

It is Time to Address Airborne Transmission of COVID-19

Understanding the transmission of respiratory infections indoors requires expertise in many distinctly different areas of science and engineering, including virology, aerosol physics, flow dynamics, exposure and epidemiology, medicine, and building engineering, to name the most significant. No one person has expertise in all these areas. However, collectively, the community of the signatories to the Comment understands the characteristics and mechanisms behind the generation of respiratory microdroplets, survival of viruses in the microdroplets, transport of the microdroplets and human exposure to them, and the airflow patterns that carry microdroplets in buildings. We have dedicated our careers working in this multidisciplinary field, and our statement stems from our collective expertise spanning the entire field.

The signatories listed on the first two pages contributed to the writing of this commentary, and all the signatories reviewed the document.

Professor Linsey C. Marr
Civil and Environmental Engineering
Virginia Tech, USA
Email: lmarr@vt.edu

Professor William Bahnfleth
Department of Architectural Engineering
The Pennsylvania State University, USA
Email: wbahnfleth@psu.edu

Professor Jose-Luis Jimenez
Department of Chemistry and Cooperative Institute
for Research in Environmental Sciences (CIRES)
University of Colorado at Boulder, USA
Email: jose.jimenez@colorado.edu

Professor Yuguo Li
Department of Mechanical Engineering
The University of Hong Kong, Hong Kong, China
Email: liy@hku.hk

William W. Nazaroff
Daniel Tellep Distinguished Professor Emeritus
Civil and Environmental Engineering Department
University of California, Berkeley, USA
Email: nazaroff@ce.berkeley.edu

Professor Catherine Noakes
School of Civil Engineering
University of Leeds, United Kingdom
Email: C.J.Noakes@leeds.ac.uk

Dr Chandra Sekhar
Individual Capacity, Singapore
Email: chandra.sc@gmail.com

Professor Julian Wei-Tze Tang
Respiratory Sciences
University Leicester, United Kingdom
Email: jwtang49@hotmail.com

Associate Professor Raymond Tellier
Department of Medicine
McGill University, Canada
Email: raymond.tellier@muhc.mcgill.ca

Professor Philomena M. Bluysen
Faculty of Architecture and the Built Environment
Delft University of Technology, The Netherlands
Email: P.M.Bluysen@tudelft.nl

Dr. Atze Boerstra
REHVA Vice-President
Federation of European Heating, Ventilation and Air
Conditioning Associations
The Hague, The Netherlands
Email: ab-bba@binnenmilieu.nl

Professor Giorgio Buonanno
Department of Civil and Mechanical Engineering
University of Cassino and Southern Lazio
Cassino, Italy
Email: buonanno@unicas.it

Professor Junji Cao
Institute of Earth Environment
Chinese Academy of Sciences, Beijing, China
Email: cao@loess.llqg.ac.cn

Professor Stephanie J. Dancer
Department of Medical Microbiology, NHS
Lanarkshire, School of Applied Sciences
Edinburgh Napier University, United Kingdom
Email: Stephanie.Dancer@lanarkshire.scot.nhs.uk

Dr. Francesco Franchimon
Managing Director and Owner
Vital Environments
Franchimon ICM, The Netherlands
Email: francesco@franchimon-icm.nl

Dr. Charles Haworth
Consultant Respiratory Physician, Cambridge
Centre for Lung Infection, The Adult Cystic Fibrosis
Centre, The Lung Defence Clinic, Royal Papworth
Hospital, Cambridge, United Kingdom
Email: charles.haworth@nhs.net

Dr. Jaap Hogeling
Managing Director, International Standards
ISSO, Netherlands Building Research Institute, The
Netherlands
Email: j.hogeling@isso.nl

Associate Professor Christina Isaxon
Ergonomics and Aerosol Technology
Lund University, Lund, Sweden
Email: christina.isaxon@design.lth.se

Professor Jarek Kurnitski
Department of Civil Engineering and Architecture
Tallinn University of Technology, Estonia
Email: jarek.kurnitski@taltech.ee

Assistant Professor Marcel Loomans
Department of the Built Environment
Eindhoven University of Technology (TU/e)
The Netherlands
Email: m.g.l.c.loomans@tue.nl

Professor Guy B. Marks
Director, Centre for Air quality Research and
evaluation (CAR), Faculty of Medicine
University of New South Wales (UNSW), Sydney,
Australia
Email: g.marks@unsw.edu.au

Professor Livio Mazzarella
AiCARR Vice President
Department of Energy
Politecnico di Milano, Italy
Email: livio.mazzarella@polimi.it

Professor Arsen Krikor Melikov
International Centre for Indoor Environment and
Energy, Department of Civil Engineering, Technical
University of Denmark, Denmark
Email: akm@byg.dtu.dk

Professor Shelly Miller
Mechanical Engineering Department
University of Colorado Boulder, USA
Email: Shelly.Miller@colorado.edu

Professor Emeritus Peter V. Nielsen
The Faculty of Engineering and Science
Department of Civil Engineering
Aalborg University, Denmark
Email: pvn@civil.aau.dk

Professor Jordan Peccia
Department of Chemical and Environmental
Engineering, Yale University, USA
Email: jordan.peccia@yale.edu

Professor Xavier Querol
Department of Geosciences
Institute of Environmental Assessment and Water
Research, Spanish National Research Council
Barcelona (IDAEA-CSIC), Spain
Email: xavier.querol@idaea.csic.es

Professor Emeritus Olli Seppänen
Department of Mechanical Engineering
Aalto University Finland
Email: olli1944@gmail.com

Professor Shin-ichi Tanabe
Department of Architecture
Waseda University, Japan
Email: tanabe@waseda.jp

Professor Kwok Wai Tham
Department of Building
National University of Singapore, Singapore
Email: bdqtkw@nus.edu.sg

Associate Professor Pawel Wargocki
International Centre for Indoor Environment and
Energy, Department of Civil Engineering
Technical University of Denmark
Email: paw@byg.dtu.dk

Associate Professor Aneta Wierzbicka
Ergonomics and Aerosol Technology
Lund University, Sweden
Email: Aneta.Wierzbicka@design.lth.se

Boya Distinguished Professor Maosheng Yao
College of Environmental Sciences and Engineering,
Peking University, Beijing, China
Email: yao@pku.edu.cn

Co-Signing Scientists:

Professor Jonathan Abbatt
Department of Chemistry
University of Toronto, Canada
Email: jonathan.abbatt@utoronto.ca

Dr. John Adgate
Department of Environmental and Occupational
Health, Colorado School of Public Health
University of Colorado, USA
Email: john.adgate@cuanschutz.edu

Professor Alireza Afshari
Department of the Built Environment (BUILD)
Aalborg University, Denmark
Email: aaf@build.aau.dk

Professor Kang-Ho Ahn
Department of Mechanical Engineering
Hanyang University, Republic of Korea
Email: khahn@hanyang.ac.kr

Professor Francis Allard
LaSIE (Engineering Sciences for Environmental
Issues Laboratory)
La Rochelle University, France
Email: francis.allard@univ-lr.fr

Professor Joseph Allen
Healthy Buildings Program
Harvard T.H. Chan School of Public Health, USA
Email: jgallen@hsph.harvard.edu

Dr. Celia Alves
Centre for Environmental and Marine Studies,
University of Aveiro, Portugal
Email: celia.alves@ua.pt

Professor Meinrat O. Andreae
Max Planck Institute for Chemistry, Germany
Email: m.andreae@mpic.de

Professor Isabella Annesi-Maesano
Epidemiology of Allergic and Respiratory Diseases
(EPAR) Department, IPLESP, INSERM and
Sorbonne University, France
Email: isabella.annesi-maesano@inserm.fr

Professor Ahmet Arisoy
Mechanical Engineering Department
İstanbul Technical University, Turkey
Email: arisoyah@itu.edu.tr

Professor Andrew P. Ault
Department of Chemistry
University of Michigan, USA
Email: aulta@umich.edu

Dr. Gwi-Nam Bae
Center for Particulate Air Pollution and Health
Korea Institute of Science and Technology,
Republic of Korea
Email: gnae@kist.re.kr

Dr. Gabriel Bekö
International Centre for Indoor Environment and
Energy, Department of Civil Engineering
Technical University of Denmark, Denmark
Email: gab@byg.dtu.dk

Professor Scott C. Bell, Chief Executive
Translational Research Institute
Brisbane, Australia
Email: scott.bell@tri.edu.au

Professor Allan Bertram
Department of Chemistry
University of British Columbia, Canada
Email: bertram@chem.ubc.ca

Professor Mahmood Bhutta
Department of ENT Surgery, Brighton & Sussex
University Hospitals, United Kingdom
Email: m.bhutta@doctors.org.uk

Dr. Seweryn Bialasiewicz
Australian Centre for Ecogenomics
The University of Queensland, Australia
Email: seweryn@uq.edu.au

Professor Merete Bilde
Department of Chemistry
Aarhus University, Denmark
Email: bilde@chem.au.dk

Tami Bond, Scott Presidential Chair in Energy
Environment and Health
Department of Mechanical Engineering
Colorado State University, USA
Email: Tami.Bond@colostate.edu

Professor Joseph Brain
Department of Environmental Health
Harvard University, USA
Email: brain@hsph.harvard.edu

Professor Marianna Brodach
Engineering Department, Moscow Architectural
Institute (State Academy), Russia
Email: brodatch@abok.ru

Professor David M. Broday
Civil & Environmental Engineering
Technion Institute of Technology, Israel
Email: dbrodav@technion.ac.il

Professor Guangyu Cao
Department of Energy and Process Engineering
Norwegian University of Science and Technology,
Norway
Email: Guangyu.cao@ntnu.no

Professor Christopher D. Cappa
Department of Civil and Environmental Engineering
University of California, Davis, USA
Email: cdcappa@ucdavis.edu

Professor Annmarie Carlton
Department of Chemistry,
University of California, Irvine, USA
Email: agcarlo@uci.edu

Professor Paul K.S. Chan
Department of Microbiology, Faculty of Medicine
The Chinese University of Hong Kong,
Hong Kong, China
Email: paulkschan@cuhk.edu.hk

Professor Christopher Chao
Faculty of Engineering, The University of Hong
Kong, Hong Kong, China
Email: cyhchao@hku.hk

Associate Professor Kuan-Fu Chen
Clinical Informatics and Medical Statistics Research
Center and Department of Emergency Medicine,
Chang Gung University and Chang Gung Memorial
Hospital, Taiwan
Email: kfchen@mail.cgu.edu.tw

Professor Qi Chen
College of Environmental Sciences and Engineering
Peking University, Beijing, China
Email: qichenpku@pku.edu.cn

Professor Qingyan Chen
Mechanical Engineering, Purdue University, USA
Email: yanchen@purdue.edu

Dr. David Cheong
Individual Capacity, Singapore
Email: davidalice2005@yahoo.com.sg

Dr. Per Axcel Clausen
New Technologies, National Research Centre for
the Working Environment, Denmark
Email: pac@nrcwe.dk

Professor Ross Crawford
Orthopaedic Surgeon, The Prince Charles Hospital
Medical Robotics, Queensland University of
Technology, Brisbane, Australia
Email: r.crawford@qut.edu.au

Professor Derek Clements-Croome
Department of Built Environment
Reading University, United Kingdom
Email: d.j.clements-croome@reading.ac.uk

Professor Geo Clausen
Department of Civil Engineering
Technical University of Denmark, Denmark
Email: gc@byg.dtu.dk

Dr. Ian Clifton
Department of Respiratory Medicine, Leeds
Teaching Hospitals NHS Trust, United Kingdom
Email: i.clifton@nhs.net

Dean Richard L. Corsi
Maseeh College of Engineering and Computer
Science, Portland State University, Oregon, USA
Email: rcorsi@pdx.edu

Professor Benjamin J. Cowling
School of Public Health, The University of Hong
Kong, Hong Kong, China
Email: bcowling@hku.hk

Professor Francesca Romana d'Ambrosio
Department of Industrial Engineering
University of Salerno, Italy
Email: fdambrosio@unisa.it

Professor Ghassan Dbaibo
Center for Infectious Diseases Research
American University of Beirut, Lebanon
Email: gdbaibo@aub.edu.lb

Professor Richard de Dear
School of Architecture, Design and Planning
The University of Sydney, Australia
Email: Richard.Dedear@sydney.edu.au

Professor Gianluigi de Gennaro
Department of Biology
University of Bari Aldo Moro, Italy
Email: gianluigi.degennaro@uniba.it

Dr. Peter DeCarlo
Environmental Health and Engineering
Johns Hopkins University, USA
Email: pdecarl1@jhu.edu

Professor Philip Demokritou
Department of Environmental Health
TH Chan School of Public Health
Harvard University, USA
Email: pdemokri@hsph.harvard.edu

Dr. Hugo Destailats
Indoor Environment Group
Lawrence Berkeley National Laboratory, USA
Email: HDestailats@lbl.gov

Professor Joanna Domagala-Kulawik
Department of Pneumonology and Allergy
Medical University of Warsaw, Poland
Email: domagalakulawik@gmail.com

Lord University Professor Neil M. Donahue
Center for Atmospheric Particle Studies
Carnegie Mellon University, USA
Email: nmd@andrew.cmu.edu

Professor Caroline Duchaine
Biochemistry, Microbiology and Bio-Informatics
Department, Université Laval, Canada
Email: caroline.duchaine@bcm.ulaval.ca

Professor Marzenna R. Dudzinska
Department of Indoor and Outdoor Air Quality
Lublin University of Technology, Poland
Email: m.dudzinska@pollub.pl

Professor Dominic E. Dwyer
Director, New South Wales Health Pathology Public
Health Pathology, NSWHP-ICPMR
University of Sydney, Westmead, Australia
Email: dominic.dwyer@sydney.edu.au

Professor Greg Evans P.Eng. FCAE, FAAAS
Southern Ontario Centre for Atmospheric Aerosol
Research
University of Toronto, Canada
Email: greg.evans@utoronto.ca

Associate Professor Delphine K. Farmer
Department of Chemistry
Colorado State University, USA
Email: delphine.farmer@colostate.edu

Kevin P. Fennelly, MD, MPH, ATSF
Pulmonary Branch, Division of Intramural Research
NHLBI / NIH, USA
Email: Kevin.Fennelly@nih.gov

Professor Richard Flagan
Departments of Chemical Engineering and
Environmental Science and Engineering
California Institute of Technology, USA
Email: flagan@caltech.edu

Dr. Janine Fröhlich-Nowoisky
Multiphase Chemistry
Max Planck Institute for Chemistry, Germany
Email: j.frohlich@mpic.de

Professor Manuel Gameiro da Silva
ADAI, LAETA, Department of Mechanical
Engineering, EfS Initiative
University of Coimbra, Portugal
Email: manuel.gameiro@dem.uc.pt

Dr. Christian George
IRCELYON, CNRS, France
Email: christian.george@ircelyon.univ-lyon1.fr

Associate Professor Marianne Glasius
Department of Chemistry
Aarhus University, Denmark
Email: glasius@chem.au.dk

Professor Allen H. Goldstein
Department of Environmental Science, Policy, and
Management
University of California at Berkeley, USA
Email: ahg@berkeley.edu

Professor João Gomes
Chemical Engineering Department
ISEL - Lisbon Polytechnic, Portugal
Email: jgomes@deq.isel.ipl.pt

Dr. Michael Gormley
Institute for Sustainable Building Design
Heriot- Watt University, Edinburgh, United Kingdom
Email: m.gormley@hw.ac.uk

Professor Rafal Górný
Department of Chemical, Aerosol and Biological
Hazards, Central Institute for Labour Protection -
National Research Institute, Poland
Email: ragor@ciop.pl

Professor Emeritus David Grimsrud
Founding Editor, Indoor Air Journal
University of Minnesota (Retired), USA
Email: grimsrud@earthlink.net

Professor Keith Grimwood
School of Medicine
Griffith University, Brisbane, Australia
Email: k.grimwood@griffith.edu.au

Professor Charles N. Haas
Civil, Architectural & Environmental Engineering
Drexel University, USA
Email: haas@drexel.edu

Professor Fariborz Haghighat
Building, Civil and Environmental Engineering
Concordia University, Canada
Email: Fariborz.Haghighat@concordia.ca

Professor Michael Hannigan
Department of Mechanical Engineering
University of Colorado, USA
Email: hannigan@colorado.edu

Professor Roy Harrison
School of Geography, Earth & Environmental
Sciences,
University of Birmingham, United Kingdom
Email: r.m.harrison@bham.ac.uk

Professor Ulla Haverinen-Shaughnessy, D. Sc.
Civil Engineering; Indoor Air Program
The University of Oulu; The University of Tulsa
Finland & USA
Email: ulla.haverinen-shaughnessy@oulu.fi

Professor Philippa Howden-Chapman
Department of Public Health
University of Otago, Wellington, New Zealand
Email: philippa.howden-chapman@otago.ac.nz

Professor Per Heiselberg
Department of the Built Environment
Aalborg University, Denmark
Email: pkh@build.aau.dk

Professor Daven K. Henze
Department of Mechanical Engineering
University of Colorado Boulder, USA
Email: daven.henze@colorado.edu

Dr. Jean-Michel Heraud
Virology Unit,
Institut Pasteur de Madagascar, Madagascar
Email: jmheraud@pasteur.mg

Professor Hartmut Herrmann
Atmospheric Chemistry Department (ACD)
Leibniz-Institute for Tropospheric Research
(TROPOS), Germany
Email: herrmann@tropos.de

Professor Philip K. Hopke
Public Health Sciences, University of Rochester
School of Medicine and Dentistry, USA
Email: philip_hopke@URMC.rochester.edu

Ray Horstman,
Beoing (Retired), USA
Email: randshors@gmail.com

Professor Wei Huang
Department of Occupational and Environmental
Health, Peking University, Beijing, China
Email: whuang@pku.edu.cn

Professor J. Alex Huffman
Department of Chemistry and Biochemistry
University of Denver, USA
Email: alex.huffman@du.edu

Professor David S. Hui
Department of Medicine & Therapeutics, The
Chinese University of Hong Kong,
Hong Kong, China
Email: dschui@cuhk.edu.hk

Professor Tareq Hussein
Department of Physics
University of Jordan, Jordan
Email: t.hussein@ju.edu.jo

Dr. Gabriel Isaacman-VanWertz
Civil and Environmental Engineering
Virginia Tech, USA
Email: ivw@vt.edu

Professor Jouni J.K. Jaakkola
Center for Environmental and Respiratory Health
Research, University of Oulu, Finland
Email: jouni.jaakkola@oulu.fi

Professor Matti Jantunen
National Institute for Health and Welfare, Finland
Email: matti.jantunen@janding.fi

Associate Professor Lance Jennings
Pathology and Biomedical Science
University of Otago, Christchurch, New Zealand
Email: lance.jennings@cdbh.health.nz

Professor Dennis Johansson
Building Services, Lund University, Sweden
Email: dennis.johansson@hvac.lth.se

Dr. Jan Kaczmarczyk
Department of Heating, Ventilation and Dust
Removal Technology
Silesian University of Technology, Poland
Email: jan.kaczmarczyk@polsl.pl

Professor George Kallos
Department of Physics
National & Kapodistrian University of Athens,
Greece
Email: kallos@mg.uoa.gr

Professor David Katoshevski
Environmental Engineering
Ben-Gurion University of the Negev, Israel
Email: davidk@bgu.ac.il

Professor Frank Kelly
School of Public Health
Imperial College London, United Kingdom
Email: fkelly@imperial.ac.uk

Associate Professor Søren Kjærsgaard
Department of Public Health
Aarhus University, Denmark
Email: sk@ph.au.dk

Associate Professor Luke D. Knibbs
School of Public Health
The University of Queensland, Brisbane, Australia
Email: l.knibbs@uq.edu.au

Dr. Henrik N. Knudsen
Department of the Built Environment (BUILD)
Aalborg University, Denmark
Email: hnk@sbi.aau.dk

Professor GwangPyo Ko
Graduate School of Public Health
Seoul National University, Republic of Korea
Email: gko@snu.ac.kr

Associate Professor Evelyn S.C. Koay
Yong Loo Lin School of Medicine, Department of
Pathology
National University of Singapore, Singapore
Email: patkoaye@nus.edu.sg

Dr. Jen Kok
Centre for Infectious Disease and Microbiology
Laboratory Services
NSW Health Pathology-Institute of Clinical
Pathology and Medical Research, Australia
Email: jen.kok@health.nsw.gov.au

Professor Nino Kuenzli, MD
Department of Epidemiology and Public Health and
Department of Education and Training, Swiss
Tropical and Public Health Institute, Switzerland
Email: nino.kuenzli@swisstph.ch

Professor Risto Kosonen
Mechanical Engineering, Aalto University, Finland
Email: risto.kosonen@aalto.fi

Professor Markku Kulmala
Institute for Atmospheric and Earth System
Research (INAR) / Physics, Faculty of Science
University of Helsinki, Finland
Email: markku.kulmala@helsinki.fi

Adjunct Professor Kazukiyo Kumagai
Graduate School of Engineering
Tokyo University of Science, Japan
Email: kkumagai@rs.tus.ac.jp

Professor Prashant Kumar
Global Centre for Clean Air Research (GCARE)
University of Surrey, United Kingdom
Email: p.kumar@surrey.ac.uk

Dr. Kazumichi Kuroda
School of Medicine, Nihon University, Japan
Email: kuroda.kazumichi@nihon-u.ac.jp

Professor Kiyoungh Lee
Department of Environmental Health Sciences
Seoul National University, Republic of Korea
Email: cleanair@snu.ac.kr

Professor Nelson Lee [MBBS, MRCP, MD,
FRCP(Edin), FRCP(Lond), FIDSA]
Department of Medicine, Division of Infectious
Diseases, University of Alberta, Canada
Email: laishunn@ualberta.ca

Dr. Barry Lefer
Individual Capacity, USA
Email: barry.lefer@nasa.gov

Professor Vincent Lemort
Thermodynamics Laboratory
University of Liège, Belgium
Email: Vincent.Lemort@uliege.be

Professor Xianting Li
Department of Building Science
Tsinghua University, Beijing, China
Email: xtlingli@tsinghua.edu.cn

Professor Dusan Licina
Civil and Environmental Engineering, EPFL – École
Polytechnique Fédérale de Lausanne, Switzerland
Email: dusan.licina@epfl.ch

Dr. Chao-Hsin Lin, PE
Environmental Control Systems
Boeing Commercial Airplanes, USA
Email: chao-hsin.lin@boeing.com

Professor Junjie Liu
School of Environmental Science and Engineering
Tianjin University, China
Email: jjliu@tju.edu.cn

Dr. Kam Lun E. Hon, MBBS, MD, FAAP, FCCM
The Department of Paediatrics & The Hong Kong
Institute of Integrative Medicine
The Chinese University of Hong Kong,
Hong Kong, China
Email: ehon@hotmail.com

Professor John C. Little
Department of Civil and Environmental Engineering
Virginia Tech, USA
Email: jcl@vt.edu

Dr. Li Liu
Department of Building Science
Tsinghua University, Beijing, China
Email: liuli_archi@tsinghua.edu.cn

Dr. Janet M. Macher, ScD MPH
School of Public Health, Alumna
University of California, Berkeley, USA
Email: janmacher@berkeley.edu

Associate Professor Ebba Malmqvist
Occupational and Environmental Medicine
Lund University, Sweden
Email: ebba.malmqvist@med.lu.se

Dr. Corinne Mandin
Department of Health and Comfort
Scientific and Technical Center for Building, France
Email: corinne.mandin@cstb.fr

Professor Ivo Martinac
Division of Sustainable Buildings, Building Services
and Energy Systems
KTH Royal Institute of Technology, Sweden
Email: im@kth.se

Professor Dainius Martuzevičius
Faculty of Chemical Technology
Kaunas University of Technology, Lithuania
Email: daimart@ktu.lt

Dr. Mark J. Mendell
Indoor Environment Department
Lawrence Berkeley National Laboratory, USA
Email: mmendell@pacbell.net

Professor David Miller
Department of Chemistry
Carleton University, Ottawa, Canada
Email: david.miller@carleton.ca

Assistant Professor Claudia Mohr
Department of Environmental Science
Stockholm University, Sweden
Email: claudia.mohr@aces.su.se

Dr. Luisa T. Molina
Department of Earth, Atmospheric and Planetary
Sciences
Massachusetts Institute of Technology, USA
Email: lmolina@mit.edu

Professor Glenn Morrison
Environmental Sciences and Engineering
University of North Carolina, Chapel Hill, USA
Email: glenn.morrison@unc.edu

Dr. Roya Mortazavi
Atmospheric and Oceanic Sciences
McGill University, Canada
Email: roya.mortazavi@mail.mcgill.ca

Professor Edward Nardell
Department of Global Health Equity, Brigham &
Woman's Hospital, Harvard University School of
Medicine and School of Public Health, USA
Email: enardell@bwh.harvard.edu

Professor Athanasios Nenes
School of Architecture, Civil and Environmental
Engineering, École Polytechnique Fédérale de
Lausanne, Switzerland
Email: athanasios.nenes@epfl.ch

Emeritus Adjunct Professor Mark Nicas
School of Public Health, University of California,
Berkeley, USA
Email: mnicas@berkeley.edu

Professor Zhi Ning
Division of Environment and Sustainability
The Hong Kong University of Science and
Technology, Hong Kong, Hong Kong, China
Email: zhining@ust.hk

Professor Jianlei Niu
Fellow of ISIAQ, ASHRAE, and IBPSA
Faculty of Construction and Environment
The Hong Kong Polytechnic University, Hong Kong,
Hong Kong, China
Email: jian-lei.niu@Polyu.edu.hk

Dr. Hidekazu Nishimura
Virus Reserch Center, Clinical Research Division
Sendai Medical Center, National Hospital
Organization, Japan
Email: hide-nishimura@mte.biglobe.ne.jp

Professor Colin O'Dowd MAE MRIA
Centre for Climate & Air Pollution Studies
National University of Ireland Galway, United
Kingdom
Email: colin.odowd@nuigalway.ie

Professor Bjarne W. Olesen
International Centre for Indoor Environment and
Energy, Technical University of Denmark, Denmark
Email: bwo@byg.dtu.dk

Dr. Paula J. Olsiewski
Alfred P. Sloan Foundation, USA
Email: olsiewski@sloan.org

Professor Spyros Pandis
Chemical Engineering Department
University of Patras, Greece
Email: spyros@chemeng.upatras.gr

Professor Daniel Peckham
Leeds Institute of Medical Research
University of Leeds, United Kingdom
Email: d.g.pecham@leeds.ac.uk

Professor Tuukka Petäjä
Institute for Atmospheric and Earth System
Research (INAR) / Physics
Faculty of Science, University of Helsinki, Finland
Email: tuukka.petaja@helsinki.fi

Professor Zbigniew Popiolek
Department of Heating Ventilation and Dust
Removal Technology
Silesian University of Technology in Gliwice
(Politechnika Śląska), Poland
Email: zbigniew.popiolek@polsl.pl

Professor Ulrich Pöschl
Multiphase Chemistry Department
Max Planck Institute for Chemistry, Germany
Email: u.poschl@mpic.de

Dr. Wayne R. Ott
Department of Civil and Environmental Engineering
Stanford University, USA
Email: wott1@stanford.edu

Professor Kimberly Prather
Distinguished Chair in Atmospheric Chemistry
Scripps Institution of Oceanography
University of California, San Diego, USA
Email: kprather@ucsd.edu

Professor Andre S. H. Prevot
Laboratory of Atmospheric Chemistry
Paul Scherrer Institute, Switzerland
Email: andre.prevot@psi.ch

Professor Hua Qian
School of Energy and Environment
Southeast University, China
Email: qianh@seu.edu.cn

Dr. Shanna Ratnesar-Shumate
Department of Pathology and Microbiology
University of Nebraska Medical Center, USA
Email: sratnesar@gmail.com

James L. Repace, MSc.
President, Repace Associates, Inc. Secondhand
Smoke Consultants, USA
Email: repace1@verizon.net

Professor Tiina Reponen
Department of Environmental and Public Health
Sciences University of Cincinnati, USA
Email: Tiina.Reponen@uc.edu

Professor Ilona Riipinen
Department of Environmental Science
Stockholm University, Sweden
Email: ilona.riipinen@aces.su.se

Emeritus Professor Susan Roaf
Institute for Sustainable Building Design, EGIS
Heriot Watt University, Edinburgh, United Kingdom
Email: s.roaf@hw.ac.uk

Professor Allen L. Robinson
Department of Mechanical Engineering
Carnegie Mellon University, USA
Email: alr@andrew.cmu.edu

Professor Yinon Rudich
Department of Earth and Planetary Sciences
Weizmann Institute, Israel
Email: yinon.rudich@weizmann.ac.il

Professor Manuel Ruiz de Adana
Department of Applied Thermodynamics
University of Cordoba, Spain
Email: manuel.ruiz@uco.es

Dr. Masayuki Saijo
Department of Virology
National Institute of Infectious Diseases, Japan
Email: msaijo@nih.go.jp

Professor Reiko Saito
Division of International Health
Graduate School of Medical and Dental Sciences
Niigata University, Japan
Email: jasmine@med.niigata-u.ac.jp

Professor Paulo Saldiva
Department of Pathology
University of São Paulo, Brazil
Email: pepino@usp.br

Professor Tunga Salthammer
Department of Material Analysis and Indoor
Chemistry
Fraunhofer WKI, Braunschweig, Germany
Email: tunga.salthammer@wki.fraunhofer.de

Professor Joshua L. Santarpia
Department of Pathology and Microbiology
University of Nebraska Medical Center, USA
Email: josh.santarpia@unmc.edu

Nohl Professor John H. Seinfeld
Department of Chemical Engineering
California Institute of Technology, USA
Email: seinfeld@caltech.edu

Distinguished Professor Emeritus Gary S. Settles
Mechanical Engineering
Pennsylvania State University, USA
Email: gss2@psu.edu

Associate Professor Siegfried Schobesberger
Department of Applied Physics
University of Eastern Finland, Finland
Email: siegfried.schobesberger@uef.fi

Associate Professor Paul T. J. Scheepers
Radboud Institute for Health Sciences
Radboudumc, The Netherlands
Email: Paul.Scheepers@radboudumc.nl

Professor Max H. Sherman,
Lawrence Berkeley National Laboratory (Retired),
USA
Email: MHSherman@lbl.gov

Professor Alan Shihadeh
Maroun Semaan Faculty of Engineering &
Architecture, American University of Beirut, Lebanon
Email: as20@aub.edu.lb

Professor Manabu Shiraiwa
Department of Chemistry
University of California, Irvine, USA
Email: m.shiraiwa@uci.edu

Professor Jeffrey Siegel
Department of Civil & Mineral Engineering
University of Toronto, Canada
Email: jeffrey.siegel@utoronto.ca

Professor Torben Sigsgaard
Department of Public Health
Aarhus University, Denmark
Email: ts@ph.au.dk

Dr. Brett C. Singer
Sustainable Energy and Environmental Systems
Department
Lawrence Berkeley National Laboratory, USA
Email: bcsinger@lbl.gov

Professor James N. Smith
Department of Chemistry
University of California, Irvine, USA
Email: jimsmith@uci.edu

Professor Armin Sorooshian
Department of Chemical and Environmental
Engineering, University of Arizona, USA
Email: armin@email.arizona.edu

Dr. Jerzy Sowa
Faculty of Building Services, Hydro and
Environmental Engineering
Warsaw University of Technology, Poland
Email: jerzy.sowa@pw.edu.pl

Professor Brent Stephens
Department of Civil, Architectural, and
Environmental Engineering,
Illinois Institute of Technology, USA
Email: brent@iit.edu

Professor Huey-Jen Jenny Su
Institute of Environmental Health Sciences
National Cheng Kung University, Taiwan
Email: hjsu@mail.ncku.edu.tw

Professor Jordi Sunyer
Childhood and Environment, ISGlobal, Spain
Email: jordi.sunyer@isglobal.org

Professor Jason D. Surratt
Department of Environmental Sciences and
Engineering, Gillings School of Global Public Health
University of North Carolina at Chapel Hill, USA
Email: surratt@unc.edu

Professor Kazuo Takahashi
Department of Clinical Laboratory Medicine
International University of Health and Welfare,
Japan
Email: takahashikz@iuhw.ac.jp

Professor Nobuyuki Takegawa
Department of Chemistry
Tokyo Metropolitan University, Japan
Email: takegawa@tmu.ac.jp

Professor Jørn Toftum
Department of Civil Engineering
Technical University of Denmark, Denmark
Email: jt@byg.dtu.dk

Distinguished Professor Margaret A. Tolbert
Department of Chemistry and CIRES
University of Colorado, Boulder, USA
Email: tolbert@colorado.edu

Associate Professor Euan Tovey
Woolcock Institute of Medical Research
University of Sydney, Australia
Email: euan.tovey@sydney.edu.au

Professor Barbara J. Turpin
Department of Environmental Sciences and
Engineering, Gillings School of Global Public Health,
University of North Carolina - Chapel Hill, USA
Email: bjturpin@email.unc.edu

Professor Annele Virtanen
Department of Applied Physics
University of Eastern Finland, Finland
Email: annele.virtanen@uef.fi

Professor John Volckens
Department of Mechanical Engineering
Colorado State University, USA
Email: john.volckens@colostate.edu

Professor Claire Wainwright
Child Health Research Centre
The University of Queensland, Brisbane, Australia
Email: claire.wainwright@health.qld.gov.au

Dr. Lance A. Wallace
US EPA (Retired), USA
Email: wallace73@gmail.com

Professor Boguang Wang
Institute for Environmental and Climate Research
Jinan University, Guangzhou, China
Email: tbongue@jnu.edu.cn

Professor Chia C. Wang
Aerosol Science Research Center
National Sun Yat-sen University, Taiwan
Email: chiawang@mail.nsysu.edu.tw

Professor Michael Waring
Department of Civil, Architectural and Environmental
Engineering, Drexel University, USA
Email: msw59@drexel.edu

Professor John Wenger
School of Chemistry & Environmental Research
Institute, University College Cork, Ireland, United
Kingdom
Email: j.wenger@ucc.ie

Professor Charles J. Weschler
Environmental & Occupational Health Sciences
Institute
Rutgers University, USA
Email: weschlch@rwjms.rutgers.edu

Professor Brent Williams
Department of Energy, Environmental, & Chemical
Engineering
Washington University in St. Louis, USA
Email: brentw@wustl.edu

Professor Mary E. Wilson
Global Health
San Francisco and Harvard Chan School of Public
Health, University of California, USA
Email: mewilson@hsph.harvard.edu

Professor Armin Wisthaler
Department of Chemistry
University of Oslo, Norway
Email: armin.wisthaler@kjemi.uio.no

Dr. Kazimierz Wojtas
Faculty of Environmental and Power Engineering
Cracow University of Technology, Poland
Email: kaz_wojtas@o2.pl

Dr. Douglas R. Worsnop
Institute for Atmospheric and Earth System
Research (INAR) / Physics, Aerodyne Research /
University of Helsinki, USA / Finland
Email: worsnop@aerodyne.com

Professor Ying Xu
Department of Building Science
Tsinghua University, Beijing, China
Email: xu-ying@mail.tsinghua.edu.cn

Associate Professor Naomichi Yamamoto
Environmental Health Sciences
Seoul National University, Republic of Korea
Email: nyamamoto@snu.ac.kr

Professor Xudong Yang
Department of Building Science
Tsinghua University, Beijing, China
Email: xyang@tsinghua.edu.cn

Dr. Hui-Ling Yen
School of Public Health
The University of Hong Kong, Hong Kong, China
Email: hyen@hku.hk

Professor Emeritus Hiroshi Yoshino
Department of Architecture and Building Science
Tohoku University, Japan
Email: yoshino@sabine.pln.archi.tohoku.ac.jp

Dr. Hassan Zaraket
Department of Experimental Pathology,
Immunology, and Microbiology, Faculty of Medicine,
American University of Beirut, Lebanon
Email: hz34@aub.edu.lb

Professor Zhiqiang (John) Zhai
Department of Civil, Environmental and Architectural
Engineering
University of Colorado at Boulder, USA
Email: john.zhai@colorado.edu

Professor Junfeng (Jim) Zhang
The Nicholas School of the Environment
Duke University, USA
Email: junfeng.zhang@duke.edu

Professor Qi Zhang
Department of Environmental Toxicology
University of California, Davis, USA
Email: dkwzhang@ucdavis.edu

Professor Jensen Zhang
Department of Mechanical and Aerospace
Engineering
Syracuse University, USA
Email: jszhang@syr.edu

Professor Yinping Zhang
Department of Building Science
Tsinghua University, Beijing, China
Email: zhangyp@tsinghua.edu.cn

Professor Bin Zhao
Department of Building Science, School of
Architecture, Tsinghua University, Beijing, China
Email: binzhao@tsinghua.edu.cn

Professor Tong Zhu
College of Environmental Sciences and Engineering
Peking University, Beijing, China
Email: tzhu@pku.edu.cn