

# ARL SCIENCE REVIEW

## Chair and Reviewers

Panel Chair: Kevin Gallo

<b>Primary Reviewer</b>	<b>Research Area Coverage</b>
Clifford Glantz	Atmospheric Dispersion & Boundary Layer
Kilian Smith	Atmospheric Dispersion & Boundary Layer
Stephan de Wekker	Atmospheric Dispersion & Boundary Layer
Armistead G. (Ted) Russell	Atmospheric Chemistry and Deposition
Alexandra (Sandy) Steffen	Atmospheric Chemistry and Deposition
Kevin Gallo (Chair)	Climate Observations and Analyses
Chris Fiebrich	Climate Observations and Analyses

## ATMOSPHERIC DISPERSION & BOUNDARY LAYER

### Clifford Glantz

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### Biography

Mr. Glantz is a Project Manager and Senior Staff Scientist with the Pacific Northwest National Laboratory. Mr. Glantz manages projects and conducts research in emergency response and preparedness, atmospheric dispersion and consequence assessment modeling, critical infrastructure protection, cybersecurity, and risk management. In the US, his work is supported by the Department of Energy (DOE), Department of Homeland Security, Department of Defense, and other agencies. Internationally, his work is supported by the European Union Centre of Excellence, International Atomic Energy Agency, and United National Interregional Crime and Justice Institute. Mr. Glantz has authored over 70 technical publications and papers, authored over 100 conference presentations, and won a number of awards for his research during his 30+ year tenure at PNNL.

### Education:

M.S., Atmospheric Sciences, University of Washington  
B.S., Physics and Atmospheric Sciences, State University of New York at Albany.

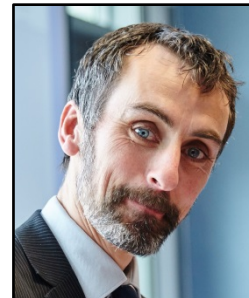
**ARL Research Area:** Atmospheric Dispersion & Boundary Layer Characterization

**Direct Funding Connections:** None

**Research Collaborations:** Working with the ARL Field Research Division's HYRad model (a version of HYSPLIT) to make a generic application for all DOE laboratories and facilities.

## **Kilian Smith**

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## **Biography**

Dr. Smith has almost 20 years of experience working in the environmental field. He was awarded a first class honours Bachelors Degree in Science (Experimental Physics) and a PhD in Experimental Physics (Radiation Physics and Radiochemistry) from University College Dublin (UCD), and he was awarded the Nevin medal for Physics. After completing his PhD, he took up a position as a college lecturer in the Department of Experimental Physics at UCD. In 2010, he completed a MSc in Nuclear Science and Technology, graduating with distinction from the University of Manchester, England.

In 2001, he began working in the Environmental Laboratory of Ireland's Environmental Protection Agency (EPA), with responsibility for the air monitoring programme. Since 2005, he has worked in the EPA's Emergency Preparedness Section. Dr. Smith has represented Ireland on a number of international committees and working groups. He is currently a member of a number of expert groups for the European Commission, the International Atomic Energy Agency, and the Nuclear Energy Authority. He is also involved in the development and application of computer models that simulate the transfer of radiation in the environment. With colleagues from the Irish Meteorological Service, he established a national HYSPLIT user group.

## **Education:**

PhD, Radiation Physics and Radioecology, University College Dublin.

MSc, with distinction, in Nuclear Science and Technology, University of Manchester. Placed first in class and awarded the UK Nuclear Decommissioning Authority prize.

BSc Physics, University College Dublin. Placed first in class and awarded the Thomas E. Nevin medal for Physics.

**ARL Research Area:** Atmospheric Dispersion & Boundary Layer Characterization

**Direct Funding Connections:** None

**Research Collaborations:** Previous collaboration with a now retired ARL scientist

**Stephan de Wekker**

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**Biography**

Dr. de Wekker is an Associate Professor at the University of Virginia, Department of Environmental Sciences. He has provided fundamental contributions to the understanding of atmospheric boundary layer (ABL) processes in complex landscapes and how this surface complexity affects the variability of the ABL in space and time. Dr. de Wekker's contributions have come from extensive studies of the ABL using a combination of observational, theoretical, and numerical modeling tools. In many cases, he starts with the design and execution of hypothesis-driven field experiments that are followed by theoretical and numerical modeling studies. In other cases, theoretical and numerical modeling studies precede, rather than follow, field experiments. His current research emphasizes the atmosphere over mountains, but he also addresses the atmosphere over other landscapes, such as flat and inhomogeneous, urban, and coastal areas. Dr. de Wekker's focus is on ABL processes at spatial scales of a few kilometers (local scale) to tens of kilometers (mesoscale) and temporal scales of hours to days. These local and mesoscale processes are highly relevant for applied, interdisciplinary studies that form an important part of his research agenda. His publications may be found at his website:

[http://atmos.evsc.virginia.edu/De\\_Wekker\\_Lab/publications.html](http://atmos.evsc.virginia.edu/De_Wekker_Lab/publications.html)

**Education:**

Ph.D., Atmospheric Science, The University of British Columbia. Dissertation:  
De Wekker, S. F. J.: 2002, Structure and Morphology of the Convective Boundary Layer in Mountainous Terrain, Ph.D. Dissertation, The University of British Columbia, BC, Canada, 191 pp.

M.S., Soil, Water, Atmosphere (Cum Laude), Wageningen University, The Netherlands. M.S. Thesis: De Wekker, S.F.J., 1996: The estimation of areally-averaged sensible heat fluxes over complex terrain with a large-aperture scintillometer. MS Thesis, Wageningen University, Netherlands 42 pp.

**ARL Research Area:** Atmospheric Dispersion & Boundary Layer Characterization

**Direct Funding Connections:** None

**Research Collaborations:** None

## ATMOSPHERIC CHEMISTRY AND DEPOSITION

### Armistead G. (Ted) Russell

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### Biography

Prof. Russell is the Howard T. Tellepsen Chair and Regents' Professor of Civil and Environmental Engineering at Georgia Tech, where his research is aimed at better understanding the dynamics of air pollutants at urban and regional scales and assessing their impacts on health and the environment to develop approaches to design strategies to effectively improve air quality. He was a member of EPA's Clean Air Science Advisory Committee (CASAC) and a member of the National Research Council's Board on Environmental Studies and Toxicology, and he continues to serve on associated committees. He chaired the CASAC NO<sub>x</sub>-SO<sub>x</sub>, Secondary NAAQS review panel, the Ambient Air Monitoring Methods Subcommittee, and the Council on Clean Air Compliance Analysis' Air Quality Modeling Subcommittee, and was on the Health Effects Institute's Report Review Committee. Professor Russell was an Associate Editor of the journal Environmental Science and Technology. He currently co-directs the Southeastern Center for Air Pollution and Epidemiology and the NSF Sustainability Research Network "Environmentally Sustainable, Healthy and Livable Cities" project. Prof. Russell has recently received funding from the National Science Foundation, NASA, EPA, the state of Georgia, Phillips 66, the Southern Company, the Electric Power Research Institute, CDC, the Health Effects Institute and NIH.

### Education:

M.S. and Ph.D., Mechanical Engineering, California Institute of Technology.  
B.S., Washington State University.

**ARL Research Area:** Atmospheric Chemistry and Deposition

**Direct Funding Connections:** None

**Research Collaborations:** Participated with ARL in some projects associated with the NASA Air Quality Applied Science Team

## **Alexandra (Sandy) Steffen**

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### **Biography**

Dr. Steffen is an Atmospheric Mercury Specialist and lead researcher of atmospheric mercury processes for the Air Quality Research Division of the Science and Technology Branch of Environment Canada (EC), where she has worked for twenty years. Dr. Steffen's research specializes in the chemistry of mercury, its transformations in the atmosphere, and deposition into the ecosystem. She has served as the lead of the Canadian Mercury Science Assessment; as a lead investigator in numerous national and international mercury research programs; and as a Senior Science Advisor to Environment Canada. Dr. Steffen supervises technical and scientific staff, post-doctoral fellows, student and long term contractors at EC and manages capital and operational budgets there. A recognized expert in the field of atmospheric mercury research, she has served as the chair of the scientific steering committee and was a co-chair of the 10th International Conference for Mercury as a Global Pollutant (ICMGP) in Halifax, Nova Scotia in 2011, and has served on the science steering committee for ICMGP conferences in Guiyang, China, Edinburgh, Scotland, and Jeju, Korea from 2009-2015. Dr. Steffen has authored over 45 peer reviewed publications, more than 10 technical reports, and has presented over 70 academic presentations at national and international workshops and conferences.

### **Education:**

Ph.D., Natural Sciences, Leuphana University Luneberg, Germany  
M.Sc., Environmental Analytical Chemistry, University of Waterloo  
B.Sc., Hons. Chemistry, minor Environmental Studies, University of Waterloo

**ARL Research Area:** Atmospheric Chemistry and Deposition

**Direct Funding Connections:** None

**Research Collaborations:** Informal. Provide mercury monitoring network datasets.

## CLIMATE OBSERVATIONS AND ANALYSES

### Kevin Gallo (Review Panel Chair)

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### Biography

Dr. Gallo is positioned with the US Geological Survey Earth Resources Observation and Science (EROS) Center where he is the lead investigator on several collaborative research efforts between NOAA/NESDIS and USGS related to land-atmosphere interactions. He is also an Adjunct Professor with the South Dakota State University Geographic Information Science Center of Excellence.

Dr. Gallo is co-lead on development of the NOAA-USGS Land Product Characterization System. He is a member of the GOES-R Land Algorithm Working Group and the USGS-NASA/EOSDIS Land Processes Distributed Active Archive Center's User Working Group, and he is the NOAA representative to the Committee on Earth Observation Satellites' Virtual Land Surface Imaging Constellation Study Team. He is a former member of the American Meteorological Society Board of the Urban Environment (1999-2003) and a former member of the Board of the International Association for Urban Climate (2006-10). His current research activities include:

- The use of high-resolution satellite data and in situ data to validate NOAA operational satellite data and products;
- Satellite-based analysis and assessment of urban effects on the local environment at climate observation stations, and
- Documentation of historical Native American observations of weather and climate.

### Education:

M.S. and Ph.D., Agricultural Climatology/Meteorology , Purdue University  
B.S., Geography/Meteorology, Northern Illinois University

**ARL Research Area:** Climate Observations and Analyses

**Direct Funding Connections:** None

**Research Collaborations:** None

**Chris Fiebrich**

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**Biography**

Dr. Fiebrich is the Associate Director of the Oklahoma Climatological Survey and Manager of the Oklahoma Mesonet at the University of Oklahoma. His research focus involves improving our climate data through the use of automated weather stations. He has also published papers on data quality assurance, the history of weather observations, and meteorological instrumentation. While at the University of Oklahoma, he spent a year as an intern at the National Weather Service Headquarters in Washington, D.C. He works with all aspects of the Oklahoma Mesonet, from laboratory calibrations to site maintenance to Mesonet websites. He also provides outreach to teachers and emergency managers.

**Education:**

B.S., M.S., and Ph.D., Meteorology, University of Oklahoma.

**ARL Research Area:** Climate Observations and Analyses

**Direct Funding Connections:** None

**Research Collaborations:** None