

Michael J. Hargather

Professor of Mechanical Engineering, Dean's Research Scholar, New Mexico Tech
Research Scientist, Energetic Materials Research and Testing Center (EMRTC)

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EDUCATION **Doctor of Philosophy in Mechanical Engineering**

- Pennsylvania State University, May 2008
- Dissertation: *Scaling, characterization, and application of gram-range explosive charges to blast testing of materials*
- Advisor: Dr. Gary Settles

Bachelor of Science in Mechanical Engineering, with Honors, Minor in Physics

- Penn State Erie, The Behrend College, May 2004
- Grade Point Average: 3.81
- Honors Thesis: *Molecular dynamics simulation of magnetic nanoparticles in a fluid*
- Honors Research Advisor: Dr. G. William Baxter
- Senior Design Project: *Natural gas pipeline flow regulator*
- Design Advisor: Dr. James Sonnenmeier
- Summer abroad, University College of Northampton, 2003

ACADEMIC	Professor, New Mexico Tech	April 2022 – present
EMPLOYMENT	Dean's Research Scholar, New Mexico Tech	August 2020 – present
HISTORY	Research Scientist, Energetic Materials Research and Testing Center	Sept. 2013 – present
	Associate Professor, New Mexico Tech	April 2017 – April 2022
	Assistant Professor, New Mexico Tech	Aug. 2012 – April 2017
	Visiting Assistant Professor, New Mexico Tech	Jan. 2012 – July 2012
	Research Associate, PSU Exp. and Comp. Convection Laboratory	Aug. 2011 – Dec. 2011
	Research Associate, Penn State Gas Dynamics Laboratory	June 2008 – July 2011
	Research Assistant, Penn State Gas Dynamics Laboratory	Aug. 2004 – May 2008
	Physics Laboratory Instructor, Penn State Erie	Aug. 2002 – May 2004

TEACHING **Mechanical Engineering Department**, New Mexico Tech, Undergraduate Classes

EXPERIENCE	• AE 417 – Aerospace Propulsion	Fa 2014, Fa 2016
	• ES 111 – Introduction to Programming	Fa 2013, Sp 2015
	• ES 216 – Fluid Dynamics	Fa 2012
	• ES 347 – Thermodynamics	Su 2012, Sp 2013, Fa 2013-2017, Fa 2019
	• ES 350 – Heat and Mass Transfer	Sp 2012
	• EXPL 101L – Introduction to Explosives Laboratory	Sp 2017, Sp 2020
	• EXPL 189L – Introduction to Pyrotechnics Laboratory	Sp 2015
	• MENG 189 – Introduction to Programming for Mechanical Engineers	Sp 2014
	• MENG 189 – Aerospace LLC	Sp 2015
	• MENG 305 – Numerical Methods and Analysis	Fa 2017-2021
	• MENG 351L – Fluid-Thermal Sciences Laboratory	Sp 2014, Fa 2014

TEACHING
EXPERIENCE
(CONTINUED)

Mechanical Engineering Department, New Mexico Tech, Graduate Classes

- MENG 431 – Fluid and Thermal Systems Sp 2013-2018
- MENG 431L – Fluid and Thermal Systems Laboratory Sp 2015-2018
- MENG 556 / AE 420 – Compressible Flow Sp 2016-2022
- MENG 560 – Combustion Fa 2012
- MENG 561 – Introduction to Digital Image Processing Fa 2015, Fa 2018, Fa 2020
- MENG 585 – Graduate Research Seminar Sp 2012, Fa 2012, Sp 2016, Fa 2019
- MENG 589 – Advanced Numerical Methods and Analysis, Fa 2018

Instructor, Mechanical and Nuclear Eng. Dept., Pennsylvania State University

- ME 320 – Fluid Dynamics Fa 2012, Fa 2008
- ME 420 – Compressible Flow I Sp 2011
- ME 520 – Compressible Flow II Fa 2010
- ME 300 – Engineering Thermodynamics Sp 2009
- Developer for a new graduate-level experimental methods course Su 2011

Graduate Teaching Fellowship, Mechanical and Nuclear Eng. Dept., Pennsylvania State University (faculty mentor: Dr. Eric Marsh)

- ME 201 – Introduction to Thermal Science Fa 2007, Sp 2008

Laboratory Instructor, Physics Department, Penn State Erie

- PHYS 211L – Mechanics Sp 2003
- PHYS 212L – Electricity and Magnetism Fa 2002, Fa 2003, Sp 2004

Student evaluations are available for all courses taught

RESEARCH
FUNDING

My research focuses on the development and application of optical techniques to the study of high-speed compressible flows and explosions. My expertise is as an experimental fluid dynamicist, with specialties in optical diagnostics including schlieren and shadowgraph flow visualization, high-speed imaging, explosive characterization, and rocket propulsion. I have been PI or institution PI for a total of over \$3 million in direct expenditures while at New Mexico Tech.

Currently funded research

- Principal Investigator with Co-PI Dr. Mostafa Hassanalian, “Intelligent Energetic Systems Engineering (INTENSE) REU with RET Supplement, National Science Foundation (NSF), 4 years, \$279,182, Aug. 2018 – Aug. 2022
- Principal Investigator with Co-PI Dr. Jamie Kimberley, “Experimental investigation of shock and detonation propagation through two-dimensional arrays of metal inclusions”, Air Force Office of Scientific Research (AFOSR), 3 years, \$624,110, Aug. 2019 – Aug. 2023
- Principal Investigator with Co-PI Dr. Jamie Kimberley, “Lab-scale stressed-target visualization”, Sandia National Laboratories, 1.5 years, \$286,000, July 2020 – Aug. 2022

RESEARCH
FUNDING
(CONTINUED)**Currently funded research (continued)**

- Principal Investigator, “Quantitative optical measurement of shock interactions around high-velocity projectiles”, Lawrence Livermore National Laboratory, 3 years, \$385,506, Mar. 2021 – Mar. 2023
- Co-Principal Investigator with PI Dr. Michelle Pantoya at Texas Tech, “Growing STEMs Consortium: Training the next generation of engineers for the DOE/NNSA Workforce”, Department of Energy MSIPP, 3 years, \$3,000,000 total, \$900,000 to NMT, May 2021 – May 2024
- Principal Investigator with Co-PI Dr. Gayan Rubasinghe, “Rechargeable battery abuse research: Flammable environment studies”, Sandia National Laboratories, 1.5 years, \$50,000, Sept. 2020 – Mar. 2022
- Principal Investigator with Co-PIs Dr. Jamie Kimberley and Dr. Bin Lim, “Ultra-high-speed framing camera for shock and detonation studies”, US Army DURIP, 1 year, \$599,541, Apr. 2021 – Sept. 2022
- Principal Investigator with Co-PI Dr. Jamie Kimberley, “RMII Task Order”, Reactive Metals International, Inc., 2 year, \$20,000, Oct. 2019 – Oct. 2022
- Principal Investigator, Explosive Research and Testing: Reactive material fragmentation, Minority Serving Research and Development Center (MSRDC) and NSWC Indian Head, 3 years, \$45,000, Dec. 2019 – Dec. 2022
- Principal Investigator with Co-PI Dr. Jamie Kimberley, “Reactive nanocomposite materials for enhanced lethality kinetic warheads - Phase II Enhanced”, Reactive Metals International, Inc., 2 years, \$130,000, Sept. 2021 – June 2023
- Principal Investigator, “High-speed schlieren imaging of multi-phase blast (MBX) explosions”, IS4S, 1 year, \$37,419, June 2021 – May 2022
- Principal Investigator, “Blast Induced Shock Loading Study”, Sandia National Laboratories, 2 years, \$150,000, Mar. 2022 – Sept. 2023
- Principal Investigator, “Characterization of seismic waveforms from energetic sources”, Explor, 1 year, \$75,000, Dec. 2021 – Dec. 2022
- Principal Investigator, “Instrumentation development and signature analysis”, Sandia National Laboratories, 6 months, \$20,000, Apr. 2022 – Sept. 2022
- Co-Principal Investigator with PI Dr. Udaykumar at University of Iowa, “Energetic materials selection and micro-structural design for robust performance under damage scenarios”, University Consortium of Applied Hypersonics, 3 years, \$450,000 to NMT, Jan. 2022 – Dec. 2024

Previously funded research

- Co-Principal Investigator with PI Dr. Chelsey Hargather, “Advanced additive manufacturing techniques for solid rocket propellant”, DARPA SBIR with X-BOW Launch Systems, 3 years, \$396,036, July 2018 – Nov. 2021
- Co-Principal Investigator with PI Dr. Steve Beaudoin at Purdue University, “TESSA II”, Department of Homeland Security (DHS), 2 years, \$67,328, Sept. 2019 – Sept. 2021
- Co-Principal Investigator with PI Dr. Peter Vorobieff at University of New Mexico, “Multiphase flow physics for reduced order models”, Defense Threat Reduction Agency (DTRA), 4 years, \$1,049,999 total, \$325,000 to NMT, Mar. 2018 – Mar. 2022
- Principal Investigator, “Blast induced shock loading study”, Sandia National Laboratories, 1 year, \$58,688, Dec. 2020 – Sept. 2021

RESEARCH
FUNDING
(CONTINUED)**Previously funded research (continued)**

- Principal Investigator, “Background oriented schlieren imaging of large-scale explosive events”, NAWCWD China Lake, 0.5 years, \$50,000, May 2021 – Sept. 2021
- Principal Investigator with Co-PI Dr. Jamie Kimberley, “Reactive nanocomposite materials for enhanced lethality kinetic warheads”, MDA SBIR Phase II with Reactive Metals International, Inc, 3.5 years, \$426,000 to NMT, Jan. 2018 – Aug. 2021
- Principal Investigator, “Shadowgraph imaging of energetic seismic sources”, Explor, 0.5 years, \$20,000, Aug. 2020 – Dec. 2020
- Principal Investigator, “Multi-point explosion visualization”, Sandia National Laboratories, 1.5 years, \$75,000, Apr. 2019 – Aug. 2020
- Principal Investigator, “DTRA Reactive materials”, NSWC Indian Head, 1.5 years, \$90,000, Oct. 2019 – Mar. 2021
- Co-Principal Investigator with PI. Dr. Hergen Eilers at ExMat Research, “Real-time measurements of combined temperature/velocity fields”, DTRA STTR with Exmat Research and Washington State University, 1 year, \$30,900, Jan. 2020 – Sept. 2020
- Principal Investigator, “Quantitative optical measurement of density fields around high-velocity projectiles”, Lawrence Livermore National Laboratory, 0.5 years, \$40,000, June 2020 – Sept. 2020
- Principal Investigator, “3D BOS imaging of shock wave interactions from multiple explosions”, Air Force Research Laboratory via IS4S, 4 years, \$211,567, Aug. 2016 – Sept. 2020
- Principal Investigator, “Rechargeable battery abuse research”, Sandia National Laboratories, 4 years, \$200,000, Oct. 2016 – Sept. 2020
- Principal Investigator, “Schlieren imaging of multi-phase blast (MBX) explosions”, Air Force with IS4S, \$33,500, 1 year, Aug. 2018-Sept. 2019
- Principal Investigator, “Ultra-fast diagnostics for quantifying wave shaping in PETN microdetonation experiments”, Sandia National Laboratories, 0.5 years, \$25,000, Apr. 2019 – Sept. 2019
- Principal Investigator, “Advanced diagnostics for small scale detonation testing of PETN”, Sandia National Laboratories, 1.5 years, \$86,000, Jan. 2017 – Sept. 2018
- Co-Principal Investigator, “Optical diagnostics and analysis for multiphase blast”, Air Force STTR with Protection Engineering Consultants, 9 months, \$75,000 to NMT, July 2017 – April 2018
- Co-Principal Investigator with PI Dr. Jamie Kimberley, “Characterization of consolidated tungsten/magnesium composites”, ONR SBIR Phase II Option with Reactive Metals International, Inc, 9 months, \$80,012 to NMT, Nov. 2017 – Aug. 2018
- Principal Investigator, “Experimental Investigation of Turbulent Mixing in Thermite Explosions”, Defense Threat Reduction Agency, **Young Investigator Program (YIP)**, 3 years, \$300,000, Sept. 2014 – Dec. 2017
- Principal Investigator, “Fragment Imaging”, Sandia National Laboratories, 3 months, \$15,000, July 2017 – Sept. 2017
- Co-Principal Investigator, “Characterization of consolidated tungsten/magnesium composites”, ONR SBIR with Reactive Metals International, Inc, 9 months, \$80,409 to NMT, Nov. 2016 – Sept. 2017
- Principal Investigator, “BOS diagnostics for explosive projectile tests”, Lawrence Livermore National Laboratory, 3 months, \$15,000, July 2017 – Sept. 2017

RESEARCH
FUNDING
(CONTINUED)

Previously funded proposals (continued)

- Principal Investigator, “Combustible polymer testing”, Sandia National Laboratories, 9 months, \$20,000, Nov. 2016 – May 2017
- Co-Principal Investigator (PI: ALERT Center of Excellence), “Creation of procedures and methodology to understand and measure sampling efficiency and baseline”, Department of Homeland Security, 1 year, \$105,000 (allocation to NMT), Oct. 2015 – Sept. 2016
- Co-Principal Investigator, “Agile optical methods for fireball species and particle characterization”, DTRA SBIR with Spectral Energies, LLC, 6 months, \$20,000 to NMT, Sept. 2016 – March 2017
- Principal Investigator, “Small-scale testing of metal fluoropolymers”, Tetramer Technologies, LLC, 3 months, \$4,000, June 2016 – Aug. 2016
- Principal Investigator, “nMx Explosive Testing”, nanoMetallix, 3 months, \$5,000, July 2016 – Sept. 2016
- Principal Investigator, “Propulsion Technology: Rocket Test Stand Design and Implementation”, Sandia National Laboratories, 3 years, \$120,000, Jan. 2014 – Sept. 2016
- Principal Investigator, “Schlieren imaging of battery failures”, Office of Naval Research, 10 months, \$40,000, June 2015 – March 2016
- Co-Principal Investigator (PI: Dr. Sivaram Gogineni), “Multi-camera BOS imaging for arena test measurement”, Air Force SBIR with Spectral Energies, LLC, 9 months, \$150,000 (\$46,000 to NMT), June 2015 – Feb. 2016
- Principal Investigator, “Additive manufacturing for rocket motors”, Los Alamos National Laboratory, 3 months, \$20,000, 2015
- Principal Investigator, “Experimental rocket motor launch testing”, Los Alamos National Laboratory, 1 month, \$11,500, 2014
- Co-Principal Investigator (PI: Dr. Sivaram Gogineni), “Stereoscopic retroreflective shadowgraph system for warhead characterization”, Navy SBIR with Spectral Energies, LLC, 6 month Phase 1, \$75,000 (\$25,000 to NMT), 2014
- Principal Investigator, “Focusing schlieren investigation of a spray flow”, Spectral Energies, LLC, 4 months, \$7,500, 2013
- Principal Investigator, “Retroreflective shadowgraph system design”, Sandia National Laboratories, 4 months, \$33,000, 2013
- Principal Investigator, “High-speed shadowgraph imaging of shaped-charge jet formation”, Jet Research Center, 8 months, \$35,000, 2012
- Principal Investigator, “Multi-scale HME characterization and scaling analysis”, Sandia National Laboratories, 1 year, \$60,000, 2012
- Co-Principal Investigator (PI: Dr. Karen Thole), “1X scale heat transfer characterization with porous coupons”, United Technologies Pratt & Whitney, 6 months, \$70,000, 2011
- Co-Principal Investigator (PI: Dr. Gary Settles), “Schlieren based seedless PIV for high frequency cavity flow control applications in large scale wind tunnel facilities”, Air Force SBIR Phase II, \$315,000, 2009-2010
- Co-Principal Investigator (PI: Dr. Gary Settles), “Schlieren system upgrade for the Trisonic Gasdynamics Facility”, Air Force Research Laboratory, 9 months, \$50,000, 2009
- Research Collaborator (PI: Dr. Jim Runt), “Elastomeric polymer-by-design to protect the warfighter against traumatic brain injury by diverting the blast induced shock waves from the head”, Office of Naval Research, 3 year, \$2,200,000, 2009-2012 (participated until December 2011)

INDUSTRIAL **President**, Hargather Imaging Technologies, LLC, 2015 – present
 RESEARCH AND **Consultant**, Bangham Engineering, 2015-2016
 CONSULTING **Consultant**, nSight, Inc., 2012
Consultant, Aerolab LLC, 2010-2011
Consultant, Intertek, 2008
Summer Intern, Xerox Corporation, Su 2002, Su 2003, Su 2004

PEER-
 REVIEWED
 JOURNAL
 PUBLICATIONS

- [1] Mier, F. A., Hill, S. M. M., Lamb, J., Hargather, M. J., “Non-invasive internal pressure measurement of 18650 format lithium ion batteries during thermal runaway”, *Journal of Energy Storage*, 51:104322, 2022, DOI: 10.1016/j.est.2022.104322
- [2] Youngblood. S. H., Hargather, M. J., Morales, R., Phillip, J., Peguero, J., Grubelich, M., Saul, W. V., “Sea level performance of nitrous oxide and ethanol bi-propellant rocket engines”, *International Journal of Energetic Materials and Chemical Propulsion*, 21(2):15-36, 2022, DOI: 10.1615/IntJEnergeticMaterialsChemProp.2022038989
- [3] Novosselov, I. V., Coultas-McKenney, C. A., Miroshnik, L., Kottapalli, K., Ockerman, B., Manley, T. E., Gardner, M. W., Lareau, R., Brady, J., Sweat, M., Smith, A.R., Hargather, M. J., Beaudoin, S., “Trace explosives sampling for security applications (TESSA) study: Evaluation of procedures and methodology for contact sampling efficiency”, *Talanta*, 234:122633, 2021, DOI: 10.1016/j.talanta.2021.122633
- [4] Wei, T., Hargather, M., J., “A new blast wave scaling”, *Shock Waves* 31:231-238, 2021, DOI: 10.1007/s00193-021-01012-y
- [5] Peguero, J. C., Forrest, E. C., Knepper, R., Hargather, M. J., Tappan, A. S., Marquez, M. P., Vasiliauskas, J. G., Rupper, S. G., “Refractive imaging of air shock above microscale defects in pentaerythritol tetranitrate (PETN) films”, *Propellants, Explosives, Pyrotechnics*, 2020, DOI: 10.1002/prop.202000029
- [6] Winter, K. A., Hargather, M. J., “Three-dimensional shock wave reconstruction using multiple high-speed digital cameras and background-oriented schlieren imaging”, *Experiments in Fluids*, 60:93, 2019 DOI: 10.1007/s00348-019-2738-x
- [7] Mier, F. A., Hargather, M. J., Ferreira, S. R., “Experimental quantification of vent mechanism flow parameters in 18650 format lithium ion batteries”, *Journal of Fluids Engineering*, 141:061403-2, 2019, DOI: 10.1115/1.4042962
- [8] Skinner, T., Hargather, M. J., Blackwood, J., Hays, M., Bangham, M., “An apparatus for producing tunable, repeatable, hydrogen-oxygen deflagrative blast waves”, *Shock Waves*, 2019 DOI: 10.1007/s00193-019-00922-2
- [9] Mier, F. A., Bhakta, R., Castano, N., Garcia, J., Hargather, M. J., “Experimental measurement of steady and transient liquid coiling with high-speed video and digital image processing”, *Fluids*, 3:107, 2018, DOI: 10.3390/fluids3040107
- [10] Mier, F. A., Morales, R., Coultas-McKenney, C. A., Hargather, M. J., Ostanek, J., Overcharge and thermal destructive testing of lithium metal oxide and lithium metal phosphate batteries incorporating optical diagnostics, *Journal of Energy Storage*, 13:378-386, 2017
- [11] Settles, G. S., Hargather, M. J., A review of recent developments in schlieren and shadowgraph techniques, *Measurement Science and Technology*, 28:042001, DOI:10.1088/1361-6501/aa5748, 2017
- [12] Tobin, J. D., Hargather, M. J., Quantitative schlieren measurement of explosively-driven shock wave density, temperature, and pressure profiles, *Propellants, Explosives, Pyrotechnics*, DOI: 10.1002/prop.201600097, 2016

PEER-
REVIEWED
JOURNAL
PUBLICATIONS
(CONTINUED)

- [13] Mier, F. A., Hargather, M. J., Color gradient background-oriented schlieren imaging *Experiments in Fluids*, 57:95, 2016
- [14] Skaggs, M. N., Hargather, M. J., Cooper, M. A., Characterizing pyrotechnic ignitor output with high-speed schlieren imaging, *Shock Waves*, DOI: 10.1007/s00193-016-0640-5, 2016
- [15] Giannuzzi, P. M., Hargather, M. J., Doig, G.C., Explosive-driven shock wave and vortex ring interaction with a propane flame, *Shock Waves*, DOI: 10.1007/s00193-016-0627-2, 2016
- [16] Craven, B. A., Hargather, M. J., Volpe, J. A., Frymire, S. P., Settles, G. S., Design of a high-throughput chemical trace detection portal that samples the aerodynamic wake of a walking person, *IEEE Sensors*, 14:1852-1866, 2014
- [17] Hargather, M. J., Background-oriented schlieren diagnostics for large-scale explosive testing, *Shock Waves*, 23:529-536, 2013
- [18] Hargather, M. J., Settles, G. S., Gogineni, S., Optical diagnostics for characterizing a transitional shear layer over a supersonic cavity, *AIAA Journal*, 51:2977-2982, 2013
- [19] Young, R. M., Hargather, M. J., Settles, G. S., Shear stress and particle removal measurements of a round turbulent air jet impinging normally upon a planar wall, *Journal of Aerosol Science*, 62:15-25, 2013
- [20] Fulghum, M. R., Hargather, M. J., Settles, G. S., An integrated impactor/detector for a high-throughput explosive trace detection portal, *IEEE Sensors*, 13:1252-1258, 2013
- [21] Svingala, F. R., Hargather, M. J., Settles, G. S., Optical techniques for measuring the shock Hugoniot using ballistic projectile and high-explosive shock initiation, *International Journal of Impact Engineering*, 50:76-82, 2012
- [22] Hargather, M. J., Settles, G. S., A comparison of three modern quantitative schlieren techniques, *Optics and Lasers in Engineering*, 50:8-17, 2012
- [23] Hargather, M. J., Settles, G.S., Background-oriented schlieren visualization of heating and ventilation flows: HVAC-BOS, *HVAC&R Research*, 17(5):771-780, 2011
- [24] Hargather, M. J., Lawson, M. J., Settles, G. S., Weinstein, L. M., Seedless velocimetry measurements by schlieren image velocimetry, *AIAA Journal*, 49(3): 611-620, 2011
- [25] Hargather, M. J., Staymates, M. E., Madalis, M. J., Smith, D. J., Settles, G. S., The internal aerodynamics of cargo containers for trace chemical sampling, *IEEE Sensors Journal*, 11(5): 1184-1193, 2011
- [26] Grujicic, M., He, T., Pandurangan, B., Svingala, F. R., Settles, G. S., Hargather, M. J., Experimental characterization and material-model development for microphase-segregated polyurea: An overview, *Journal of Materials Engineering and Performance*, 21 (1): 2-16, 2011
- [27] Hargather, M. J., Settles, G. S., Madalis, M. J., Schlieren imaging of loud sounds and weak shock waves in air near the limit of visibility, *Shock Waves*, 20(1): 9-17, 2010
- [28] Hargather, M. J., Settles, G. S., Natural-background-oriented schlieren imaging, *Experiments in Fluids*, 48: 59-68, 2010

PEER-
REVIEWED
JOURNAL
PUBLICATIONS
(CONTINUED)

- [29] Hargather, M. J., Settles, G. S., Laboratory-scale techniques for the measurement of a material response to an explosive blast, *International Journal of Impact Engineering*, 36: 940-947, 2009
- [30] Hargather, M. J., Settles, G. S., Retroreflective shadowgraph technique for large-scale flow visualization, *Applied Optics*, 48 (22): 4449-4457, 2009
- [31] Hargather, M. J., Settles, G. S., Optical measurement and scaling of blasts from gram-range explosive charges, *Shock Waves*, 17: 215-223, 2007

TECHNICAL
CONFERENCE
PUBLICATIONS

- [1] Torres, S., Hargather, M. J., Robey, R. E., Pope, J., Vorobiev, O. Y., "Shock wave propagation and density field quantification in monolithic and layered polymethyl methacrylate (PMMA)", *Society of Experimental Mechanics Annual Conference*, Virtual, paper 11936, 2021
- [2] Youngblood, S. H., Palmer, S., Kimberley, J., Hargather, M. J., "In situ measurement diagnostics of the fragmentation behavior of powdered composite reactive materials subjected to high-rate dynamic loading", *Society of Experimental Mechanics Annual Conference*, Virtual, paper 11674, 2021
- [3] Falls, J. M., Hargather, M. J., Salari, K., Campos, A., "Measurement of the density field around supersonic and hypersonic projectiles using quantitative schlieren and computational simulations", *Ordnance and Ballistics Technical Working Group*, Monterey, CA, 2021
- [4] Hargather, C. Z., Hargather, M. J., Hinton, M., Purcell, D., Galindo, E., Marsh, J., Kaufman, M., "Performance evaluation of additively-manufactured AP solid rocket propellant", *JANNAF Meeting*, Virtual, 2020
- [5] Torres, S., Hargather, M. J., Grubelich, M. C., Pope, J., Robey, R. E., Vorobiev, O. Y., Morris, J. P., "Shock wave interaction and fracture growth in polymethyl methacrylate (PMMA)", *Society of Experimental Mechanics Annual Conference*, Virtual, 2020
- [6] Peterson, C. R., Winter, K. O., Hargather, M. J., "Three-dimensional flow field reconstruction of complex explosive geometries using refractive image and shape-from-silhouette techniques", *66th JANNAF Meeting Propulsion Meeting*, Dayton, OH, 2019
- [7] Youngblood, S. H., Schmittle, C., Miller, B., Hargather, M. J., Kimberley, J., Thoma, S., Martellaro, P., "Study of reactive material fragmentation behavior in gun- and explosive-launched systems", *66th JANNAF Meeting Propulsion Meeting*, Dayton, OH, 2019
- [8] Hargather, M. J., Kimberley, J., Youngblood, S. H., Martellaro, P., Thoma, S. G., "Characterization of fragmentation and energy release Behavior of reactive metal composites", *Ordnance and Ballistics Technology Working Group Meeting*, Monterey, CA, 2019
- [9] Taylor, B. D., Mai, C. L., Thornton, S. D., Paikoff, B. C., Winter, K. O., Hargather, M. J., Peiris, S., "Simulations and experiments of collaborative blast from multiple cylindrical charges", *Warheads and Ballistics Symposium*, 2018
- [10] Hargather, M. J., Winter, K., Mai, Peiris, S., "Analysis of Mach stem formation in reflecting and multiple interacting explosions for enhanced blast effects", *Warheads and Ballistics Symposium*, 2018
- [11] Witham, R., Elmer, W., Hare, D., Hargather, M. J., "Development of an affordable scaled test to study blast effects from hypersonic weapons", *Warheads and Ballistics Symposium*, 2018
- [12] Forrest, E. C., Peguero, J. C., Hargather, M. J., Knepper, R., Tappan, A., Marquez, M., Vasiliauskas, J., Rupper, S., "Effect of microscale defects on shock and detonation propagation in pentaerythritol tetranitrate (PETN) films", *16th International Detonation Symposium*, Cambridge, MD, July 2018.

TECHNICAL
CONFERENCE
PUBLICATIONS
(CONTINUED)

- [13] Winter, K., Hargather, M. J., Mai, C., Diggs, A., Peiris, S., High-speed, refractive imaging of multiple-charge shock-wave interactions and focusing, *JANNAF 48th Combustion Meeting*, 2017
- [14] Hargather, M. J., Winter, K., Mai, C., Diggs, A., Peiris, S., High-speed refractive imaging of air blast from multiple charges, *Warheads and Ballistics Symposium*, 2017
- [15] Mier, F. A., Hargather, M. J., Ferreira, S., Determining the internal pressure in 18650 format lithium batteries under thermal abuse, *Electrical Energy Storage Applications and Technologies*, paper, 2017
- [16] Hargather, M. J., Kimberley, J., Thoma, S. G., Failure and fragmentation of pressed bi-metallic composites, *APS Shock Compression of Condensed Matter*, paper, 2017
- [17] Hargather, M. J., Smith, J. L., Anderson, J., Winter, K., Optical diagnostics for energetic materials research, *ASME IMECE*, paper number IMECE2016-67372, 2016
- [18] Hargather, M. J., Winter, K., Gogineni, S., Warhead characterization using multi-camera imaging of fragment and shock wave motion, *Warheads and Ballistics Symposium*, 2016
- [19] Phillip, J., Youngblood, S. H., Saul, W. V., Grubelich, M. C., Hargather, M. J., Development and testing of a nitrous-oxide/ethanol bi-propellant rocket engine, *AIAA Propulsion and Energy*, AIAA-2016-5092, 2016
- [20] Hargather, M. J., Winter, K., Gogineni, S., Multi-camera diagnostics to measure shock wave and fragment motion in complex environments, *JANNAF 47th Combustion Meeting*, 2016
- [21] Anderson, J. A., Smith, J. L., Hargather, M. J., Optical diagnostics to quantify turbulent mixing in post-blast environment, *JANNAF 47th Combustion Meeting*, 2016
- [22] Grubelich, M. C., Youngblood, S. H., Hargather, M. J., Saul, W. V., Nitrous oxide ethanol bi-propellant rocket engine and gas generator development and testing, *Space Propulsion*, 2016
- [23] Chan, J.E.C., Giannuzzi, P.M., Kabir, K.R., Hargather, M.J., Doig, G.C., Interactions of shock tube exhaust flows with laminar and turbulent flames, *AIAA SciTech*, 2016
- [24] Youngblood, S. H., Hargather, M. J., Grubelich, M. C., Saul, W. V., Computational modeling of a liquid nitrous oxide and ethanol fueled rocket engine, *JANNAF 46th Combustion, 34th Airbreathing Propulsion, 34th Exhaust Plume and Signatures, 28th Propulsion Systems Hazards Joint Subcommittee Meeting*, 2014
- [25] Hargather, M. J., Canafax, N. B., Stereoscopic retroreflective shadowgraph system for warhead characterization, *JANNAF 46th Combustion, 34th Airbreathing Propulsion, 34th Exhaust Plume and Signatures, 28th Propulsion Systems Hazards Joint Subcommittee Meeting*, 2014
- [26] Hargather, M. J., Hussan, S., Quinlin, M., Jacomb-Hood, T., Francis, Z., Seneca, C., Fernando, R., Fluid dynamics dimensional analysis take-home experiment using paper airplanes, *ASEE Annual Conference*, 2013
- [27] Hargather, M. J., Thole, K. A., Characterization of flow through porous metals, *ASME Turbo Expo*, paper GT2013-94945, 2013
- [28] Svingala, F. R., Hargather, M. J., Settles, G. S., Modern optical methods for determining the shock Hugoniot of transparent solids, *28th International Symposium on Shock Waves*, 2011
- [29] Hargather, M. J., Settles, G. S., Recent developments in schlieren and shadowgraphy, *27th AIAA Aerodynamic Measurement Technology and Ground Testing Conference*, paper AIAA-2010-4206, 2010

 TECHNICAL
 CONFERENCE
 PUBLICATIONS
 (CONTINUED)

- [30] Hargather, M. J., Settles, G. S., Background-oriented schlieren visualization of heating and ventilation flows: HVAC-BOS, *14th International Symposium on Flow Visualization*, 2010
- [31] Hargather, M. J., Lawson, M. J., Settles, G. S., Weinstein, L. M., Gogineni, S., Focusing-schlieren PIV measurements of a supersonic turbulent boundary layer, *47th AIAA Aerospace Sciences Meeting*, paper AIAA-2009-69, 2009
- [32] Hargather, M. J., Settles, G. S., Dreibelbis, L. J., Liebner, T. J., Natural-background-oriented schlieren imaging, *13th International Symposium on Flow Visualization*, 2008
- [33] Settles, G. S., Hargather, M. J., Madalis, M. J., Schlieren imaging of loud sounds and weak shock waves in air near the limit of visibility, *13th International Symposium on Flow Visualization*, 2008
- [34] Hargather, M. J., Settles, G. S., Gatto, J. A., Gram-range explosive blast scaling and associated materials response, *26th International Symposium on Shock Waves*, 2007
- [35] Biss, M. M., Settles, G. S., Hargather, M. J., Dodson, L. J., Miller, J. D., High-speed digital shadowgraphy of shock waves from explosions and gunshots, *26th International Symposium on Shock Waves*, 2007
- [36] Hargather, M. J., Settles, G. S., Gatto, J. A., Full-scale optical experiments on the explosive failure of a ULD-3 air cargo container, *4th International Aviation Security Technology Symposium*, 2006
- [37] Hargather, M. J., Settles, G. S., Gatto, J. A., Optical measurement, characterization, and scaling of blasts from gram-range explosive charges, *4th International Aviation Security Technology Symposium*, 2006

 INVITED
 TECHNICAL
 PRESENTATIONS

1. Quantitative schlieren measurements of density fields around supersonic projectiles, Lawrence Livermore National Laboratory, LLNL, November 10, 2021
2. Quantitative schlieren measurements of density fields around supersonic projectiles and in explosive blast fields, Texas Tech University, October 8, 2021
3. The fluid dynamics of lithium ion battery failures, Sandia National Laboratories, NM, July 2, 2020
4. Shock waves, turbulence, rockets, and education, Science Cafe, Socorro, NM, November 14, 2019
5. Hypersonics related research at New Mexico Tech, US AF Hypersonics Pitch Day, Niceville, FL, November 7, 2019
6. Shock waves, turbulence, rockets, and education, MENG 110, New Mexico Tech, Socorro, NM, September 4, 2019
7. Explosively driven shock wave and fireball surface evolution and tracking, New Mexico State University, Las Cruces, NM, April 12, 2019
8. Research Resources: An Overview of Library, LaTeX, and Reference Management Tools, presented in Mechanical Engineering Department Seminar, New Mexico Tech, Socorro, NM, October 4, 2018
9. Explosive characterization using high-speed imaging, presented at New Mexico Tech Petroleum Department Seminar, October 2017
10. Shock waves, turbulence, rockets, and education, presented to New Mexico Tech MENG 110 class, October 2017
11. Three-dimensional shock wave and fragment tracking for warhead characterization, presented at Purdue University, May 2017

INVITED
TECHNICAL
PRESENTATIONS
(CONTINUED)

12. New Mexico Tech liquid rocket engine facility overview, presented at NASA White Sands, November 2016
13. Overview of refractive imaging techniques for explosive testing, presented at Sandia National Laboratories, August 2016
14. Shock waves, turbulence, rockets, and grad school, presented at NMT ASME Student Chapter Meeting, November 2015
15. Overview of current research in Shock and Gas Dynamics Laboratory at New Mexico Tech, presented at Los Alamos National Laboratory, September 2015
16. Quantitative flow visualization techniques for shock wave measurements, presented at University of New Mexico, March 2015
17. Shock wave visualization and measurement using the Background Oriented Schlieren (BOS) technique, presented at Sandia National Laboratories, June 2014
18. Quantitative flow visualization techniques for compressible flow experiments, presented at Sandia National Laboratories, April 2014
19. Optical measurement of airblast shock wave pressures, presented at Eglin Air Force Base, March 2014
20. Michael Faraday's The Chemical History of a Candle, presented in the New Mexico Tech Mechanical Engineering Graduate Seminar, September 2012
21. Laboratory-scale explosive research, presented at the French-German Research Institute of Saint-Louis, June 2009

TECHNICAL
CONFERENCE
PRESENTATIONS

1. Torres, S.M., Hargather, M. J., "Negative meniscus lens for enhancing depth-of-focus in schlieren imaging systems", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
2. Espinoza, V., Hargather, M. J., "Explosively-driven shock wave propagation around geometrical arrays", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
3. Peterson, C., Hargather, M. J., "Automated extraction of interface perturbations from explosively driven gas clouds in varying confinement", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
4. Strebe, K.M., Delaney, M., Hargather, M. J., "High-resolution background-oriented schlieren of large-scale field explosions", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
5. Harrington, S., Peterson, C., Hargather, M. J., "Persistence of shock asymmetries in asymmetric charge detonations", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
6. Falls, J.M., Hargather, M. J., Campos, A., "Measurement of the density field around supersonic conical projectiles using quantitative schlieren imaging", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
7. Palmer, S., Hargather, M. J., "Three-dimensional particle tracking velocimetry and size estimation using stereo shadowgraph systems", *APS Division of Fluid Dynamics Meeting*, Phoenix, AZ, November 21-23, 2021
8. Torres, S., Hargather, M. J., Robey, R. E., Pope, J., Vorobiev, O. Y., "Shock wave propagation and density field quantification in monolithic and layered polymethyl methacrylate (PMMA)", *Society of Experimental Mechanics Annual Conference*, Virtual, paper 11936, 2021

TECHNICAL
CONFERENCE
PRESENTATIONS
(CONTINUED)

9. Youngblood, S. H., Palmer, S., Kimberley, J., Hargather, M. J., "In situ measurement diagnostics of the fragmentation behavior of powdered composite reactive materials subjected to high-rate dynamic loading", *Society of Experimental Mechanics Annual Conference*, Virtual, paper 11674, 2021
10. Falls, J. M., Hargather, M. J., Salari, K., Campos, A., "Measurement of the density field around supersonic and hypersonic projectiles using quantitative schlieren and computational simulations", *Ordnance and Ballistics Technical Working Group*, Monterey, CA, 2021
11. Hargather, C. Z., Hargather, M. J., Hinton, M., Purcell, D., Galindo, E., Marsh, J., Kaufman, M., "Performance evaluation of additively-manufactured AP solid rocket propellant", *JANNAF Meeting*, Virtual, 2020
12. Torres, S. Hargather, M. J., Grubelich, M. C., Pope, J., Robey, R. E., Vorobiev, O. Y., Morris, J. P., "Shock wave interaction and fracture growth in polymethyl methacrylate (PMMA)", *Society of Experimental Mechanics Annual Conference*, Virtual, 2020
13. Peterson, C. R., Winter, K. O., Hargather, M. J., "Three-dimensional flow field reconstruction of complex explosive geometries using refractive image and shape-from-silhouette techniques", *66th JANNAF Meeting Propulsion Meeting*, Dayton, OH, 2019
14. Youngblood, S. H., Schmittle, C., Miller, B., Hargather, M. J., Kimberley, J., Thoma, S., Martellaro, P., "Study of reactive material fragmentation behavior in gun- and explosive-launched systems", *66th JANNAF Meeting Propulsion Meeting*, Dayton, OH, 2019
15. Hargather, M. J., Kimberley, J., Youngblood, S. H., Martellaro, P., Thoma, S. G., "Characterization of fragmentation and energy release Behavior of reactive metal composites", *Ordnance and Ballistics Technology Working Group Meeting*, Monterey, CA, 2019
16. Hargather, M. J., DiGregorio, S., Rivera, A., "A quantitative analysis of the chemical evolution of an iodine plume using optical filtering and imaging spectroscopy", *APS Division of Fluid Dynamics Meeting*, Seattle, WA, 2019
17. Espinoza, V., Peterson, C., Hargather, M. J., "Multi-dimensional evolution of explosive product gas cloud, Part I: Evolution from two-dimensional to three-dimensional", *APS Division of Fluid Dynamics Meeting*, Seattle, WA, 2019
18. Peterson, C., Espinoza, V., Hargather, M. J., "Multi-dimensional evolution of explosive product gas cloud, Part II: Gram scale charges", *APS Division of Fluid Dynamics Meeting*, Seattle, WA, 2019
19. Mier, F. A., Hill, S., Hargather, M. J., "Optical measurement of the interaction between outwardly oriented, steady gas jets", *APS Division of Fluid Dynamics Meeting* Seattle, WA, 2019
20. Hargather, M. J., Hassanalian, M., "Intelligent energetic systems engineering (INTENSE) REU", poster, *NSF Engineering Education and Centers Grantees Conference*, Washington, DC, 2019
21. Kimberley, J., Hargather, M. J., "Introduction to high-speed imaging for experimental mechanics applications", *Society of Experimental Mechanics Annual Conference*, Reno, NV, 2019
22. Forrest, E. C., Peguero, J. C., Hargather, M. J., Knepper, R., Tappan, A., Marquez, M., Vasiliauskas, J., Rupper, S., "Effect of microscale defects on shock and detonation propagation in pentaerythritol tetranitrate (PETN) films", *16th International Detonation Symposium*, Cambridge, MD, July 2018

TECHNICAL
CONFERENCE
PRESENTATIONS
(CONTINUED)

23. Taylor, B. D., Mai, C. L., Thornton, S. D., Paikoff, B. C., Winter, K. O., Hargather, M. J., Peiris, S., "Simulations and experiments of collaborative blast from multiple cylindrical charges", *Warheads and Ballistics Symposium*, Monterey, CA, July 2018
24. Hargather, M. J., Winter, K., Mai, Peiris, S., "Analysis of Mach stem formation in reflecting and multiple interacting explosions for enhanced blast effects", *Warheads and Ballistics Symposium*, Monterey, CA, July 2018
25. Witham, R., Elmer, W., Hare, D., Hargather, M. J., "Development of an affordable scaled test to study blast effects from hypersonic weapons", *Warheads and Ballistics Symposium*, Monterey, CA, July 2018
26. Hargather, M. J., Benalil, K., Bhakta, R., "Development of stereo schlieren image velocimetry", *APS Division of Fluid Dynamics Meeting*, Atlanta, GA, November 2018
27. Digregorio, S., Hargather, M. J., "Shock wave propagation and reflections in confined two- and three-dimensional geometries", *APS Division of Fluid Dynamics Meeting*, Atlanta, GA, November 2018
28. Winter, K. O., Hargather, M. J., Mai, C., L., "Analysis of irregular Mach reflections of explosively-driven shock waves from surfaces", *APS Division of Fluid Dynamics Meeting*, Atlanta, GA, November 2018.
29. Mier, F. A., Hargather, M. J., Ferreira, S., "Quantifying simulated venting flow from 18650 format lithium ion batteries with optical techniques", *APS Division of Fluid Dynamics Meeting*, Atlanta, GA, November 2018.
30. Mier, F. A., Hargather, M. J., Ferreira, S., "Simulated venting flow from 18650 format lithium ion batteries incorporating optical diagnostics, *Sandia Peer Review*, Poster, Santa Fe, NM, 2018.
31. Hargather, M. J., "Optical diagnostics for reactive fragment characterization", *JANNAF Reactive Materials Technical Exchange Meeting*, Eglin AFB, FL, October 2018.
32. Hargather, M. J., "Reactive imaging techniques for explosive testing", *Range Commander's Council, Optical Systems Group Meeting*, Las Cruces, NM, October 2018.
33. Bhakta, R., Hargather, M. J., Development of a low-cost multiple diode PIV laser for high-speed flow visualization, *APS Division of Fluid Dynamics Meeting*, Denver, CO, November 2017
34. DiGregorio, S., Lucero, C., Anderson, J., Hargather, M. J., Experimental study of explosively-driven shock wave propagation in scaled two-dimensional geometries, *APS Division of Fluid Dynamics Meeting*, Denver, CO, November 2017
35. Garcia, J. Hargather, M. J., Harrison, J. B., A comparison of microspheres and sediment drag using a Visual Accumulation Tube, *APS Division of Fluid Dynamics Meeting*, Denver, CO, November 2017
36. Mier, F. A., Hargather, M. J., Ferreira, S., Measurement of 18650 format lithium ion battery vent mechanism flow parameters, *APS Division of Fluid Dynamics Meeting*, Denver, CO, November 2017
37. Morales, R., Peguero, J., Hargather, M. J., Schlieren image velocimetry measurements in a rocket engine exhaust plume, *APS Division of Fluid Dynamics Meeting*, Denver, CO, November 2017
38. Winter, K., Hargather, M. J., Mai, C., Diggs, A., Peiris, S., High-speed, refractive imaging of multiple-charge shock-wave interactions and focusing, *JANNAF 48th Combustion Meeting*, Newport News, VA, December 2017

TECHNICAL
CONFERENCE
PRESENTATIONS
(CONTINUED)

39. Mier, F. A., Hargather, M. J., Ferreira, S., Determining the internal pressure in 18650 format lithium batteries under thermal abuse, *Electrical Energy Storage Applications and Technologies*, San Diego, CA, October 2017
40. Hargather, M. J., Winter, K., Mai, C., Diggs, A., Peiris, S., High-speed refractive imaging of air blast from multiple charges, *Warheads and Ballistics Symposium*, Monterey, CA, August 2017
41. Kimberley, J., Hargather, M. J., Thoma, S. G., Failure and fragmentation of pressed bi-metallic composites, *APS Shock Compression of Condensed Matter*, St. Louis, MO July 2017
42. Coultas-McKenney, C., Hargather, M. J., Analysis of sliding friction during controlled swipe sampling, *Trace Explosives Detection Workshop*, Santa Fe, NM, April 2017
43. Hargather, M. J., Smith, J. L., Anderson, J., Winter, K., Optical diagnostics for energetic materials research, *ASME IMECE*, Phoenix, AZ, November 2016
44. Anderson, J., Hargather, M. J., Optical diagnostics of turbulent mixing in explosively-driven shock tube, *APS Division of Fluid Dynamics*, Portland, OR, November 2016
45. Bhakta, R., Mier, F. A., Castano, N., Thackrah, J., Marquis, T., Garcia, J., Hargather, M. J., Measurement of steady and transient liquid coiling with high-speed video and digital image processing, *APS Division of Fluid Dynamics*, Portland, OR, November 2016
46. Coultas-McKenney, C., Winter, K., Hargather, M. J., High-speed schlieren imaging of rocket exhaust plumes, *APS Division of Fluid Dynamics*, Portland, OR, November 2016
47. Phillip, J., Morales, R., Youngblood, S., Hargather, M., Grubelich, M., Saul, W. V., Liquid rocket engine testing facility at New Mexico Tech, *APS Division of Fluid Dynamics*, Portland, OR, November 2016
48. Hargather, M. J., Overview of refractive imaging techniques for explosive testing, *National Energetic Materials Initiative Meeting*, Socorro, NM, August 2016
49. Hargather, M. J., Winter, K., Gogineni, S., Warhead characterization using multi-camera imaging of fragment and shock wave motion, *Warheads and Ballistics Symposium*, 2016
50. Hargather, M. J., Phillip, J., Youngblood, S. H., Saul, W. V., Grubelich, M. C., Development and testing of a nitrous-oxide/ethanol bi-propellant rocket engine, *AIAA Propulsion and Energy*, 2016
51. Hargather, M. J., Winter, K., Gogineni, S., Multi-camera diagnostics to measure shock wave and fragment motion in complex environments, *JANNAF 47th Combustion Meeting*, 2016
52. Anderson, J. A., Smith, J. L., Hargather, M. J., Optical diagnostics to quantify turbulent mixing in post-blast environment, *JANNAF 47th Combustion Meeting*, 2016
53. Mier, F. A., Hargather, M. J., Color gradient background oriented schlieren imaging, *68th APS Division of Fluid Dynamics Meeting*, 2015
54. Smith, J. L., Hargather, M. J., Experimental investigation of turbulent mixing in post-explosion environment, *68th APS Division of Fluid Dynamics Meeting*, 2015
55. Hargather, M. J., Armstrong, C., Analysis of shock wave propagation from explosives using computational simulations and artificial schlieren imaging, *67th APS Division of Fluid Dynamics Meeting*, 2014

TECHNICAL
CONFERENCE
PRESENTATIONS
(CONTINUED)

56. Hargather, M. J., Canafax, N. B., Explosive-driven shock wave interaction with a propane flame, *67th APS Division of Fluid Dynamics Meeting*, 2014
57. Smith, J. L., Youngblood, S. H., Hargather, M. J., New applications of focusing schlieren imaging, *67th APS Division of Fluid Dynamics Meeting*, 2014
58. Tobin, J., Hargather, M. J., Quantitative schlieren measurement of shock wave pressure profile, *66th APS Division of Fluid Dynamics Meeting*, 2013
59. Romo, C. P., Hargather, M. J., Background-oriented schlieren measurement of shock wave pressure profile, *66th APS Division of Fluid Dynamics Meeting*, 2013
60. Hargather, M. J., Rockwell, O., Characterization of a magnetohydrodynamic (MHD) shock sensor using schlieren imaging, *66th APS Division of Fluid Dynamics Meeting*, 2013
61. Hargather, M. J., Optical measurement of airblast shock wave parameters, *Shock and Vibration Symposium*, 2013
62. Hargather, M. J., Hussan, S., Quinlin, M., Jacomb-Hood, T., Francis, Z., Seneca, C., Fernando, R., Fluid dynamics dimensional analysis take-home experiment using paper airplanes, *ASEE Annual Conference*, 2013
63. Hargather, M. J., Thole, K. A., Characterization of fluid flow through porous metals, *ASME Turbo Expo*, 2013
64. Hargather, M. J., Settles, G. S., High-volume sampling for explosive trace detection, *Trace Explosives Detection Workshop*, 2011
65. Hargather, M. J., Settles, G. S., Laboratory-scale blast testing and research, *Gordon Research Conference, Energetic Materials*, 2010
66. Hargather, M. J., Settles, G. S., Recent developments in schlieren and shadowgraphy, *27th AIAA Aerodynamic Measurement Technology and Ground Testing Conference*, 2010
67. Hargather, M. J., Settles, G. S., Modern quantitative schlieren techniques, *63rd APS Division of Fluid Dynamics Meeting*, 2010
68. Hargather, M. J., Lawson, M. J., Settles, G. S., The aerodynamics of canine olfaction, *Gordon Research Conference, Detecting Illicit Substances: Explosives and Drugs*, 2009
69. Hargather, M. J., Lawson, M. J., Settles, G. S., Weinstein, L. M., Gogineni, S., Focusing-schlieren PIV measurements of a supersonic turbulent boundary layer, *47th AIAA Aerospace Sciences Meeting*, 2009
70. Hargather, M. J., Lawson, M. J., Settles, G. S., Schlieren velocimetry of turbulent flows, *38th AIAA Fluid Dynamics Conference*, 2008
71. Hargather, M. J., Settles, G. S., Background-oriented schlieren (BOS): Techniques and applications for multi-scale flow visualization and measurement, *61st APS Division of Fluid Dynamics Meeting*, 2008
72. Hargather, M. J., Settles, G. S., A midsummer-night's shock wave, *60th APS Division of Fluid Dynamics Meeting*, 2007
73. Hargather, M. J., Settles, G. S., Small-scale materials blast testing using gram-range explosives and air-shock loading, *59th APS Division of Fluid Dynamics Meeting*, 2006
74. Hargather, M. J., Settles, G. S., Determining the TNT equivalence of gram-sized explosive charges using shock-wave shadowgraphy and high-speed video recording, *58th APS Division of Fluid Dynamics Meeting*, 2005

STUDENT
ADVISING**Graduate Research Advising**

- Stewart Youngblood, PhD in Mechanical Engineering, Jan. 2018 – present, PhD expected May 2022
- Christian Peterson, PhD in Mechanical Engineering, June 2018 – present, PhD expected Dec. 2022
- Sivana Torres, PhD in Mechanical Engineering, May 2019 – present, PhD expected May 2023
- Veronica Espinoza, PhD in Mechanical Engineering, May 2020 – present, PhD expected May 2023
- Simone Hill, MS in Mechanical Engineering, May 2020 – present, MS expected May 2022
- Sean Palmer, MS in Mechanical Engineering, June 2020 – present, MS expected May 2022
- James Reeves, MS in Mechanical Engineering, Jan. 2021 – present, MS expected Dec. 2022
- Kailene Strebe, MS in Mechanical Engineering, June 2021 – present, MS expected May 2023
- Jason Falls, MS in Mechanical Engineering, June 2020 – Mar. 2022
- Kyle Winter, PhD in Mechanical Engineering, Jan. 2017 – May 2021, MS July 2018, PhD May 2021
- F. Austin Mier, PhD in Mechanical Engineering, Jan. 2017 – Sept. 2020, MS May 2018, PhD Sept. 2020
- Julio Peguero, MS in Mechanical Engineering, Jan 2018 – Sept. 2019
- Raj Bhakta, MS in Mechanical Engineering, Aug. 2016 – Oct. 2018
- Kyle Benalil, MS in Mechanical Engineering, Aug. 2017 – Sept. 2018
- Rudy Morales, MS in Mechanical Engineering, Jan. 2017 – Aug. 2018
- James Anderson, MS in Mechanical Engineering, Aug. 2015 – May 2017
- Joshua Smith, MS in Mechanical Engineering, Aug. 2014 – May 2016
- Stewart Youngblood, MS in Mechanical Engineering, Aug. 2013 – Sept. 2015
- Michael Shattuck, MS in Mechanical Engineering, Mar. 2012 – Jan. 2015
- Cynthia Romo, MS in Mechanical Engineering, Aug. 2012 – Dec. 2014
- Jesse Tobin, MS in Mechanical Engineering, Aug. 2012 – Aug. 2014
- Megan Tribble, MS in Mechanical Engineering, Aug. 2012 – May 2014

STUDENT
ADVISING
(CONTINUED)

Current Undergraduate Research Advising

- David Avalos-Violante, BS in Mechanical Engineering, June 2020 – present, BS expected Dec. 2022
- Maria D’Orazio, BS in Mechanical Engineering, Jan. 2022 – present, BS expected May 2023
- Logan Byrom, BS in Mechanical Engineering, Jan. 2022 – present, BS expected May 2023

Faculty Advisor for Mechanical Engineering Design Teams

- Sounding Rocket Fa 2016 – present, Fa 2012 – Sp 2014
- Owens Corning eLUGant Design Fa 2019 – Sp 2020
- RingIR Vapor Detection Fa 2018 – Sp 2020
- Energetic Materials 3D Printer Fa 2015 – Sp 2017
- Portable Drop Hammer Fa 2014 – Fa 2015
- Explosive Vapor Detection Fa 2014 – Sp 2015
- Rocket Engine Test Stand Fa 2013 – Sp 2014
- TATP Remote Synthesis Fa 2013 – Sp 2014
- Refrigeration Demonstration Fa 2013 – Fa 2014
- Battery Crush Tester Sp 2012 – Sp 2013
- Sacred Power Solar Collector Sp 2012 – Sp 2013

Academic Advisor for more than 15 current undergraduate Mechanical Engineering students

Member of more than 10 graduate committees at New Mexico Tech

TECHNICAL
WORKSHOP
LEADERSHIP

Founder and Lead Instructor, High-speed digital imaging techniques for blast and impact measurement workshop, June 2014 –present
Instructor, EMRTC High Explosives Principles and Applications course, March 2018 – present
Instructor, FEMA Science of Disasters short course, May 2013-2016

TECHNICAL
WORKSHOP
PARTICIPATION

Rocket Test Group Meeting, White Sands, New Mexico, Oct. 2015 Rocket Test Group Meeting, China Lake, California, Dec. 2014
 Trace Explosives Sampling for Security Applications, Boston, Massachusetts, Aug. 2014
 Trace Explosives Detection Workshop, Baltimore, Maryland, Apr. 2010.
 Counter IED Technology Assessment Workshop, US DHS, Nov. 2009
 Explosive Particle Sampling Workshop, US DHS Transportation Security Lab., Feb. 2009
 Fundamentals of Explosives Short Course, University of Rhode Island, May 2008

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- PROFESSIONAL MEMBERSHIPS American Society of Mechanical Engineers, Member 2001 – present
American Physical Society, Member 2005 – present
American Institute of Aeronautics and Astronautics, Senior Member 2008 – present
American Society for Engineering Education, Member 2010 – present
National Association of Rocketry, Member 2015 – present
International Pyrotechnic Society, Member 2020 – present
Society of Experimental Mechanics, Member 2021 – present
- SELECTED MEDIA APPEARANCES Los Alamos National Lab youtube channel, *Novel Rocket Design Flight Tested* Oct. 2014
Discovery Science Channel show *World's Strangest: Explosions*, June 2014
NPR Science Article “What does sound look like”, Apr. 2014
PBS Nova show *Cold Vase JFK*, Nov. 2013
PBS Nova show *Manhunt-Boston Bombers*, May 2013
- SELECTED UNIVERSITY SERVICE Chair of Faculty Senate, 2020 – present
NMT ASME student chapter advisor, 2017 – present
Member of Strategic Plan Executive Board, 2022 – present
Vice-Chair of Faculty Senate, 2018 – 2020
Mechanical Engineering Associate Department Chair, 2019-2020
Participant in President’s Leadership Retreat and BluePrint 2027 Strategic Plan, 2017 – present
Member of Academic Freedom and Tenure Committee, 2017 – 2020
Member of Regents Faculty Conference Committee, 2013 – 2015
Member of Computing on Campus Committee, 2015 – 2017
Organizer of Research Coffee Hour, 2013-2017
Student Living Learning Community course development and teaching, 2013 – 2015
Member of Collaborative Senior Capstone Course Development Committee, 2014 – 2016
Member of NMT 2015 – 2020 Strategic Planning Committee
Co-Chair of Community of Scholars Task Force, 2013 – 2014
Member of Space Allocation Committee, 2012 – 2014
Regularly attend Faculty Senate meetings at New Mexico Tech
- AWARDS Penn State College of Engineering “40 Under 40” Alumni Award, 2020
- EDITOR *Shock Waves*, Editorial Board Member, 2021 – present
- PEER REVIEWER *Experiments in Fluids*
International Journal of Impact Engineering
Flow Measurement and Instrumentation
Journal of Aerosol Science and Technology
Shock Waves
Propellants, Explosives, Pyrotechnics
Measurement Science and Technology
Ocean Engineering
Aerospace Science and Technology
Journal of Flow Visualization
AIAA Journal