David Leith, Royal Hathaway, and Friedrich Löffler, "Cohesion in Granular Materials", *Bulk Solids Handling*, **14**: 101-106, (1994).

Leith, David, "Apparatus for Administering Solid Particulate Aerosols to the Lungs", US Patent 5,304,125, issued 19 April 1994.

Ramachandran, G., Peter C. Raynor and David Leith, "Collection Efficiency and Pressure Drop for a Rotary-Flow Cyclone", *Filtration and Separation*, **31**: 631-636 (1994).

Plinke, Marc A.E., David Leith, Maryanne G. Boundy and Friedrich Löffler, "Dust Generation from Handling Powders in Industry", *Am. Indust. Hyg. Assoc. J.*, **56**: 251-257 (1995).

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McAneny, John J., David Leith and Maryanne G. Boundy, "Volatilization of Mineral Oil Mist Collected on Sampling Filters", *Appl. Occup. Environ. Hyg.*, **10** (9): 783-787 (1995).

Lanning, Jeffrey S., Maryanne G. Boundy and David Leith, "Validating a Model for the Prediction of Dust Generation", *Particulate Science and Technology*, **13**: 105-116 (1995).

Cooper, Steven J., Peter C. Raynor and David Leith, "Evaporation of Mineral Oil in a Mist Collector", *Applied Occupational and Environmental Hygiene*, **11**: 1204-1211 (1996).

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Leith, David, Peter C. Raynor, Maryanne G. Boundy and Steven J. Cooper, "Performance of Industrial Equipment to Collect Coolant Mist", *Am. Indus. Hyg. Assoc. J.*, **57:** 1142-1148 (1996).

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Cooper, Steven J. and David Leith, "Evaporation of Metalworking Fluid Mist in Laboratory and Industrial Collectors", *Am. Indus. Hyg. Assoc. J.*, **59:** 45-51 (1998).

Thornburg, Jonathan, Steven J. Cooper and David Leith, "Counting Efficiency of the API Aerosizer", *Journal of Aerosol Science*, **30** (4): 479-488 (1999).

Raynor, Peter C., and David Leith, "Evaporation of Accumulated Multicomponent Liquids from Fibrous Filters", *Annals of Occupational Hygiene*, **43** (3):181-192 (1999).

Volckens, John, Maryanne Boundy, David Leith and David Hands, "Oil Mist Concentration: A Comparison of Sampling Methods", *Am. Indus. Hyg. Assoc. J.*, **60:** 684-689 (1999).

Rosati, Jacky, David Leith and Peter C. Raynor, "Determinants of Filter Lifetime", *Filtration and Separation*, **36** (10): 30-32 (1999).

Raynor, Peter C. and David Leith, "The Influence of Accumulated Liquid on Fibrous Filter Performance", *Journal of Aerosol Science*, **31:** 19-34 (2000).

Raynor, Peter C., John Volckens, and David Leith, "Modeling Evaporative Loss of Oil Mist Collected by Sampling Filters", *Applied Occupational and Environmental Hygiene*, **15** (1): 90-96 (2000).

Volckens, John, Maryanne Boundy and David Leith, "Mist Concentration Measurements II: Laboratory and Field Evaluations", *Applied Occupational and Environmental Hygiene*, **15** (4): 370-379 (2000).

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Boundy, Maryanne, David Leith, David Hands, Michael Gressel and G. Edward Burroughs, "Performance of Industrial Mist Collectors Over Time", *Applied Occupational and Environmental Hygiene*, **15** (12): 928-935 (2000).

Wagner Jeff. and David Leith (2000) "Laboratory and Field Testing of a Passive Aerosol Sampler", *Inhalation Toxicology*, **12**(6 Supplement 2) 139 (2000).

Wagner, Jeff and David Leith, "Field Tests of a Passive Aerosol Sampler", *Journal of Aerosol Science*, **32**: 33-48 (2001).

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Wagner, Jeff and David Leith, "Passive Aerosol Sampler. II: Wind Tunnel Experiments", *Aerosol Science and Technology*, **34**(2) 193-201 (2001).

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Armendariz, Alfredo J. and David Leith, "A Personal Sampler for Aircraft Engine Cold Start Particles: Laboratory Development and Testing", *Am. Indus. Hyg. Assoc. J.*, **64**: 755-762 (2003).

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