

STEVEN J. SCHAFRIK

PROFESIONAL PREPARATION

Virginia Tech,	Blacksburg, VA,	Mining and Mineral Engineering,	PhD	2013
Virginia Tech,	Blacksburg, VA,	Mining and Mineral Engineering,	MS	2001
Virginia Tech,	Blacksburg, VA,	Mining and Mineral Engineering,	BS	1999

PROFESSIONAL APPOINTMENTS

August 2017 – Present	Associate Professor, Mining Engineering Department, University of Kentucky
October 2020 – Present	Fellow, James B. Beam Institute for Kentucky Spirits
May 2015 – July 2017	Research Associate Professor Virginia Center for Coal and Energy Research, Virginia Tech
August 2013-May 2015	Research Assistant Professor Virginia Center for Coal and Energy Research, Virginia Tech
May 2012–August 2013	Senior Research Associate Virginia Center for Coal and Energy Research, Virginia Tech
August 2001–May 2012	Research Associate Virginia Center for Coal and Energy Research, Virginia Tech
May 1999–August 2001	Research Assistant Virginia Center for Coal and Energy Research, Virginia Tech

RESEARCH INTERESTS

Currently conducting research applying advanced computing technologies to mining problems such as mine automation, mine ventilation, and dust filtering. I have been heavily engaged in research on a variety of topics, including: (a) underground coal mining expert systems and simulators; (b) effectiveness of technology, such as virtual reality, in safety training and learning; and, (c) enhancements of location and tracking technologies for underground mining. My research has been supported by federal and state agencies, private companies and foundations. I have been working with the James B. Beam Institute to use mining technology for ventilation, data management, sensing and mineral separation in the bourbon industry.

SELECTED PUBLICATIONS

Editor of Proceedings

- Jong, E., Sarver, E., Schafrik, S., Luxbacher, K., Proceedings of the 15th North American Mine Ventilation Symposium, Blacksburg, VA ISBN 978-0-692-47348-1

Peer-reviewed Journals

- Schafrik, S., M. Karmis and Z. Agioutantis, “A Novel, Web-Based, Continuous Mining Simulator,” *Transactions of the Society for Mining, Metallurgy and Exploration, Inc.*, 2001, vol. 310, pp. 69-74
- Schafrik, S., M. Karmis and Z. Agioutantis, “Methodology of Incident Recreation Using Virtual Reality,” *Mining Engineering*, October 2004, Volume 56, Issue 9, pp. 40-45
- Griffin, K, S. Schafrik, M. Karmis, “Designing and Modeling Wireless Mesh Communications In Underground Coal Mines,” *Mining Engineering*, June 2010, Volume 62, Issue 6, pp. 16-26
- Westman, E., K. Luxbacher and S. Schafrik, “Passive Seismic Tomography for Three-Dimensional Time-Lapse Imaging of Mining-Induced Rock Mass Changes,” *The Leading Edge*, March 2012 v. 31 no. 3 p. 338-345

- Xu, G., K. Luxbacher, S, Ragab, S, Schafrik, “Development of a Remote Analysis Method for Underground Ventilation Systems Using Tracer Gas and CFD in a Simplified Laboratory Apparatus,” *Tunneling and Underground Space Technology Incorporating Trenchless Technology Research*, Volume 33, January 2013, Pages 1–11
- Schafrik, S., Dietrich, C., Harwood, C., “Geolocation for Underground Coal Mining Applications: Classification of Systems and Limitations,” *Mining Engineering Magazine* April 2014, Vol 66 Issue 4, pp 22-42.
- Wisniewski, R.; Schafrik, S., Underground coal mine tracking and communication system reliability and availability methodology, *Transactions of the Society for Mining, Metallurgy, and Exploration*, 2014, Vol. 336, No. 1, pp. 426-434
- Jong, E.; Schafrik S.; “Evaluation of an E-field through-the-earth (TTE) communications system at an underground longwall mine in West Virginia”, *Mining Engineering*, Sept 2016, Volume 68, Issue 9, pp. 91-96
- Kumar, A. R., Levy, A., Kumar, A., Schafrik, S., and Novak, T. “Computational Fluid Dynamics Modeling and Laboratory Analysis of Aerosol Particles’ Capture on Thin Swirling Water Film in a Vortecone.” *Powder Technology* 361 (2020): 499–506.
- Androulakis, V, Sottile, J., Schafrik, S., and Agioutantis, Z. “Concepts for Development of Autonomous Coal Mine Shuttle Cars.” *IEEE Transactions on Industry Applications* 56, no. 3 (2020): 3272–80.
- Kumar, A.R., Schafrik, S. “Multiphase CFD Modeling and Laboratory Testing of a Vortecone for Mining and Industrial Dust Scrubbing Applications.” *Process Safety and Environmental Protection* 144 (2020): 330–36.
<https://doi.org/10.1016/j.psep.2020.07.046>.
- Kumar, A. R., Schafrik, S., and Novak, T. “Multi-Phase Computer Modeling and Laboratory Study of Dust Capture by an Inertial Vortecone Scrubber.” *International Journal of Mining Science and Technology* 30, no. 3 (2020): 287–91.
- Kumar, A. R., Arya, S., Levy, A., Schafrik, S., Wedding, W.C., and Saito, K. “Scale and Numerical Modeling to Determine Operating Points of a Non-Clogging Vortecone Filter in Mining Operation.” *Progress in Scale Modeling, an International Journal* 1, no. 1 (2020)
- Kumar, A. R., Schafrik, S., and Velasquez, O. “Designing, Modeling, and Laboratory Testing of a Non-Clogging Impingement Type Filter for Mining Dust Scrubbers.” *Mining, Metallurgy & Exploration* 37, no. 6 (2020): 1911–18. (W*)

Book Chapters

- Schafrik, S., “Communication and Tracking System Performance” *Advances in Productive, Safe, and Responsible Coal Mining* Ed. Hirschi, J., Woodhead Publishing 2018

INTELLECTUAL PROPERTIES

An Efficient Non-clogging Inertial Vortex Type Particle Scrubber (UKIP 2390, U.S. Provisional Patent App. Ser. No. 62/931,860) – A replacement filter for Continuous Miner Scrubber filters, which requires no maintenance and no modifications

A Self-Cleaning, Non-clogging, Water-flooded impingement Screen for Dust-Control (UKIP 2274, U.S. Provisional Patent App. Ser. No. 62/746,711) – A maintenance free replacement filter for flooded bed scrubbers

A Diver’s Bell for Wilderness Workers (VTIP 15-043) – A Quadcopter Drone based system for cellular, GPS and Citizen Band communications in remote areas.

AMCAD (VTIP 13-097) and COMMS (VTIP 10-079) – Design based systems for the layout and optimization of wireless communications infrastructure in underground coal mines.