# RODMAN R. LINN

**Earth and Environmental Sciences Division**
**Mail Stop T003**
**Los Alamos National Laboratory**
**Los Alamos, NM 87545**
**Email: rrl@lanl.gov**
**Phone: (505) 665-6254; Fax: (505) 665-3415**

## EDUCATION

**Ph.D.** **Mechanical Engineering**, 1997
New Mexico State University (NMSU), Las Cruces, NM

**Dissertation Title:** *A Transport Model for Studying Wildfire Behavior*

**Thesis Advisors:** Francis Harlow and O'Neill Burchett

**M.S.** **Mechanical Engineering**, 1993
University of Illinois at Urbana – Champaign (UIUC), IL

**Thesis Title:** *Effects of Modeled Terms In the Reynolds-Stress Transport Equations*

**B.S.** **Mechanical Engineering**, 1991
NMSU, Las Cruces, NM
Graduated with Highest Honors in College of Engineering
GPA: 4.0/4.0

## GENERAL BACKGROUND AND EXPERTISE

- Two decades of demonstrated leadership in the field of wildfire behavior modeling and application of coupled wildfire/atmosphere behavior models to study fundamental wildfire behavior and its response to various environmental conditions.
- Extensive experience in atmospheric phenomena involving strong coupling such as, wind/vegetation interaction, and wind interactions with wind turbines and wind turbine arrays as well as passive, high-temperature and explosive dispersion.
- Demonstrated success in developing internationally recognized, leading-edge computational tools.
- Strong background in theoretical turbulence, computational fluid mechanics, and heat transfer.
- Experience leading teams of researchers in an environment, which is 100% soft funding.
- Experience serving in advisory capacities for multi-national and multi-institutional research programs.

- Successful project, team, and group (60 people) management experience.
- Demonstrated leadership of multi-institutional and multi-national research projects.
- Demonstrated capability to address difficult personnel issues.
- Active DOE "Q" clearance.

## EMPLOYMENT EXPERIENCE

**Senior Scientist**

Computational Earth Science Group

Earth and Environmental Sciences Division

Los Alamos National Laboratory (LANL), Los Alamos, NM

10/2008 – present (promoted from Senior Scientist 4 to Senior Scientist 5 in 7/2013)

- Leading the continued development, implementation, testing, and application of computational models for wildfire behavior (FIRETEC).
- LANL-Lead (collaborating with other institutions) for the application of FIRETEC to explore implications of prescribed-fire practices.
- Leading the development of reduced-order coupled/fire atmosphere models.
- Leading the application of HIGRAD to study coupled ecosystem atmosphere interaction (moisture, carbon and energy.)
- Leading the extension and application of FIRETEC to urban fire conflagration and firestorms.
- Leading the continued development and application of LANL's WindBlade model for studying the multi-scale interaction between wind turbines and surrounding complex wind patterns.
- Leading program development efforts for wildfire-related projects at LANL as well as projects dealing with a variety of other atmospheric modeling efforts
- Serving technical advisory roles for numerous projects within the team, group and division.
- Serving as subject matter expert regarding wildfire science on several government committees at the request of DOE
- Mentoring students and post docs.

**Team Leader for Atmospheric Modeling and Weapons Phenomenology Team**

Earth and Environmental Sciences Division

Los Alamos National Laboratory (LANL), Los Alamos, NM

Within: Computational Earth Sciences Group 2008-4/2016

Within: Atmosphere, Climate, and Environmental Dynamics Group 2004-2008

Within: Atmospheric Sciences Group 2000-2004

- Established priorities, coordinated projects and budgets, and led a variety of technical projects for the team.
- Led and performed program development activities for projects contained within the team and contributed to those that extended outside the team.
- Inspired this team to continually expand the application of its tools into new fields of study and continually improve those tools including the complete reformulation computational models to take advantage of new computing architectures.

**Deputy Group Leader for Atmospheric, Climate, and Environmental Dynamics Group**

Earth and Environmental Sciences Division

Los Alamos National Laboratory (LANL), Los Alamos, NM

2/2005 – 10/2008

- Worked with the group leader to define multidisciplinary technical directions for the group and to solve personnel, inter-project and inter-group conflicts.
- Coordinated and integrated projects and budgets for a group of approximately 50 individuals (technical staff, post-docs, students, technicians and administrative group members).
- Performed project and program development activities for the group.
- Served as acting group leader for short and extended periods at the request of the division office or group leader

**Technical Staff Member, Scientist**

Earth and Environmental Sciences Division

Los Alamos National Laboratory (LANL), Los Alamos, NM

1997 – 2/2005

- Initiated the development, implementation, testing and application of computational models for wildfire behavior (FIRETEC).
- Initiated the development of LANL's WindBlade model for studying the multiscale interaction between wind turbines and surrounding complex wind patterns.
- Performed critical roles in developing computational and analytical models for complex multi-phase atmospheric processes.
- Used stochastic representations and PDF methods to describe physical behaviors.
- Mentored students.

**Adjunct Professor/Instructor for Undergraduate Engineering**

University of New Mexico - Los Alamos Branch College/UNM Extended University**,** 1999 – Present

- Teaching undergraduate Civil and Mechanical Engineering courses in Mechanics, Mechanics of Materials, Fluid Dynamics, and Heat transfer (normally 2 semester courses per year)
- Chair of UNM-LA Engineering Advisory Panel (2015, 2016)

**LANL Graduate and Undergraduate Research Assistant**

Continuously from 1993 until 1997 and summers of 1990, 1991, and 1992

- Began the development of a transport model physics-based wildfire prediction, FIRETEC.
- Used finite-difference computer codes to study turbulent flow.
- Worked with large fluid modeling codes to observe material reactions to high explosives.
- Developed programs to simulate turbulence activity involved in constant density flow and multi-fluid mixing.

**University Research Assistant**

University of Illinois at Urbana – Champaign (Mechanical Engineering Department), 1992 – 1993

New Mexico State University (Mechanical Engineering Department), 1990 – 1992

**Additional Adjunct Professorships at Universities**

Brigham Young University, Provo, UT, 2003 – 2009, Ph.D. Committee

University of Toledo, Toledo, OH, 2003 – 2010, Ph.D. Committee

University of Montana, Missoula, MT, 2003 – 2009, Ph.D. Committee

Florida State University, Tallahassee, FL, 2007 – 2014, multiple Ph.D. Committees

University of Colorado, Boulder, CO, 2011– present, multiple PhD. Committees

University of California, Davis, CA, 2011–2014, PhD. Committee

University of Wyoming, Laramie CO, 2015–present, PhD. Committee

Colorado State University, Fort Collins, CO, 2015–present, PhD. Committee

## HONORS and AWARDS

- Award of Excellence by NNSA Defense Programs 2013, 2014, 2015
- Los Alamos Awards Program Recipient 2013, 2012, 2015
- Principal Investigator on 2003 R&D 100 Award-winning Entry: FIRETEC, A Physics-Based Wildfire Model
- Principal Investigator on 2004 Federal Laboratory Consortium Far-West and Mid-Continent Regions' Outstanding Technology Award

- Selected to be a Member of NMSU Mechanical Engineering Academy, 2004 (Elected to the Board of Directors 2005-2006, and served as the chair of this department's Industrial Advisory Committee 2007-2015)
- Highest Honor Distinction for being the top graduate from College of Engineering (NMSU, fall 1991)
- Departmental Fellowship (UIUC, 1992 – 1993)
- National Dean's List (1989 – 1990)
- Regent's Scholarship (NMSU, 1988 – 1991), Excel Scholarship (University of New Mexico [UNM],, 1987 – 1988)
- Dean's List (UNM, 1987 – 1988 and NMSU, 1988 – 1991)

## PROFESSIONAL AFFILIATIONS

- DOE representative to Federal Fire Science Coordinating Council (6/2016 – present)
- Served as subject matter expert and performed reviews for Fund for Scientific Research – FNRS
- Chair of UNM-LA Engineering Advisory Panel (2015, 2016)
- DOE representative to the OSTP Wildland Fire Science and Technology Task Force (6/2014 – 6/2016)
- Joint Action Group for National Wildland Fire Weather Needs Assessment (3/2014 – present)
- LANL Institutional Computing Advisory Board (2011 – present)
- Associate Editor for International Journal of Wildland Fire, 2005 – Present
- New Mexico State University Mechanical Engineering Academy 2004 – present
    - Board of Directors, 2005 – 2013
    - Industrial Advisory Committee, 2007 – Present (Chair 2008-2015)
- Associate Director of California Institute for Hazards Research (2007-2011)
- NWEUG/WESC Nuclear Weapons Effects Fire Subgroup Co-Leader (DoD, DOE, AWE partners), 2004 – 2011
- International Advisory Committee for FIRE PARADOX Project (funded by the European Union), 2006 – 2010
- NOAA Fire Weather Research Working Group (2007 – 2009)
- Subject Matter Expert for ARPA-E review panel (2009-2010)
- Science Foundation Arizona Review Committee, Subject Matter Expert Wind Energy (2008)
- Active member of the National Core Fire Science Caucus

- Invited Guest Scientist (Université de la Méditerranée UNIMECA Technopôle de Château Gombert), June-July 2000
- Los Alamos Employees' Scholarship Fund Advisory Committee, 2008-2014
- LANL Student Programs Advisory Committee, 1995 – 1998
- Served on numerous LANL Division Leader, Deputy Division Leader, Group Leader and Staff Search committees.
- Co-initiator of the LANL/FSU Geophysical Fluid Dynamics Institute Memorandum of Understanding

## MENTORING

- Served roles on Ph.D. or Masters Committees.
  - Russell Parsons, (PhD – University of Montana), Forestry, 2003 – 2008
  - Michael Clark, (PhD – Brigham Young University), Chemical Engineering, 2003 – 2008
  - Francois Pimont, (PhD – INRA, France), Engineering 2006– 2008
  - Peter Kenney, (PhD – University of Toledo), Mechanical Engineering, 2003 – 2009
  - Jeremy Sauer, (PhD – Florida State University), Geophysical Fluid Dynamics, 2005 – 2013
  - Jesse Canfield, (PhD – Florida Sate University), Geophysical Fluid Dynamics) 2004 – 2014 (Started mentoring Jesse as undergraduate at University of New Mexico 2004)
  - Brian Vanderwende, (PhD – University of Colorado), Atmospheric Science, 2010 – Present
  - Sohail Shafii, (PhD – University of California Davis), Computer Science, 2011 – 2014
  - Joseph C.Y. Lee, (PhD – University of Colorado), Atmospheric Science, 2015 – present
  - Dani Steger, (MS –Colorado State University), Forestry, 2015 – present
  - Marlin Holmes (PhD – University of Wyoming), Mechanical Engineering, 2015 – present
  - Laura Mazarro (PhD – University of Colorado), Atmosphereic Science, 2016 – present
- Mentored and guided Post Doc, post-graduate, undergraduates and high school coops at Los Alamos National Laboratory
  - Ned Winter (ME undergraduate), University of New Mexico, 2003 – 2004
  - Jesse Canfield, (Mechanical Engineering, Geophysical Fluid Dynamics) University of New Mexico, New Mexico State University, Florida State University, 2004 – 2014

- Kyle Christenson (ME undergraduate), New Mexico State University, 2005 – 2006
- Francois Pimont, (Engineering), INRA, University of Provence, France 2006
- Michael Clark, (Mechanical Engineering), Brigham Young University, 2003 – 2008
- Garrett Altman (Geography undergraduate and MS), University of California Santa Barbara, 2005-2006
- Jeremy Sauer, (PhD – Florida State University), Geophysical Fluid Dynamics, 2005 – 2013
- Joseph Koby, (High school Coop Student), 2006
- Eunmo Koo (Ph.D. candidate, ME), University of California Berkeley, 2002 – 2006, then as a Post Doc 2006- 2009
- Sarah Nelson (ME undergraduate), New Mexico State University, 2007 – 2008
- Alyssa Brooks (ME undergraduate), New Mexico State University, 2008 – 2010
- Joshua Roybal (ChE undergraduate), New Mexico State University, 2008 – 2010
- Jason Bossert (Applied Mathamatics Undergraduate), University of California Santa Barbara, 2009 – 2014
- Andrew Thoma, (High School Coop Student), Sept. 2010 – Aug. 2011
- Anu Kramer, University of California Berkeley, Forestry, 2011 – 2012
- Sarah Terrill (ME undergraduate), University of New Mexico Sept. 2011 – 2013
- Nicolas Castano (ME undergraduate), New Mexico Tech. University May 2012 – 2013
- Rachel Robey (Applied Mathamatics) University of Colorado, June 2012 – present
- Jackson Knoll (Atmospheric Physics undergraduate), University of Montana, June 2013 – 2014
- Laura Mazzaro (Atmospheric Sciences PhD sudent), University of Colorado, April 2015 – present
- Domingo Munoz-Esparza, (LANL Post Doc), 7/2014 – 2/2016
- Isabelle Runde, (High School Coop Student, Geo-Sciences undergraduate with University of California Santa Barbara), Los Alamos High School, 6/2015 – present

## PATENTS

**Linn, R.R**. and E. Koo (2011). Determining Effects of Turbine Blades on Fluid Motion. US, Los Alamos National Security, LLC**. 7953563.**

**Linn, R.R**. and E. Koo (2012). Determining Effects of Turbine Blades on Fluid Motion. US, Los Alamos National Security, LLC**. 8170813.**

## PUBLICATIONS

### Refereed Journal Articles

Pimont F, Dupuy JL, **Linn R**, Parsons R, Martin-StPaul N, (2016) "Wind-measurement accuracy in fire experiments: lessons learned from large-eddy simulations in a homogeneous forest", Agricultural and Forest Meteorology.

Sauer, J, Muñoz Esparza D, Canfield JM, Kim YJ, **Linn R**, Costigan K, Parsons R, Branko Kosovic (Submitted 2016), "Revealing Non-Anomalous Meteorological Catalysts of Anomalous Fire Behavior: The 2011 Las Conchas Fire Blowup" Bulletin of the American Meteorological Society.

Sieg C., **Linn R.**, Pimont F., McMillin J., HoffmanC. M., Winterkamp J., Baggett L. S., (submitted 2016) "Simulated fire hazard following bark beetle outbreaks in ponderosa pine: Synergy, antagonism, and neutrality", Ecological Applications.

Jolly WM, Hintz J, **Linn RR**, Kropp RC, Conrad ET, Parsons RA and Winterkamp J, (2016) "Seasonal variations in red pine (*Pinus resinosa*) and jack pine (*Pinus banksiana*) foliar thermo-physio-chemistry and their potential influence on stand-scale wildland fire behavior", Forest Ecology and Management.

Muñoz Esparza D; Sauer JA; **Linn RR**; Kosovic B, (in press, 2015) "Limitations of One-Dimensional Mesoscale PBL Parameterizations in Reproducing Mountain-Wave Flows", Journal of Atmospheric Sciences.

Sauer J.; Muñoz-Esparza D; Canfield J; Costigan K; **Linn R**; Kim YJ, (submitted 2015) "New Insights into Boundary Layer Influence on Stratified Atmospheric Flows over Terrain through Large-Eddy Simulations", Journal of Atmospheric Sciences

Hoffman CM., Canfield J, **Linn RR**, Mell W, Sieg CH, Pimont F, Ziegler J. (In Press 2015), "Evaluating crown fire rate of spread predictions from physics-based models", Fire Technology.

Hoffman CM, **Linn R**, Parsons R, Sieg C, Winterkamp J, (2015) "Modeling spatial and temporal dynamics of wind flow and potential fire behavior following a mountain pine beetle outbreak in a lodgepole pine forest" Agriculture and Forest Meteorology, 204(2015)79–93.

Canfield J.M., **Linn R.R.**, Sauer J.A., Finney M., J. Forthofer (2014), "A numerical investigation of the interplay between fireline length, geometry, and rate of spread", Agricultural and Forest Meteorology, **189–190**(1): 48-59.

Shafii S., Obermaier H., **Linn R**., Koo E., Hlawitschka M., Garth C., B. Hamann and Joy K. (2013) "Visualization and Analysis of Vortex-Turbine Intersections in Wind

Farms", Transactions on Visualization and Computer Graphics.

**Linn RR**, Sieg CH, Hoffman CM, Winterkamp JL, (2013). "Modeling wind fields and fire propagation following bark beetle outbreaks in spatially-heterogeneous pinyon-juniper woodland fuel complexes", Agricultural and Forest Meteorology, 173: 139-153, ISSN 0168-1923.

Cunningham P., **Linn R**., Koo E., Wilson C. (2013). "Large-eddy simulations of air flow and turbulence within and around low aspect ratio cylindrical open-top chambers." Journal of Applied Meteorology and Climatology, 52, 1716–1737.

Vega J.A., Jiménez E., Dupuy JL., **Linn R.R.** (2012). "Seeking opportunities for backfire use in shrubland wildfire fighting in NW Spain." International Journal of Wildland Fire.

**Linn R.**, Anderson K., Winterkamp J., Brooks A., Wotton M., Edminster C., Dupuy JL., Pimont F (2012). "Incorporating field wind data into FIRETEC simulations of the International Crown Fire Modeling Experiment (ICFME): preliminary lessons learned." Canadian Journal of Forest Research 42(5): 879-898, http://dx.doi.org/10.1139/X2012-038.

Pimont F., Dupuy J-L. **Linn R.R.** (2012). "Coupled slope and wind effects on fire spread with influences of fire size: a numerical study using FIRETEC." International Journal of Wildland Fire.

Marino E., Dupuy JL., Pimont F., Guijarro M., Hernando C., **Linn R.** (2012). "Fuel bulk density and fuel moisture content effects on fire rate of spread: a comparison between FIRETEC model predictions and experimental results in shrub fuels." Journal of Fire Sciences.

**Linn R.**, Canfield J., Cunningham P., Pimont F., Dupuy J-L., Edminster C. (2012). "Using periodic line fires to gain a new perspective on multi-dimensional aspects of forward fire spread." Agricultural and Forest Meteorology **157**(0): 60-76.

Koo E., **Linn R.R.**, Pagni P.J., Edminster C.B. (2012). "Modeling firebrand transport in wildfires using HIGRAD/FIRETEC." International Journal of Wildland Fire.

Dupuy J.-L., **Linn R. R**., Konovalov V., Pimont F., Vega J. A., Jiménez E (2011). "Exploring three-dimensional coupled fire-atmosphere interactions downwind of wind-driven surface fires and their influence on backfires using the HIGRAD-FIRETEC model." International Journal of Wildland Fire **20**(6): 734-750.

Cassagne N, Pimont F, Dupuy JL, **Linn RR**, Marels A, Olivieri C, Rigolot R., (2011). "Using a fire propagation model to assess the efficiency of prescribed burning in reducing the fire hazard." Ecological Modelling **222**(8): 1502-1514.

Pimont F., Dupuy J.L, **Linn R.R.** (2011). "Impacts of fuel-break structure on wind-flows and fire propagation simulated with FIRETEC." Annals of Forest Science 68(3): 523-530.

**Linn R.**, Winterkamp J., Weise D., Edminster C. (2010). "A numerical study of slope and fuel structure effects on coupled wildfire behaviour." International Journal of Wildland Fire **19**(2): 179-201.

Clark M. M., Fletcher T. H., **Linn R. R.** (2010). "A sub-grid, mixture-fraction-based thermodynamic equilibrium model for gas phase combustion in FIRETEC: development and results." International Journal of Wildland Fire **19**(2): 202-212.

Pimont F., Dupuy J-L., **Linn R.R**. and Dupont S. (2009). "Validation of FIRETEC wind-flows over a canopy and a fuel-break." International Journal of Wildland Fire **18**(7): 775-790.

Colman, J.J. and **Linn R.R.** (2007). "Separating combustion from pyrolysis in HIGRAD/FIRETEC." International Journal of Wildland Fire **16**(4): 493-502.

**Linn, R.**, Winterkamp J., Edminster C., Colman J.J. , Smith W.S.. (2007). "Coupled influences of topography and wind on wildland fire behaviour." International Journal of Wildland Fire **16**(2): 183-195.

Cunningham, P. and **Linn R.R.** (2007). "Numerical simulations of grass fires using a coupled atmosphere-fire model: Dynamics of fire spread." Journal of Geophysical Research-Atmospheres **112**(D5).

Pimont, F., **Linn, R.R.,** Dupuy, J-L., Morvan, D. (2006). "Effects of vegetation description parameters on forest fire behavior with FIRETEC." Forest Ecology and Management **234S**(S120).

**Linn, R. R.**, Cunningham, P. (2005). "Numerical simulations of grass fires using a coupled atmosphere-fire model: basic fire behavior and dependence on wind speed." Journal of Geophysical Research-Part D-Atmospheres **110**(D13).

**Linn, R. R.**, J. Winterkamp, J. Colman, C. Edminster. (2005). "Modeling interactions between fire and atmosphere in discrete element fuel beds." International Journal of Wildland Fire **14**(1): 37-48.

Cunningham, P., Goodrick S.L., Hussaini M.Y., **Linn R.R.** (2005). "Coherent vortical structures in numerical simulations of buoyant plumes from wildland fires." International Journal of Wildland Fire **14**(1): 61-75.

**Linn, R.R.**, Reisner, J. Colman J., Winterkamp J., (2002). "Studying wildfire behavior using FIRETEC." International Journal of Wildland Fire **11**(3-4): 233-246.

Berk, R., Bickel P.,. Campbell K, Fovell R., Keller-McNulty S., Kelly E., **Linn R.**, Park B., Perelson A., Rouphail N., Sacks J., Schoenberg F. (2002). "Workshop on

Statistical Approaches for the Evaluation of Complex Computer Models." Statistical Science **17**(2): 173-192.

Hanson H.P., Bradley M.M., Bossert J.E., **Linn R. R.**, Younker L.W. (2000). "The potential and promise of physics-based wildfire simulation." Environmental Science & Policy **3**(4): 161-172.

Reisner, J., S. Wynne, L. Margolin, **Linn R.**. (2000). "Coupled atmospheric-fire modeling employing the method of averages." Monthly Weather Review **128**(10): 3683-3691.

**Los Alamos Technical Reports**

Smith W. S., **Linn R. R**., Sauer J. A., Canfield J. M., Winterkamp J. L.. (2007) HIGRAD/FIRETEC wildfire model: Description of basic theory and numerics, Los Alamos National Laboratory Scientific Report LA-UR-078232.

D. Berning, J. St. Ledger, M. Schick, R. Roussel-Dupre, T. Carney, **R. Linn,** H. Cui, T. McPherson, S. Flaim, R. Michelsen, (2006).*Nuclear Effects Planning Factors to Aid Preparedness for Emergency Response to a Detonation of a Nuclear Weapon*, Published as Los Alamos National Laboratory Report, LA-CP-06-1166

**Linn, R.R.**, Clark T.T., Harlow F.H., and Turner L. (1998). Turbulence Transport with Non-local Interactions, Los Alamos National Laboratory LA-13401-MS

Linn, R. R. (1997). A Transport Model for Prediction of Wildfire Behavior. Los Alamos National Laboratory Science Report. Los Alamos, NM, Los Alamos National Laboratory. LA-13334-T.

**Book Chapters**

Malcolm J. Andrews, Fernando F. Ginstein, Edward Kwicklis, **Rodman Linn**. (in copyedit and production stage) “Security and Environmental Fluid Dynamics (EFD)” Fernando, J. ed. *Environmental Fluid Dynamic Handbook,* Taylor & Francis Group.

## INVITED TALKS

**International**

- Marseille University-UNIMECA le département de Mécanique, Marsielle, France (June 2000), “Transport Models for Wildfires Wildfire Modeling”**
- University of Corsica, Workshop on forest fire science, Corse, France, (July 28, 2004) “Directions of Current Landscape-Scale Physics-Based Wildfire Modeling”**
- FIRESTAR Project Closing Meeting, Marsielle, France (March 18, 2005), “Three-Dimensional Physics-Based Wildfire Modeling”**
- 19th International Congress of Mechanical Engineering (COBEM 2007), Brasilia, Brazil (Nov 6 2007) “A approach to physics-based Transport model for modeling coupled fire/atmosphere behavior”**

- INRA, URFM - Ecologie des Forets Mediterraneennes, Avignon, France (April 17, 2005), "Wildfire Modeling at Los Alamos National Laboratory"**
- University of Toronto Workshop on Fire Spotting , Toronto, Canada (March 20, 2009) "Firebrand Behavior Investigations Using FIRETEC "**
- International Energy Agency Experts Meeting on "Micro meteorology inside wind farms and wakes between wind farms, Pomploma, Spain, (May 6, 2010) "Coupled Turbine/Atmosphere Modeling at Los Alamos National Laboratory"
- VI International Conference on Forest Fire Research, Short Course on Fire Behaviour, Lisbon, Portugal (Nov 13, 2010), "Coupled Fire/Atmosphere Behavior"**
- Swiss Federal Institute of Technology (ETH) department of Building Physics and Swiss Federal Laboratories for Material Science and Technology (EMPA) Building Science and Technology Department, Zurich, Switzerland, (May 24, 2011) "Atmospheric Modeling Research at Los Alamos National Laboratory"
- University of Melboune, Coupled Atmosphere-Bushfire Modelling Workshop, Melbourne Australia, (May 17, 2012) "Physical Wildfire Modeling in the Context of Coupled Fire/Atmosphere Phenomena" **
- Chonju University, Departmental Seminar, Chonju, Korea, (Nov. 9, 2012) "WindBlade: Coupled Turbine/Atmosphere Modeling"**
- Keynote speaker at Global R&D Center (Nov. 12-13 2012), a symposium for the international collaborative R&D centers, Seoul, Korea**
- VII International Conference on Forest Fire Research, Short Course on Fire Behaviour, Lisbon, Portugal (Nov 15, 2014), "Simulating wildfire behavior using physical process-based models"**
- Urban Physics Winter School, Ascona, Switzerland (Jan 29, 2015) "Urban flow, Wind Energy and Fire Modeling", hosted by EMPA/ETH.**
- Natural Resources Canada, Northern Forestry Center, Edmonton, Alberta, Canada (July 25, 2016), "Coupled Wildfire/Atmosphere Behavior Research with FIRETEC" **
- Alberta Provincial Government, Alberta Agriculture and Forestry, Edmonton, Alberta, Canada (July 27, 2016), "Overview of FIRETEC and associated applications" **

** Indicates that a portion of the international travel expenses were paid for by host organization.

**Notable Examples of Domestic Invited Talks**

*Government programs and Conferences*

- Office of Science Technology and Policy (OSTP), Subcommittee on Natural Disaster Reduction (SNDR) (April 28, 1999) "Approaches and Considerations for Modeling Wildland Fires"

- Workshop on Statistical Approaches for the Evaluation of Complex Computer Models, Santa Fe, NM (Dec. 4, 1999) "Complexity in Three-dimensional Wildfire Simulations"
- AIAA Conference, Jet Propulsion Conference (July 9 2001) "Method And Initial Results of HCL Transport Modeling" at NASA's invitation and request
- National Academy of Science Panel, Sandia National Laboratory, (March 29, 2004) "Overview of NNSA Lab Activity in Fire from Weapons Effects"
- Core Fire-Science Fire Caucus
    - Los Alamos, NM (Oct. 8, 2004) "Foundations and Current Directions: Landscape-Scale Physics-Based Wildfire Modeling at Los Alamos National Laboratory"
    - Seattle, WA (July 26, 2006) "Ongoing FIRETEC Research Directions"
- STRATCOM Strategic Advisory Group (SAG) on Science and Technology (S&T), Omaha, NE (Sept. 7, 2006) "Capabilities and Gaps related to Fire as Nuclear Weapon Effect"
- NCAR/LANL Fire Weather Workshop, Santa Fe, NM (Feb. 28, 2007) "Fire Weather and its Impacts"
- California Institute of Hazards Research, Sacramento, CA (Jan. 15, 2008) " Physics-Based Modeling Coupled Fire/Atmosphere Behavior"
- California Board of Forestry, Sacramento, CA (May, 8 2008) "Physics-based Wildfire Modeling"
- Joint Fire Sciences Program
    - Governing Board Meeting, Minneapolis, MN (May 26 2010) "Historical and current Wildfire Modeling Research at LANL"
    - Measurement and Models Workshop, Boise, ID (Oct. 5, 2011) " Considerations for wildland-fire experiment data collection"
- APEC Cooperation for Earthquake Simulation (ACES) Workshop on Advances in Simulation of Multihazards Maui, Hawaii (May 3, 2011) "Selected Complexities in Wildfire Modeling"
- Café-Scientifique, Los Alamos, Espanola, Santa Fe, Albuquerque, NM (September 2011) "Wildfire Modeling"
- Seimens, Boulder, CO, (Feb. 2, 2010) "HIGRAD/FIRETEC-WindBlade"
- Next Generation Ecosystem Experiment Meeting, Fairbanks, Alaska, (Feb 15, 2010) "Explorations of NGEE above-ground heating tradeoffs using numerical simulations"
- JOWOG 43, Los Alamos National Laboratory, (Aug. 22, 2012), "Exploring coupled fire-atmosphere behavior in urban fire conflagrations"
- National Research Council, Washington DC, (November 1, 2012) "Complexity of Wildfire Behavior (from a physical perspective)"

- NNSA Headquarters, Washington DC., (Nov. 28, 2013), Background and perspectives concerning a decades research on nuclear-weapon-induced fire effects"
- Tri-Lab Nuclear Weapon Effects Study, Sandia National Laboratory, Albuquerque, (June 12, 2013), "Fire as a Nuclear Weapon Effect"
- JOWOG 43, Lorton VA, (Aug. 13, 2013), "WESC-related LANL efforts regarding Nuclear-Weapon-Induced fire effects"
- Invited Video Briefing to Chief of the USDA Forest Service, Tom Tidwell, (March 13, 2013) "Coupled Wildfire/Atmosphere Behavior Research at Los Alamos National Laboratory" and follow up briefing (May 30, 2013)
- American Geophysical Union Fall meeting, San Fransisco, CA, (Dec. 17, 2014) "An Emerging Role for Numerical Modeling in Wildfire Behavior Research: Explorations, Explanations, and Hypothesis Development"
- Defense Threat Reduction Agency, CNTA Program Review, Albuquerque, NM (Nov. 1, 2016) "Fires as Nuclear Weapon Effects"
- Climate Research Symposium and Climate Adaptation Roundtables, Santa Fe, NM (Nov. 15, 2016) "Understanding the coupling between wildfires and their environment"

*Universities:*

- National Defense University, Washington DC (July 16, 1998), "Crisis Forecasting and Wildfire Behavior Modeling"
- BYU, Department of Chemical Engineering (Jan. 23, 2002), "Studying Wildfire Behavior Using FIRETEC"
- New Mexico Highlands University
    - Las Vegas, New Mexico (Oct. 8, 2004) "Current Landscape-Scale Physics-Based Wildfire Modeling"
    - Los Alamos, NM (Dec. 12, 2007) "Physics-Based Modeling Coupled Fire/Atmosphere Behavior"
- Florida State University, Tallahassee, FL
    - Computational Science and Information Technology (May 16, 2002) "Studying Wildfire Behavior Using FIRETEC"
    - Geophysical Fluid Dynamics Institute seminar (March, 23 2005) "Foundations and Current Directions in Landscape-Scale Physics-Based Wildfire Modeling at Los Alamos National Laboratory"
- University of California Santa Barbara, Geography Department, Santa Barbara, CA, (March, 2005) "Recent Advances in Wildfire Modeling at Los Alamos National Laboratory"
- University of New Mexico, Department of Mechanical Engineering (Sept 17 2010) "Using CFD to Studying Coupled Atmospheric Phenomena such as Wildfire Behavior"

- University of Maryland, Departments of Fire Protection Engineering and Mechanical Engineering (April 2015) "An Emerging Role for Numerical Modeling in Wildfire Behavior Research: Explorations, Explanations, and Hypothesis Development"

*Research Laboratories*

- Lawrence Berkeley Laboratory, UC-DOE Laboratory High performance Computing Review, (June 17, 2001) "Wildfire Modeling in Complex Environments"
- Lawrence Livermore National Laboratory, National Atmospheric Release Advisory Center, (April 19, 2001) "Physics-Based Wildfire Modeling"
- National Center for Atmospheric Research Seminar, Boulder, CO (May 10, 2005) "Physics-based wildfire modeling"
- Sandia National Laboratory, Combustion and Aerosol Sciences Department (June 12, 2006) "Using a Transport Model for Simulating Wildfires"
- Lawrence Livermore National Laboratory, Livermore, CA (Feb. 15, 2007) "Capabilities and Gaps related to Mass Fires"
- USDA Forest Service
    - Pacific Northwest Research Station, Seattle, WA, (May 13, 2003, Aug.5 2005) "Recent FIRETEC Work"
    - Rocky Mountain Research Station, Missoula MT, (July 12, 2007) "Using a Transport Model to Simulate Wildfires"
    - Rocky Mountain Research Station, Missoula MT, (April 29, 2008) "An Approach to Physics-Based Transport Modeling Coupled Fire/Atmosphere Behavior."
    - Rocky Mountain Research Station, Missoula MT, (March 14, 2009) "Current LANL FIRETEC Investigations: Works in Progress"
    - Rocky Mountain Research Station, Flagstaff, AZ, (July 30, 2009) "Physical Process-based Wildfire Modeling"
    - Rocky Mountain Research Station, Missoula MT, (Sept. 13, 2012) "Exploring dynamic interactions in fire behavior with FIRETEC: synopsis of recent work"
- Argonne National Labortory, Chicago IL, (Sept. 4, 2013) "Using CFD to Study Coupled Atmospheric Phenomena"

*LANL talks to high-level visitors*

- EES Division Review Committees (May 6 2000; May 17, 2006)
- Dave Cleaves (Nov. 5, 2001) "Wildfire Modeling at Los Alamos National Laboratory"
- EPA (Oct. 30, 2003) "Dispersion Modeling and More Using HIGRAD/FIRETEC"
- New Mexico Secretary of Environment Curry, (May 4, 2004) "Wildfire Modeling Research at Los Alamos National Laboratory"

- Honorable Congressmen Ken Calvert (R-CA), (May 24, 2004) “Wildfire Modeling Research at Los Alamos National Laboratory”
- New Mexico Legislature Water and Natural Resources Committee (Aug. 4, 2005) “Wildfire Modeling Research at Los Alamos National Laboratory”
- IBM (Jan. 6, 2005) “Physics-Based Wildfire Modeling at Los Alamos National Laboratory”
- National Academy of Sciences (Nov. 3 2005) ”Wildfire Modeling at Los Alamos National Laboratory”
- Japan Safe & Secure Society Committee (Aug. 16, 2006) “High Fidelity Atmospheric Modeling for Dispersion and More “
- Department of Homeland Security Representatives (Aug. 4, 2006) “High Fidelity Atmospheric Modeling for Dispersion and More”
- Pete Nanos (March, 13, 2007) “Fire Effects from Nuclear Weapons”
- EES Division wide meeting (March 4, 2009) “WindBlade-Coupled Atmosphere Turbine Modeling”
- USDA Forest Service, Washington Office Research Leadership including USFS chief of research (March 8 2010)
- USDA Forest Service Washington Office Leadership (May 8, 2010)”Investment and Leveraging toward HIGRAD and FIRETEC”, “Examples of FIRETEC R&D”
- Mark Handschy and Avi Gopstein, Senior advisors, Undersecretary of Energy (October 25, 2010), “Wind Modeling and Engineering”
- Honorable David Danielson, DOE-EERE Assistant Secretary (March 13, 2012), “WindBlade: Coupled Turbine/Atmosphere Modeling– an application of high performance computing (HPC)”
- 2012 HED Plasmas and Fluids Capability Review (March 5, 2012)”WindBlade: Coupled Turbine/Atmosphere Modeling – an application of high performance computing (HPC)”
- Michael Robinson, U.S. DOE Energy Efficiency and Renewable Energy (EERE) Wind and Water Power Program (November 28, 2012) “HPC wind-opportunities”
- 2013 Computational Physics and Applied Mathematics Capability Review (May 22, 2013), High-Resolution Atmospheric Modeling
- Michael Derby and Shreyas Ananthan, U.S. DOE Energy Efficiency and Renewable Energy (EERE) Wind and Water Power Program (July 11, 2013) WindBlade: Coupled Turbine/Atmosphere Modeling
- Todd Hahn, DTRA (Sept. 25, 2013), “LANL efforts regarding nuclear weapon-induced fire effects”
- Congressman Ben R. Lujan (D-NM) (April 22, 2014), “Fire behavior Research at LANL”
- 2014 LANL Science of Signatures Pillare review (May 29, 2014) “High-resolution modeling helps inform about signatures associated with potential fire behavior”

- Presented LANL fire research portfolio to NM representative and senate staffers (Udal, Lujan, Heinrick) (Aug. 2014)
- 2014 Science of Signatures Capability Review (May 14, 2014) ”High-resolution modeling helps inform about signatures associated with potential fire behavior”
- 2015 CNES Review: Bioenergy, Environmental Biology, and Systems Biology (May 14, 2015) ”Process-based wildfire modeling enables new understanding of fire behavior and risk”
- Poster at LANL 2015 CNES Review: Bioenergy, Environmental Biology, and Systems Biology (May 14, 2015) ”Process-based wildfire modeling enables new understanding of fire behavior and risk”
- Poster at LANL 2016 CPAM Capability Review: Computational Fluid Dynamics (June 28, 2016) ”Recent Developments in HIGRAD-FIRETEC” (Co-Author)
- DOE NNSA Field Office, LANL-Site Operations (Jan. 20, 2016): “Potential impact of converging wildfire fronts at Area G”
- Defense Nuclear Facilities Safety Board, Los Alamos National Laboratory (June 17, 2016): “Potential impact of converging wildfire fronts at Area G”, Eunmo Koo, Kristen Honig, Judith Winterkamp, Rodman Linn.Defense Nuclear Facilities Safety Board, Los Alamos National Laboratory (June 17, 2016): “Potential impact of converging wildfire fronts at Area G”

**ORGANIZATIONAL INVOLVEMENT IN WORKSHOPS AND MEETING**

- Led the organization of LANL Wildfire Modeling Workshop with invited experts from Russia and France (Jan. 1999)
- Co-led the organization of LANL Wildfire Science Workshop, which followed the Cerro Grande Wildfire (Nov. 13, 2000)
- Organizing committee for Florida State University, Computational Science and Information Technology’s Wildfire Modeling in Southeastern Fuels Workshop (March 2003)
- Organized and hosted meeting of the Core Fire Science Caucus, Los Alamos, NM, 2004)
- Co-initiator of the LANL/FSU Geophysical Fluid Dynamics Institute MOU (Initiated in 2005)
- Scientific/Technical Program Committee member for the IEEE International Symposium on Environment Identities and Mediterranean Area, Corsica, France (July 2006)
- Organized session for fire session for the UK/US Nuclear Weapons Effects User Group meeting (JOWOG 43)
    - LANL, Los Alamos New Mexico (April 25, 2005)
    - Atomic Weapon Establishment (AWE), Aldermaston, United Kingdom,

(April 27, 2007)

- Helped organize California Institute of Hazard (CIHR) Workshop with the California Board of Forestry (May, 2008)
- Co-host for the LANL 2011 Wind Energy Engineering Workshop Modeling of Turbine-Turbine Interactions with Experimental Validation (March 2-3, 2011)
- Organized Multi-hazard session of 2011 ACES/SCEC Simulators Workshop, Maui (May 1-5, 2011)
- American Meteorological Society Fire and Forest Meteorology Conference Organizing Committee (2009, 2011)
- DOE EERE A2e program High Fidelity Modeling Steering committee (2014)

**COLLABORATIOS**

Served as lead POC for numerous external collaborations with domestic and international technical experts from a variety of research institutions including:

- Atomic Weapons Establishment (POC: Brian Bibby, Stephen Gaunt)
- Brigham Young University (POC: Thomas Fletcher)
- Canadian Forest Service (POC: Kerry Anderson)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO) (POC: James Gould)
- Eglin Air Force Base (POC: John Hiers)
- Florida State University (POC: Carol Anne Clayson, who is no longer at FSU)
- French National Institute for Agricultural Research (INRA), France (POC: Jean Luc Dupuy)
- Livermore National Laboratory (POC: Michael Bradley)
- National Center for Atmospheric Research (POC: Janice Coen)
- New Mexico State University (POC: Ian Leslie)
- Northern Arizona University (POC: John Bailey, who is no longer at NAU)
- Sandia National Laboratory (POC: Alex Brown)
- Tall Timbers Research Station (POC: John Hiers)
- University of California
    - Berkeley (POC: Patrick Pagni)
    - Riverside (POC: Shankar Mahalingam, who is no longer at Riverside)
    - Santa Barbara (POC: Dar Roberts)
- University of Colorado (POC: Julie Lundquist)
- University of Monash, Australia (POC: Micheal Reeder)
- University of New Mexico (POC: Svetlana Poroseva)
- University of Toronto (POC: Mike Wotton)
- USDA Forest Service
    - Rocky Mountain Research Station (POC: Carolyn Sieg)
    - Pacific Northwest Research Station (POC: William Mel)

- Pacific Southwest Research Station (POC: David Weise)
- Southern Research Station (POC: Scott Goodrick)

Hosted international experts and their students as LANL visitors, including (principals):

- Kerry Anderson (Natural Resources Canada)
- Jean Luc Dupuy (INRA, France)
- James Gould (CSIRO, Australia)
- Stephen Guant (AWE, United Kingdom)
- Anotoly Grishin (Tomsk University, Russia)
- Francis Holmes (AWE, United Kingdom)
- Michel Larini (University of Provence, France)
- Dominique Morvan (University of Marseille, France)
- Enrico Paterna (EMPA, Switzerland)
- Michael Reeder (University of Monash, Australia)
- Francois Pimont (INRA, France)
- Nicola Scott (AWE, United Kingdom)
- Daniel Thompson (Natural Resources Canada)
- Jean Charles Vallet (INRA, France)
- Michael Wotton (University of Toronto, Canada)