Noah L. Ryder, PhD, MBA, P.E.
Principal Risk & Fire Protection Engineer

For over 20 years Dr. Noah Ryder has focused on understanding fire and explosion's interaction with both built and natural environments. He presently serves as a Principal Engineer and Managing Partner at Fire & Risk Alliance, LLC. and leads the Risk, Modeling, Applied Research, and Forensics group. He is a licensed professional fire protection engineer and focuses on how safety can be improved through the use of quantitative risk assessments, hazard evaluations, computer modeling, applied research, and performance-based design. Dr. Ryder is the Technical Committee Chair for the SFPE Foundation, actively serves on multiple NFPA technical committees, and frequently publishes and presents his work.

Dr. Ryder is knowledgeable in the application of empirical and numerical models and laboratory testing and has led numerous large consulting projects and applied research programs. Dr. Ryder's extensive experience has included Faculty Lead for the development of the UMD Hyperloop project, development of patented fire detection systems, and work on the largest battery energy storage facility in the world. Dr. Ryder's knowledge and experience has been used globally within the transportation sector, energy storage, automated and large-scale warehousing operations, utility and process industries, oil and gas industries, as well as large commercial, residential, and entertainment and amusement facilities.

Dr. Ryder teaches Fire & Explosion Investigation and Industrial Fire Protection Engineering courses at the University of Maryland in the Fire Protection Engineering Department and teaches the Advanced Enclosure Fire Dynamics course at University of Waterloo. He is a Licensed Fire Protection Engineer and Certified Fire and Explosion Investigator. He has Bachelor of Science and Master of Science degrees from the University of Maryland's Department of Fire Protection Engineering, an MBA from the R.H. Smith Business School at the University of Maryland, and a PhD in Mechanical and Mechatronics Engineering from the University of Waterloo, Ontario, Canada that focuses on sensors, combustion phenomena, and fire state determination.

Dr. Ryder's recent project experience includes:

- Battery energy storage research, testing, and Hazard Mitigation Analysis
- UMD Hyperloop Design Faculty Lead
- Tunnel ventilation, fire, and egress analysis (SES, FDS, Pathfinder)
- Advanced fire suppression and fire/gas detection research and development
- Product testing and development
- Fire cause and origin analysis
- Flame and smoke spread analysis
- Fire, explosion, and gas dispersion modeling using computational fluid dynamics (CFD) tools
- Egress analysis and modeling
- Radiation analysis
- Performance based design and code equivalency
- Litigation and expert witness support

Professional Experience

2009-Present --- Lecturer and Visiting Research Associate, University of Maryland, Department of Fire Protection Engineering

Ryder teaches the senior course "Fire & Explosion Investigation and Reconstruction" and "Industrial Fire Protection" for the Department of Fire Protection Engineering. He also works in close coordination with the department to grow the Fire Testing & Evaluation Center (FireTEC) and to increase the outreach of the center to the fire protection and safety communities. In addition, he is involved in collaborative research efforts including research related to ignition, material flammability, liquid sprays, and dispersion and detection of gasses.

2010-2014 --- Vice President, Delta Q Fire & Explosion Consultants, Inc., College Park, MD

Ryder has led and participated in large-loss incident investigations as well as in-depth quantitative risk assessments to assist in performance-based design. He provides fire and explosion analysis using state-of-the-art tools and technology as well as extensive experience in data gathering and analysis. He has specific expertise in fire and explosion computational fluid dynamics tools for use in investigation or consulting support. He provides analysis of fire and explosion causes to evaluate the role that each played in the incident. His skills obtained from a top ranked MBA program allow full understanding of both the engineering aspects of the problem as well the business impacts.

Ryder focuses on the understanding of fundamental fire and explosion behavior including: ignition; suppression and extinction of fires and explosions through water-based suppressants and inerting systems; gas dispersion; material and structural reaction to fire and blast damage, and the comparison and use of Computational Fluid Dynamics (CFD) for modeling of fires and explosions.

2003-2010 --- Vice President, Packer Engineering, Inc., Naperville, IL Chemical, Hydrocarbon & Fire Safety Engineering

During his seven-year tenure, Ryder was primarily involved with major fire & explosion investigations and reconstruction analysis for a range of clientele across multiple industries. In particular he provided detailed analysis of vapor cloud explosions, fire behavior, smoke and gas migration and ventilation, gas dispersion, blast wave effects, and material flammability behavior. He provided analysis evaluating all stages of a fire event from ignition and spread through extinction. He has extensive experience in oil & gas production and distribution facilities, food manufacturing operations, mining operations, manufacturing facilities, storage & warehousing facilities, and large commercial health-care, and residential facilities.

2000-2003 --- Project Engineer, Combustion Science & Engineering, Inc., Columbia, MD

Ryder was responsible for conducting fire investigations, fire hazard analysis, providing fire litigation support, and utilizing computer fire modeling, including both zone models and CFD modeling for fire reconstruction and design purposes. He performed cause and origin investigations of fires and explosions and carbon monoxide poisoning. In addition, Ryder was involved in the experimental design and analysis of fire and combustion applications.

1999-2000 --- Graduate Research Assistant, Fire Engineering and Thermal-Sciences

Laboratory, University of Maryland, College Park, MD

Ryder conducted research on stratification and aging of the smoke flow through ducts at varying flow rates. In addition to examining particle size, density, and distribution using a HeNe laser imaging system, he coordinated an experimental portion of the "Fire Phenomena/Enclosure Fires" course for a section of the Bureau of Alcohol, Tobacco, and Firearms training course for Certified Fire Investigators. The course involved a wide variety of experiments including spontaneous ignition of cotton rags, pool fire tests, plume characterization, and a full-scale flashover test.

1998-1999 --- Senior Building Inspector, Fairfax County Fire Marshall, Fairfax, Virginia

Ryder was responsible for review and approval of sprinkler, sprinkler tenant, and fire alarm plan submissions. He also provided guidance and recommendations to customers in order to meet jurisdictional suppression and alarm code requirements.

1996-1997 --- Fire Alarm/Suppression Technician National Fire Safety Engineering, Beltsville, Maryland

Ryder was responsible for the inspection, testing, and maintenance of fire suppression and fire alarm systems in commercial and industrial facilities. This included wet, dry, and chemical extinguishing systems and a variety of fire alarm systems addressable and non-addressable.

ACADEMIC

- Ph.D. Mechanical & Mechatronics Engineering, University of Waterloo, Ontario, Canada, 2019
- M.B.A. R.H. Smith Business School, University of Maryland, College Park, Maryland, 2004
- M.S. Fire Protection Engineering, University of Maryland, 2000
- B.S. Fire Protection Engineering, University of Maryland, 1999

POSITIONS & INSTRUCTORSHIPS

University of Maryland, College Park, MD

- UMD Hyperloop (UMD Loop) Lead Faculty Advisor
- Department of Fire Protection Engineering, Visiting Researcher and Adjunct Professor
  - Fire & Explosion Investigation and Reconstruction, Senior and Graduate Level Course
  - Industrial Fire Safety, Senior and Graduate Level Course
  - Firefighting Robot Development, Senior and Graduate Level Course

Saudi Aramco, Dammam, Saudi Arabia, Subject Matter Expert

- Fire Protection
- Loss Prevention Engineering
- Hazard Analysis
- Risk Assessment
- Computational Fluid Dynamics

LICENSES & CERTIFICATIONS

- Licensed Professional Engineer in the State of Maryland (License No. 32844)
- Licensed Professional Engineer in Washington, DC (License No. PE905164)

- Licensed Professional Engineer in the State of Delaware (License No. 13961)
- Licensed Professional Engineer in the State of Ohio (License No. 72395)
- Licensed Professional Engineer in the State of Florida (License No. 71875)
- Licensed Professional Engineer in the State of West Virginia (License No. 18931)
- Licensed Professional Engineer in the State of North Dakota (License No. PE-10633)
- Licensed Professional Engineer in the State of New York (License No. 096787-1)
- Certified Fire and Explosions Investigator, NAFI (#10638-5036)
- HAZWOPER Certified, 40-hour per 29 CFR 1910.120 (e)
- Chemical-Terrorism Vulnerability Information Authorized User Certificate (CVI-20151007-1125975)

PATENTS

- *System and Methods for Detecting, Confirming, Classifying, and Monitoring a Fire*. Patent US10002510 B2. June 19, 2018.
- *System and Methods for Detecting, Confirming, Classifying, and Monitoring a Fire*. Patent US10388136 B2. August 20, 2019.
- *System and Methods for Detecting, Confirming, Classifying, and Monitoring a Fire*. Patent Pending US 2019/0318599 A1. October 17, 2019.
- *Fire Hose and Material Therefore*. Patent Pending. 62/733,823
- *Fire Suppression Nozzle and System for Stackable Inventory Storage Modules*. Patent Pending.
- *Fluid Discharge Nozzle*. Patent Pending. US 2016/0325129 A1. November 10, 2016.

TECHNICAL COMMITTEES

- NFPA, Fuel Gases Warning Equipment
- NFPA 59, Utility LP Gas Code
- NFPA 2400, Unmanned Aerial Systems

MEMBERSHIPS

- National Council of Examiners for Engineering & Surveying, Model Law Engineer
- National Council of Examiners for Engineering & Surveying, International Registry
- Member, Institution of Fire Engineers (IFE)
- Member, Society of Fire Protection Engineers (SFPE)
- Member, International Combustion Institute
- Member, Salamander Honorary Fire Protection Engineering Society, Beta Chapter
- Member, National Fire Protection Association (NFPA)
- Member, International Association for Fire Safety Science

AWARDS

- 2018 SFPE *"Hats Off"* Award for services to SFPE
- 2017 Best Paper Award for *"Developing a Fire Test Strategy for Storage Protection Under Sloped Ceilings"*, 16th International Conference on Automatic Fire Detection & Suppression, AUBE/SUPDET
- 2011 Fire Protection Research Foundation Medal for *"Antifreeze Solutions in Home Fire Sprinkler Systems"*
- 2007 FM Global Award 1st Prize *"Round-robin study of fire modeling blind-predictions using the Dalmarnock Fire Experiments"*, 5th International Symposium on Fires and Explosions Hazards

- 2002 Harry C. Bigglestone Award for Excellence in Written Communication of Fire Protection Concepts, Fire Technology Journal for publication of *"Measurements of Smoke Characteristics in HVAC Ducts"*
- 2000 SFPE Educational & Scientific Foundation Research Award: *"Fire Resistance Contributions of Spray-Applied Fire Protection"*

PEER REVIEWER

- Journal of Hazardous Materials
- International Journal of Heat and Mass Transfer
- Process Safety and Environmental Protection Journal
- Fire Technology Journal
- International Association of Fire Safety Science Symposia

BOOKS

Hofmeister, C. et al. *SFPE Engineering Guide to Substantiating a Fire Model for a Given Application.* Society of Fire Protection Engineers, 2011.

Rein, G., Abecassis Empis, C. Carvel, R. Editors. *The Dalmarnock Fire Tests: Experiments and Modeling,* School of Engineering and Electronics, University of Edinburgh 2007. ISBN 978-0-9557497-0-4

PUBLICATIONS AND PRESENTATIONS

1. NL Ryder, JA Geiman, and EJ Weckman, "Big Data and Real Time Analytics: Use of a Hierarchical Temporal Memory Continuous Learning Algorithm for Fire State Determination", Proceedings of 2018 SUPDET.
2. NL Ryder, J Crompton, M Ryder, and S Bryant, "Performance Based Design: Testing of CPVC Sprinkler Piping for Concealed Spaces in a High-Rise Historical Building", Proceedings of 2018 SFPE International Performance-Based Codes and Fire Safety Design Methods.
3. NL Ryder, JA Geiman, and EJ Weckman, "Smart building systems, real-time data collection, and the use of a Hierarchical Temporal Memory continuous learning algorithm for Fire State Determination", Proceedings of 2018 SFPE International Performance-Based Codes and Fire Safety Design Methods.
4. JA Geiman and NL Ryder, "Developing a fire test strategy for storage protection under sloped ceilings", 2017 AUBE/SUPDET Conference Proceedings.
5. NL Ryder, EJ Weckman, "Multicriteria detection: Leveraging building control and comfort sensors for fire state determination", 2017 AUBE/SUPDET Conference Proceedings.
6. L Carmen, RJ Ballard, NL Ryder, "Hybrid fire extinguishing systems: An evaluation of the effects of high elevations on Class A and Class B fuel fires", 2017 AUBE/SUPDET Conference Proceedings.
7. SJ Jordan, NL Ryder, RJ Ballard, AW Marshall, "Optimized sprinkler development through spray field engineering analysis: Initial spray characterization and reduced order modeling", 2017 AUBE/SUPDET Conference Proceedings.
8. Jordan, S. J., Ryder, N. L., Repcik, J., and Marshall, A. W., 2017, "Spatially-resolved spray measurements and their implications." Fire Safety Journal 91 (2017) 723–729
9. Jordan, S. J., Ryder, N. L., Repcik, J., and Marshall, A. W., 2017, "Spatially-resolved spray measurements and their implications.", IAFSS 12th International Symposium, 2017.
10. MJ DiDomzio, NL Ryder, and EJ Weckman, "Electronic Gas Sensors in Fire Testing." 2016 Interflam Conference Proceedings.
11. JA Sutula and NL Ryder, "Quantifying the Hazards of Green Building Construction for Fire Investigation Analysis." International Symposium on Fire Investigation Science and Technology 2014.

12. NL Ryder and E Weckman, “Effects on Convective Heat Transfer Coefficient In Predictions of Materials Properties from Cone Calorimeter Testing.” 2013 Fire and Materials Conference, Conference Proceedings, San Francisco, CA, 2013.
13. NL Ryder, M Price, AW Marshall, “Use of Non-Fire Sensors for Fire Detection and Growth Prediction”, 2012 Annual SFPE Conference, Savannah, GA. October 2012.
14. NL Ryder “The Need for a Certification Program for Modeling use in Support of Performance Based Design and Investigations”, Proceedings of the International Symposium on Fire Investigation Science and Technology, October 2012.
15. NL Ryder, M Price, G Ligi, P Santangelo, AW Marshall, “Use of Non-Fire Sensors for Fire Detection and Growth Prediction”, 2012 Annual SFPE Conference, Savannah, GA. October 2012.
16. Y.Zheng, NL Ryder, AW Marshall, “Model Development for Predicting Fire Hose Stream Characteristics,” Suppression, Detection and Signaling Research and Applications - A Technical Working Conference (SUPDET 2012), National Fire Protection Association, Phoenix Arizona.
17. PE Santangelo, NL Ryder, AW Marshall, CF Schemel, “Flammability of Solid Materials: An Experimental Calorimetric Approach,” Proceedings of the ASME 2011 International Mechanical Engineering Congress and Exposition, Denver Colorado.
18. NL Ryder, CF Schemel, “Investigating and Learning from Industrial Fires and Explosions,” Proceedings of the 2010 SFPE SAC 3rd Fire Protection and Risk Management Conference, Saudi Arabia.
19. NL Ryder, CF Schemel, “Appropriate use of Fire & Explosion Modeling Tools for Performance Based Design,” Proceedings of the 2010 SFPE SAC 3rd Fire Protection and Risk Management Conference, Saudi Arabia.
20. NL Ryder, CF Schemel, S Mannan, “Design Requirements: A Comparison of Vapour Cloud Explosion Models and the Importance of Properly Assessing Potential Incident Impact,” Journal of Loss Prevention in the Process Industries.
21. NL Ryder, CF Schemel, S Mannan, “Design Requirements: A Comparison of Vapour Cloud Explosion Models and the Importance of Properly Assessing Potential Incident Impact,” Proceedings of the Mary Kay O’Connor 2009 International Symposium.
22. NL Ryder, CF Schemel, S Mannan, “Analysis of the Buncefield Oil Depot Explosion: Explosion Modeling and Process Safety Perspective,” Proceedings of the Mary Kay O’Connor 2009 International Symposium.
23. G Rein, JL Torero, W Jahn, J Stern-Gottfried, NL Ryder, S Desanghere, M Lázaro, F Mowrer, A Coles, D Joyeux, D Alvear, JA Capote, A Jowsey, C, Abecassis-Empis, P Reszka, “Round-Robin Study of a priori Modelling Predictions of The Dalmarnock Fire Test One,” Fire Safety Journal. Vol. 44, No. 4, May 2009.
24. G. Rein, C. Abecassis Empis, A. Amundarain, H. Biteau, A. Cowlard, A. Chan, W. Jahn, A. Jowsey, P. Reszka, T. Steinhaus, S. Welch, J.L. Torero, J. Stern-Gottfried, B. Hume, A. Coles, M. Lazaro, D. Alvear, J.A. Capote, S. Desanghere, D. Joyeux, NL Ryder, F. Mowrer, “Round-Robin Study of Fire Modeling Blind Predictions Using the Dalmarnock Fire Experiments,” 5th International Symposium on Fires and Explosions Hazards, 2007.
25. Ryder, N., Schemel, C., and Jankiewicz, S., “Near and Far Field Contamination Modeling in a Large Scale Enclosure: Fire Dynamics Simulator Comparisons with Measured Observations,” Journal of Hazardous Materials, 130, 2006, 182-186.
26. Ryder, N., Schemel, C., and Jankiewicz, S., “Near and Far Field Contamination Modeling in a Large Scale Enclosure: Fire Dynamics Simulator Comparisons with Measured Observations,” Proceedings of the Mary Kay O'Connor Process Safety Symposium, College Station, TX, 2004.
27. Ryder, N., Schemel, C., and Jankiewicz, S., “Comparing Large Eddy Simulation and Finite Element Analysis Predicted Failure Criteria to ASTM Standards,” presented to the ASM 2004 Materials Solutions Conference, Columbus, Ohio, 2004.
28. Ryder, N., Sutula, J., Schemel, C., Brunt, V.V., and Hamer, A., “Consequence Modeling Using the Fire Dynamics Simulator,” Journal of Hazardous Materials, 115, 2004, 149-154.

29. Ryder, N., Olenick, S., "Computer Modeling of a Controlled Full Scale House Burn with Fire Dynamics Simulator: Construction of a Complex Geometry and Comparison of Predictions with Experimental Data," presented to the NFPA World Safety Conference and Exposition, Dallas, TX, May 2003.
30. Ryder, N., Sutula, J., Schemel, C., Hamer, A., and Brunt, V.V., "Consequence Modeling of Fire Using Large Eddy Simulation," Proceedings of the Mary Kay O'Connor Process Safety Symposium, College Station, TX, 2003.
31. Ryder, N. and Sutula, J., "Consequence Modeling of Fire Using Large Eddy Simulation," Presented at the Mary Kay O'Connor Process Safety Symposium, College Station, TX, 2003.
32. Wolin, S., Ryder, N., "Measurements of Smoke Characteristics in HVAC Ducts," presented to the NFPA World Fire Safety Congress, Minneapolis, MN, 2002.
33. Ryder, N., Wolin, S., Milke, J., "An Investigation of the Reduction in Fire Resistance of Steel Columns Caused by Loss of Spray Applied Fire Protection," Journal of Fire Protection Engineering, Vol. 12, No. 1, 2002.
34. Ryder, N., Wolin, S., Milke, J., "Analyses of the Impact of Loss of Spray-Applied Fire Protection on the Fire Resistance of Steel Columns," presented to the International Association of Fire Safety Science Conference, Worcester, MA, 2002.
35. Zhang, W., Ryder, N., Roby, R., Carpenter, D., "Modeling of the Combustion in Compartment Fires using Large Eddy Simulation Approach," Proceedings of "Chemical and Physical Processes in Combustion," presented to the Eastern States Section of the Combustion Institute Fall Technical Meeting, December 2001.
36. Wolin, S., Ryder, N., Leprince, F., Milke, J., Mowrer, F., Torero, J. "Measurements of Smoke Characteristics in HVAC Ducts," Fire Technology, Vol. 37, No. 4, October 2001.