JOHN PFAFF BORG, Ph.D., P.E., ASME Fellow

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PROFESSIONAL EXPERIENCE

(2017-present) **Mechanical Engineering Department Chair,** Marquette University
(2016-present) **Professor, (2008-2016) Associate Prof.** (with tenure)**, (2002-2008) Assistant Prof.,** Marquette
(1997-2002) **Lead Engineer (GS-13)**, Computational Physics Group – G24
Naval Surface Warfare Center- Dahlgren Division (NSWC-DD), Dahlgren, Virginia, 22448

EDUCATION

(1996-97) **Postdoctoral Fellow,** ***Cambridge University*** and ***Queen Mary College***, England
Hosted by: Professor Mike Gaster, FRS and Dr. William R. Graham
Topic: *Investigation of Secondary Vortex Structure in the Near Wake of a Circular Cylinder*
Funding Agent: NSF-International Research Fellow Award Program (IRFP): INT-9600313

(1992-96) **Doctor of Philosophy** in Mechanical Engineering, ***University of Massachusetts*** at Amherst
Supervisor: Dr. Robert H. Kirchhoff, Professor
Dissertation Title: *The Nonlinear Effect of Dynamic and Aerodynamic Imbalance on the Harmonic and Chaotic Motion of a Horizontal Axis Wind Turbine*
Funding Agent: U.S. Department of Energy contract: XL-1-11126-1

(1990-92) **Master of Science** in Aerospace Engineering ***University of Notre Dame***
Supervisor: Dr. Albin A. Szewczyk, Professor
Thesis Title: *The Unsteady Analysis of the Near Wake of a Bluff Body with Imposed Three-dimensionality*
Funding Agent: U.S. Navy contract: 2420-24539

(1985-90) **Bachelor of Science** Mechanical Engineering, ***University of Memphis***

SCHOLARSHIP AND AWARDS

2019-20 ***OPUS Outstanding Researcher of the Year Award,*** Marquette University, College of Engineering
2017 ***Faculty All Star***, Marquette University
2017 ***Haggerty Award for Research Excellence***, Marquette University Research Award
2017 ***ASME Fellow***, American Society of Mechanical Engineering (ASME)
2017 ***Best Poster*** – DTRA Review, Washington DC
2015-16 ***Teacher of the Year***, Department of Mechanical Engineering, Marquette University
2011-12 ***Fulbright Scholar***, Fraunhofer-Institut für Kurzzeitdynamik, Ernst-Mach-Institut, Freiburg, Germany
2011-12 ***Way Klingler Sabbatical Fellowship***, Marquette University Sabbatical Fellowship
2010-11 ***Outstanding Researcher of the Year Award,*** Marquette University, College of Engineering
2010 ***Summer Faculty Fellow***, Eglin Air Force Base
2009 ***Rising Star Award,*** Sigma Xi - Research Performed by a Junior Faculty Member
2009 ***Summer Faculty Fellow***, Eglin Air Force Base
2007 ***Ralph R. Teetor Educational Award***, Society of Automotive Engineering (SAE)
2006 ***Sandia Summer Faculty***, Sandia National Laboratory
2005-06 ***Teacher of the Year***, Department of Mechanical Engineering, Marquette University
2005-06 ***Higher Education Award***, Wisconsin Space Grant Consortium & NASA
2004-05 ***Teacher of the Year***, Department of Mechanical Engineering, Marquette University
2004 ***Visiting Academic***, Cambridge University, Cavendish Laboratory- Summer 2004
2004 ***Satellite Initiative Award***, Wisconsin Space Grant Consortium & NASA
2002-03 ***Teacher of the Year***, Department of Mechanical Engineering, Marquette University
2002-03 ***Summer Faculty Fellowship Award***, Marquette University
2000 ***Technical Achievement Award***, US Navy – Naval Surface Warfare Center (NSWC)
2000 ***Letter of Appreciation,*** US Navy – Naval Surface Warfare Center (NSWC)
1999 ***Technical Excellence Award***, US Navy – Naval Surface Warfare Center (NSWC)
1997 ***Technical Excellence Award***, US Navy – Naval Surface Warfare Center (NSWC)
1996-97 ***NSF International Research Fellowship (IRFP)*** *Postdoc at Cambridge University* and *QMW College*
1996 ***Engineering Design Competition, 2nd Place***, Boston Museum of Science

Courses Taught

Undergraduate	Graduate
Fundamentals of Engineering (FE)	Transport Phenomena
Mechanics of Materials	Shock Physics
Fluids Mechanics	Intermediate Fluids
Thermodynamics I and II	Turbulence
Heat Transfer	Hydrodynamic Stability

Graduate Students

GRADUATE RESEARCH

Graduate Student	Degree	Starting	Finishing	Financial Support
Post-Doctorial Students				
1. Adam Taylor		August 2019	June 2020	COE and AFOSR FA8651-16-2-0008
2. Ivy Jones		June 2018	June 2019	COE
3. Janaka Kosgolla		Sept 2014	May. 2016	ONR/STTR w/Oceanit, N00014-12-M-0362
Major Advisor or Co-Advisor				
1. Jack Borg	MSME	August 2020	May 2022	AFOSR: FA9550-18-1-0435
2. Mahbub, Rafee	PhD	June 2018	May 2022	AFOSR: FA9550-18-1-0435
3. Adam Delhi	MSME	Jan 2019	May 2021	ONR: N68335-17-C-0581
4. Sebastian Konewko	MSME	Jan. 2018	Ex. Aug 2019	AFOSR: FA8651-16-2-0008
5. Chris Johnson	MSME – 2018 PhD	May 2016	Ex. May 2021	Full RA: *SBIR Phase II: AF141-006; Contract No. FA9550-16-C-0007* Full RA: Sandia
6. Emilie Teitz	MSME	May 2016	May 2017	Departmental TA
7. Peter Sable	PhD-ME MSME	May 2016 Sept. 2015	Ex. May 2019 May 2016	SMART Fellow (DoD full ride) Full RA: DTRA Funding HDTRA1-09-1-0045
8. Jeff Lajeunesse	PhD-ME MSME	May 2015 June 2013	December 2018 May 2015	Full RA: DTRA Funding HDTRA1-15-1-0073 Full RA: AFOSR Funding FA9550-12-1-0128
9. Logan Beaver	MSME	June 2015	May 2017	Departmental TA: AY 2015-16 ONR/STTR N00014-12-M-0362: AY 2016-17
10. Nathaniel Helminiak	MSME PhD	May 2015	December 2017 May 2020	Department TA/HDTRA1-09-1-0045 AY15-16 DTRA HDTRA1-15-1-0073 AY 2016-17
11. Merit Schumaker	MSME	June 2013	May 2015	Full RA: AFOSR Funding FA9550-12-1-0128
12. Longhao Huang	PhD-ME MSME	Sept. 2013 Sept. 2010	Ex. May 2017 August 2013	Departmental TA/Self Funded Departmental TA
13. Andrew Van Voreen	MSME	May 2011	August 2013	Full RA: DTRA Funding HDTRA1-09-1-0045
14. Cullen Braun	MSME	Sept. 2009	August 2011	Departmental TA and DTRA Funding
15. Ken Jordan	PhD - ME	Sept. 2006	August 2011	NSF Funding NSF-CTS-05216. Navy Summer Support 2007. SMART Fellow (DoD full ride)
16. Aaron Ward	MSME	Jan. 2008	December 2011	Full RA: CORVID Technologies
17. Charles Hobson	MSME	Sept 2005	December 2010	None
18. Michael Morrissey	MSME	Sept. 2007	Dec. 2009	Departmental TA 2008 Summer Support WSGC
19. Drew Fraser	MSME	Jan 2007	Dec. 2009	Full RA: NSF Funding NSF-CTS-0521602
20. Andrew Lloyd	MSME	Sept. 2004	May 2006	Departmental TA Navy Summer Support 2004 and 2005
21. Joseph Hendricks (co-advise w/ Dr. Zitomer)	MSME	May 2003	June 2005	None
22. Thomas Downs	MSME	Sept. 2003	May 2005	Full RA: Startup Navy Summer Support
23. Andrew Conaty	MSME	Sept 2004	May 2006	None
24. David Grunmann	MSME	Sept 2003	May 2006	None

Committee Member				
1. David Wilson	MSME	May 2014	May 2016	None
2. Rui Gu	MSME	Summer 2012	May 2016	None
3. Nicholas A. Smith	MSME	Sept. 2011	Aug. 2013	None
4. Adam Kimmel	MSME	May 2007	Dec. 2011	None
5. Alex Polley	MSME	May 2007	Dec. 2011	None
6. Jeroen Valensa	MSME	May 2005	Dec. 2009	None
7. Mike Johnson	MSME	May 2007	Aug. 2009	None
8. Scott Piecuch	MSME	Sept. 2007	Dec. 2009	Full RA:NSF Funding NSF-CTS-0521602
9. Colin Bosman	MSME	Sept. 2005	Ex. May. 2010	None
10. Christopher Potokar	MSME	Jan. 2005	Ex. May. 2010	None
11. Jun Su	PhD – ME	Sept. 2003	Sept. 2007	None
12. Tony Bowman	PhD – ME	Sept 2001	Dec. 2007	None
13. Kwangjin Shin	PhD – ME	Aug. 2002	Dec 2006	None
14. Joseph Jacobsen	PhD - Business	Sept. 1999	May 2005	None
15. Dianqi Fang	MSME	Sept 2002	May 2004	None
16. Anand Vyas	PhD - ME	Sept. 2000	May 2003	None
17. David J. Garski	MSME	Jan. 1995	May 2003	None

UNDERGRADUATE RESEARCHERS DIRECTED

Student	Degree	Starting Date	Finishing Date	Financial Support
1. Nichole Snider	BSME	May 2022	Aug 2022	AFRL Grant: FA9550-18-1-0435
2. Marty Wall	BSME	May 2021	Aug 2021	AFRL Grant: FA9550-18-1-0435
3. Veronica Davalos	BSME	May 2019	Aug 2019	Mcnair Fellowship
4. Chaimaa Maghfour	BSME	May 2019	Aug 2019	McNair Fellowship
5. Marissa Dauner	BSME	May 2019	Aug 2019	AFRL Grant: FA9550-18-1-0435
6. Jack Borg	BSME	May 2019	Aug 2019	AFOSR Grant: FA8651-16-2-0008
7. Alex Dawson	BSME	May 2018	Aug 2018	DTRA Grant: HDTRA1-15-1-0073
8. Steven Snider	BSME	May 2018	Aug 2018	DTRA Grant: HDTRA1-15-1-0073
9. Lauren McMullen	BSME	May 2018	Aug 2018	DTRA Grant: HDTRA1-15-1-0073
10. Alex Dawson	BSME	May 2017	Aug 2017	DTRA Grant: HDTRA1-15-1-0073
11. Ashley Hatzenbihler	BSME	May 2016	Aug 2016	DTRA Grant: HDTRA1-15-1-0073
12. Elise Hahn	BSEE	May 2015	Aug 2015	Marquette Funded-SCL
13. Nathaniel Helminiak	BSME	May 2014	Aug 2014	Wisconsin Space Grant Consortium (WSGC)
14. David Helminiak	BSEE	May 2014	Aug 2014	Wisconsin Space Grant Consortium (WSGC)
15. John Traxler	BSME	May 2014	Aug 2014	Marquette Funded-SCL
16. Trent Wolff	BSME	May 2013	Aug 2013	AFOSR Funding FA9550-12-1-0128
17. Rebecca Jaeger	BMME	May 2013	Aug 2013	Marquette Funded-REU
18. Nathaniel Helminiak	BSME	May 2013	Aug 2013	Marquette Funded-REU
19. Erich Vlach	BSME	May 2013	Aug 2013	Marquette Funded-REU
20. Tara Ortner	CEME	May 2013	Aug 2013	Marquette Funded-REU
21. Jacquelyn Rank	BSME	May 2013	Aug 2013	Marquette Funded-REU
22. Jonathan Sobeck	BSME	May 2011	Sept. 2011	DTRA Grant: HDTRA1-09-1-0045
23. Jeff Midday	BSME	May 2009	Sept 2009	Tuition and stipend – NSF-CTS-05216
24. Stacey Erdmann	BSME	Spring 2008	May 2009	Tuition and stipend – NSF-CTS-05216
25. Cheryl Perich	BSME	Spring 2008	May 2009	Wisconsin Space Grant Consortium (WSGC)
26. Andrew Dolder	BSME	December 2006	May 2007	Stipend 01430-71508 (NSF)
27. Matthew Opgenorth	BSME	May 2005	May 2007	

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

1. Christopher R. Johnson; John P. Borg; C. Scott Alexander; Jeff W. LaJeunesse; Nathaniel S. Helminiak; Paul E. Specht "Flow Strength Measurements of Wrought and AM SS304L via Pressure Shear Plate Impact Experiments" Dynamic Behavior of Materials (under review)
2. Sable, P., Neel, C.H. and Borg, J.P. High Strain-rate Shear and Friction Characterization of Fully-Dense Polyurethane and Epoxy, **International Journal of Impact Engineering,** 103472, Dec. (2020) https://doi.org/10.1016/j.ijimpeng.2019.103472
3. Johnson, CR, [MUG] Sable, PA, [MUG] LaJeunesse, J, [MUG] Dawson, A., [MUUG] Hatzenbihler, A. [MUUG] and Borg, JP Photon Doppler Velocimetry Measurements of Transverse Surface Velocities **Review of Scientific Instruments**, 89, 063106 (2018); https://doi.org/10.1063/1.5006178
4. N. S. Helminiak [MUG], D. S. Helminiak [MUG], V. Cariapa [MU-MEEN] and J. P. Borg, Resolving Two Dimensional Angular Velocity within a Rotary Tumbler, https://doi.org/10.1007/s12650-018-0495-1 **Journal of Visualization**, Springer, May (2018)
5. Derrick, JG [Imperial College], Lajeunesse, JW[MUG]., Davison, TM. [Imperial College], Borg, JP and Collins, GS [Imperial College]. Mesoscale simulations of shock compaction of a granular ceramic: effects of mesostructure and mixed-cell strength treatment. **Modelling and Simulation in Materials Science and Engineering** 26 035009 (2018)
6. J. LaJeunesse [MUG], M. Schumaker[MUG], M. Hankin [Harvard], G. Kennedy[Georgia Tech], D. Spaulding[UC-Davis], J. Borg, S. Stewart[UC-Davis], N. Thadhani [Georgia Tech] Dynamic response of dry and water-saturated sand systems, **Journal of Applied Physics**, 122(1) 015901 (2017);
7. Braun, C.A [MUG], Schumacher, M., [MUG] Rice, J. [MU-MEEN] and Borg, J.P. *Comparison of Static and Dynamic Powder Compaction: Experiment and Simulation*. **ASME Journal of Engineering Materials and Technology,** 138(1), 011003, (12 pages) Oct 08, (2015)
8. Borg, J.P. and Morrissey, M.P., [MUG] *Aerodynamics of the Knuckleball Pitch: Experimental Measurements on Slowly Rotating Baseballs*, **American Journal of Physics**, Volume 82, No 10, pg. 921-27, Oct. 2014
9. Borg, JP, Maines, W. [Air Force] and Chhabildas, L, [Air Force] *Equation of State and Isentropic Release of Aluminum Foam & PVDF System,* **Journal of Applied Physics**, 115, 213515, (13 pages) 2014
10. Borg, J. and Vogler, T. [Sandia] *Rapid Compaction of Granular Material: Characterizing Two and Three-Dimensional Mesoscale Simulations* **Shock Waves**, DOI 10.1007/s00193-012-0423-6: 23(2) 2013, pg.153-176
11. Borg, J.P., Morrissey, M. [MUG] Perich, C. [MUUG] Vogler, TJ [Sandia] and Chhabildas, L. [Sandia] *In Situ Velocity and Stress Characterization of a Projectile Penetrating a Sand Target: Experimental Measurements and Continuum Simulations*. **Inter. J. of Impact Eng** 51, 2013, pg. 23-35
12. Vogler, T. J., [Sandia] Borg, J. P. and Grady, D. E. [ARA; company]*On the scaling of steady structured waves in heterogeneous materials*, **Journal of Applied Physics**, DOI: 10.1063/1.4768705 (2012)
13. Koch,J [MU]., Borg, J, Mattson, A. [MUG], Olsen, K. [MU-Dental School] and Bahcall, J. [MU-Dental School] An In Vitro Comparative Study of Intracanal Fluid Motion and Wall Shear Stress Induced by Ultrasonic and Polymer Rotary Finishing Files in a Simulated Root Canal Model. **ISRN Dentistry** Volume 2012, Article ID 764041, 2012, 6 pages
14. Jordan, JL, [Air Force] Sutherland, G, [Army] Herbold, EB, [Lawrence Livermore] Fraser, A, [MUG] Borg, J and Richards, DW [Air Force], *Shock Equation of State of Multi-Constituent Epoxy-Metal Particulate Composites,* **Journal of Applied Physics**, 109, 013531, 2011
15. Borg, JP and Vogler, TJ [Sandia] *Aspects of simulating the dynamic compaction of a granular ceramic.* **Modelling and Simulation in Materials Science and Engineering**. **17**, 045003, pg 1-22, 2009.
16. Borg, JP and Vogler, TJ, [Sandia] *Mesoscale Simulations of a Dart Penetrating Sand*, **Inter. J. of Impact Eng**., 35(12) pg 1435-1440, Dec. 2008
17. Borg, J.P. and Vogler, T. [Sandia] *Mesoscale Calculations of the Dynamic Behavior of a Granular Ceramic.* **International Journal of Solids and Structures** 45, pg. 1676–1696, 2008
18. Borg, J.P. and Zitomer, D.H. [MU-CEEN], *Dual -Team Model for Implementing Student International Engineering Service-Learning: Remote Solar Water Pumping in Guatemala*, **ASCE-Journal of Professional Issues in Engineering Education and Practice** (J. Prof. Iss. Eng. Ed. Pr.) EI/2006/023732, 134(2), April 2008
19. Borg, J.P. and Cogar, J.R. [Corvid Technologies; Company] *Comparison of Average Radial Expansion Velocity from Impacted Liquid Filled Cylinders*, **Inter. J. of Impact Eng.**, 34 (6), pg. 1020-1035, June 2007
20. Borg, J., Cogar, J.R., [Navy] Lloyd, A., [MUG] Ward, A., [MUG] Chapman, D., [Cambridge Univ.] Tsembelis, K., [Cambridge Univ.] and Proud, W. G., [Cambridge Univ.] *Computational Simulations of the Dynamic Compaction of Porous Media*, **Inter. J. of Impact Eng,** 33, pg. 109–118, 2006

21. Borg, J., Bartyczak, S. [Navy], Swanson, N., [Navy] and Cogar, J. [Navy] *Impact and Dispersion of Liquid Filled Cylinders,* **ASME J. Fluids Eng.** Vol. 128, No. 6, pg. 1295-1307, 2006
22. Borg, J., Downs, T. [MUG] and Lloyd, A. [MUG] *High Strain Rate Fragmentation of Liquid Systems at Atmospheric Pressure*, **Inter. J. of Impact Eng.,** 33, pg. 119–125, 2006
23. Borg, J.P., Chapman, D., [Cambridge Univ.] Tsembelis, K., [Cambridge Univ.] Proud, W. G. [Cambridge Univ.], and Cogar, J.R. [Navy] *Dynamic Compaction of Porous Silica Power,* **J. Applied Physics,** vol. 98 (7), pg. 073509:1-7, 2005.
24. Borg, J.P., Grady, D. [ARA; Company] and Cogar, J.R. [Navy] *Instability and fragmentation of expanding liquid systems* **Inter. J. of Impact Eng.**, vol. 26, pg. 65-76, 2001
25. Borg, J.P. and Kirchhoff, R.H. [PhD Advisor] *Chaotic Dynamics of a Horizontal Axis Wind Turbine: Yaw and Teeter Motion* **Wind Engineering**. vol. XXII No. 1, pg. 17-30, 1998.
26. Borg, J.P. and Kirchhoff, R.H. [PhD Advisor] *Mass and Aerodynamic Imbalance of a Horizontal Axis Wind Turbine* **ASME J. Solar Energy Eng.,** Volume 120 (1), pg. 66-74, Feb 1998.
27. Borg, J.P. and Kirchhoff, R.H. [PhD Advisor] *The Effects of Static and Dynamic Imbalance it on a Horizontal Axis Wind Turbine* **ASME J. Solar Energy Eng.,** Volume 119 (3), pg. 261-262, Aug 1997.

MU - Faculty, MUG - Marquette Graduate Student and MUUG - Marquette Under-graduate

REFEREED CONFERENCE PROCEEDINGS

1. CR Johnson, S Alexander, B Farfan, J Borg, P Specht Investigating Process-Structure-Property Relations of Shock Loaded Wrought and Additively Manufactured 304L Stainless Steel Bulletin of the American Physical Society 672022, (2022)
2. R Mahbub, J Borg, J Borg, R Coutu Investigating the dynamic response of heterogeneous mixtures with variable geometric complexity Bulletin of the American Physical Society 672022, (2022)
3. N Helminiak, J Borg The Equation of State and Strength Properties of Copper Mountain Sandstone Bulletin of the American Physical Society 672022, (2022)
4. J Borg, J Borg Additively Manufactured Granular and Binder Metamaterial's Response To Shock
5. APS March Meeting Abstracts 2022, K24. 0112022, (2022)
6. R Mahbub, J Borg, R Coutu, J Borg Dynamic behavior of crystal energetic material (sugar) under uniaxial plate impact configuration APS March Meeting Abstracts 2022, N24. 0032022, (2022)
7. CR Johnson, JP Borg, CS Alexander A direct comparison of transverse velocimetry techniques using photon Doppler velocimetry (PDV) in oblique impact experiments AIP Conference Proceedings 2272 (1), 060020
9. Sebastian A. Konewko and John P. Borg Shape charge automated design: Applying DAKOTA to kinetic energy optimization **AIP Conference Proceedings 2272**, 070021 (2020); https://doi.org/10.1063/12.0000856
10. Christopher R. Johnson, John P. Borg, and C. Scott Alexander A direct comparison of transverse velocimetry techniques using photon Doppler velocimetry (PDV) in oblique impact experiments **AIP Conference Proceedings** 2272, (2020); https://doi.org/10.1063/12.0000883
11. Jeff W. La Jeunesse, Peter A. Sable, and John P. Borg Uncertainty Analysis for Transverse Surface Velocity Measurements **AIP Conference Proceedings** 2272, (2020); https://doi.org/10.1063/12.0000875
12. Nathaniel S. Helminiak and John P. Borg Uniaxial Wave Propagation Through Copper Mountain Sandstone **AIP Conference Proceedings** 2272, (2020); https://doi.org/10.1063/12.0000937
13. Peter A. Sable, Christopher H. Neel, and John P. Borg Dynamic Strength and Friction Behavior of Thermosetting Polyurethane and Epoxy, **AIP Conference Proceedings** 2272, (2020) https://doi.org/10.1063/12.0001029
14. Peter Sable and John P. Borg, Mechanical Behavior of Thermosetting Polymers Undergoing High Strain-Rate Impact Proc. **ASME. IMECE2019**, Volume 9: Mechanics of Solids, Structures, and Fluids, V009T11A021, 2019
15. *Peter Sable, John P. Borg, Mechanical Behavior of Thermosetting Polymers Undergoing High Strain-Rate Impact Proc. ASME.* IMECE2019, Volume 9: Mechanics of Solids, Structures, and Fluids, V009T11A021, November 11–14, 2019
16. Beavers, *L., Borg, J.P and Kleiser, G..* A Computational Framework for the Design and Optimization of Explosives, **Proceedings of the 30th International Symposium on Ballistics**, Hunting Beach CA, 2017
17. C. R. Johnson, J. LaJeunesse, P. Sable, A. Hatzenbihler and John P. Borg Photon Doppler Velocimetry Measurements of Transverse Surface Velocities, **Proceedings from 20th APS-SCCM-Shock Compression of Condensed Matter – 2017,** St. Louis, MO
18. John P. Borg, Projectile Penetration into Sand Targets, **Proceedings from 20th APS-SCCM-Shock**
19. J. LaJeunesse, John Borg, Sarah Stewart and Naresh Thadhani. Investigating the shock response of dry and water-saturated sand: flyer-plate experiments and mesoscale simulations, **Proceedings from 20th APS-SCCM-Shock Compression of Condensed Matter – 2017,** St. Louis, MO
20. LaJeunesse, J. [MUG], Schumaker, M.G., [MUG] Stewart, S.T. and Borg, J.P. Resolving the Dynamic Response of Sand, **International Workshop on Dynamic Behaviour of Structures and Materials**, London England, Aug. 2015

21. LaJeunesse, J. [MUG], Stewart,S. Kennedy, G., Thadhani and Borg, J. Investigating Velocity Spectra at the Hugoniot State of Shock Loaded Materials **Proceedings from 19th APS-SCCM-Shock Compression of Condensed Matter – 2015,** 60(8), 2015, Tampa Fl
22. Borg, J and Sable, P. [MUG] In situ Characterization of Projectile Penetration into Sand Targets **Proceedings from 19th APS-SCCM-Shock Compression of Condensed Matter-2015,** 60(8), 2015, Tampa Fl
23. Schumaker, M. [MUG] Stewart, S., Borg, J. Stress and Temperature Distributions of Individual Particles in a Shock Wave Propagating through Dry and Wet Sand Mixtures, **Proceedings from 19th APS-SCCM-Shock Compression of Condensed Matter-2015,** 60(8), 2015, Tampa Fl
24. Sable, P., [MUG] Borg, J., LaJeunesse, J., [MUG] Schumaker, M., [MUG] Kennedy, G., and Thadhani, N. Dynamic Compaction of Yttria-Stabilized Zirconia with the addition of Carbon Nanotubes **Proceedings from 19th APS-SCCM-Shock Compression of Condensed Matter-2015,** 60(8), 2015, Tampa Fl
25. LaJeunesse, M., [MUG] Borg, JP and Martin, B. Simulating the Planar Shock Response of Concrete, **SEM Proceedings of the 2014 Annual Conference on Experimental and Applied Mechanics**, Ed. Bo Song, Daniel Casem and Jamie Kimberly, Volume 1, pg 369-378. 2014 (http://www.springer.com/series/8922)
26. Schumaker, M., [MUG] Borg, JP, Kennedy, G. and Thadhani, N. Mesoscale Simulations of Dry Sand, **SEM Proceedings of the 2014 Annual Conference on Experimental and Applied Mechanics**, Ed. Bo Song, Daniel Casem and Jamie Kimberly, Volume 1, pg 379-388. 2014 (http://www.springer.com/series/8922)
27. Borg, J. Van Vooren, A., [MUG] Sandusky, H. and Felts, J., Sand Penetration: A Near Nose Investigation of a Sand Penetration Event, Dynamic Behavior of Materials, Volume 1 **Proceedings of the 2013 Annual Conference on Experimental and Applied Mechanics**, Song, Bo; Casem, Dan; Kimberley, Jamie (Eds.) p. 452. Chicago, 2013
28. Borg, J.P., Maines, W. R., Nixon, M. and Chhabildas, L., Equation Of State And Isentropic Release of Aluminum Foam and Fluoropolymer Composites, **Proceedings of the 11th Hypervelocity Impact Symposium**, Procedia Engineering, Volume 58, 2013, Pages 299–308
29. Van Vooren, A. [MUG], Borg, J., Sandusky, H. and Felts, J., Sand Penetration: A Near Nose Investigation of a Sand Penetration Event, **Proceedings of the 11th Hypervelocity Impact Symposium**, Procedia Engineering, Volume 58, 2013, Pages 601–607.
30. Borg, J.P., Braun, C. [MUG] Fraser, A., [MUG] Sobeck, J. [MUUG] and Van Vooren, A. [MUG] Ballistic Penetration of Sand With Small Caliber Projectiles. **Proceedings from 17th APS-SCCM-Shock Compression of Condensed Matter – 2011,** Elert, Buttler, J. Borg, J. Jordan, and T. Vogler, eds., AIP Conference Proceedings vol. 1426, New York, 2012
31. Jordan, K. and Borg, J.P. Resolving the Shock Wave Profile in Viscous Fluids. **Proceedings from 17th APS-SCCM-Shock Compression of Condensed Matter – 2011,** M. L. Elert, W. T. Buttler, J. P. Borg, J. L. Jordan, and T. J. Vogler, eds., AIP Conference Proceedings vol. 1426, New York, 2012
32. Braun C. [MUG] and Borg, J.P. One-Dimensional Strain Initiated by Rapid Compaction of a Heterogeneous Mixture. **Proceedings from 17th APS-SCCM-Shock Compression of Condensed Matter – 2011,** M. Elert, W. Buttler, J. P. Borg, J. Jordan, and T. Vogler, eds., AIP Conference Proceedings vol. 1426, New York, 2012
33. Warren Maines , Christopher Neel , Lalit Chhabildas, Borg, J.P. and Reinhart, W. Shock Compression and Release of Metal Foam. **Proceedings from 17th APS-SCCM-Shock Compression of Condensed Matter – 2011,** Elert, Buttler, Borg, Jordan, and Vogler, eds., AIP Conference Proceedings vol. 1426, New York, 2012
34. Borg, J.P. and Chhabildas, Lalit C., Three-Dimensional Dynamic Loading Simulations of Granular Sand, **Proceedings of the 11th Hypervelocity Impact Symposium**, 2010
35. Vogler, T., Grady, D. and Borg, J., Scaling Relationships for Large Amplitude Waves in Heterogeneous Materials, **16th U.S. National Congress of Theoretical and Applied Mechanics**, State College, PA, June, 2010
36. Fraser, A., [MUG] Borg, J, Jordan, J., and Sutherland, G., Micro-Mechanical behavior of Al-MnO2-Epoxy under shock loading. in **DYMAT 2009 - 9th International Conferences on the Mechanical and Physical Behaviour of Materials under Dynamic Loading**, Brussels, Belgium, vol. , 2009, pp. 1575-1582, published by EDP Sciences (www.dymat-proceedings.org).
37. Borg, JP and Vogler, TJ, The Effect of Water Content on the Shock Compaction of Sand, in **DYMAT 2009 - 9th International Conferences on the Mechanical and Physical Behaviour of Materials under Dynamic Loading**, Editor S. Hiermaier (Ed.) published by EDP Sciences, Brussels, Belgium, vol. , 2009, pp. , 1545-1552, (www.dymat-proceedings.org). ISBN: 978-2-7598-0757-4
38. Borg, JP, Vogler, TJ and Fraser, A. [MUG] A Review Of Mesoscale Simulations Of Granular Materials **16th APS Topical Conference On Shock Compression of Condensed Matter**, Nashville TN July 2009, pg 1331-1336
39. Jordan K [MUG] and Borg J. Equation of State Development as Applied to Extremely Porous Heterogeneous Materials, **16th APS Topical Conference On Shock Compression of Condensed Matter**, Nashville TN July 2009, pg. 1353-1356.

40. Fraser [MUG] and Borg. The Effect of Nano-Particles on the One-Dimensional Shock Compaction of Al-MnO_2-Epoxy Mixtures, **16th APS Topical Conference On Shock Compression of Condensed Matter**, Nashville TN July 2009, 61-64
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BOOK CHAPTERS

1. J.P. Borg, Mesoscale Dynamics, as a book chapter in *a* by, **Springer**, (in press set for early 2017)
2. J.P. Borg, J.P., Van Vooren, A. and Morrissey, M. In Situ Characterization Of Projectile Penetration Into Sand, as a book chapter in *Rapid Penetration into Granular Media* by Magued Iskander, **Elsevier**, 38 page manuscript, (in press set for July 2015)
3. Zitomer, D., Olson, L., and Borg, J.P., *International Service Learning at Marquette University: Process for Better Integration of Catholic Beliefs and Ideas into Engineering Education*, within Engineering Education and Proactive Editor Jim Heft, **Notre Dame Press**, 2011

EDITORIAL VOLUMES

1. Elert, M. L. Buttler, W. T. Borg, J. P. Jordan, J. L. and Vogler, T. J. Shock Compression of Condensed Matter – 2011, **AIP Conference Proceedings vol. 1426, New York, 2012**

GOVERNMENTAL TECHNICAL REPORTS

1. Cogar, J., Borg, J., Cambray, G., Howells, D., Robinson, N., Tonkin, N., Wallington, P., Siddall, J., "Hypervelocity Impact Studies - The Post Impact State of Thickened Fluids", United Kingdom Defense Science Technology Laboratory Report **Dstl CR11042**, June 2004.
2. Nance, R., Robinson, D., Borg, J.P., Ormsby, W. and Cogar J. *Independent Validation and Verification of Hydrocodes for High-Speed Impact Experiments* **NSWCDD/TR-01/93** July 2001 Dahlgren Virginia
3. Borg, J.P., Small, T.M. and Cogar, J.R. *Test Plan for Glancing Impacts on Fluid-Filled Metal Containers* **SMPO Pub 020800** October 2000 Dahlgren Virginia
4. Borg, J.P. and Yagla, J *Subsonic Projectile Impacting Liquid Filled Targets* **NSWCDD/TR-00/88** October 2000 Dahlgren Virginia.
5. Borg, J.P. and Clifford, C.P. *Investigation of the ESSM Quad Pack Canister Mk 8 Explosive Bolt***, NSWCDD/TR-00/94**, Dahlgren Virginia, pg. 1-27, September 2000
6. Borg, J.P. and Yagla, J. *Fast Cook-Off Simulation and Experiment for a Concentric Canister Launcher*, **NSWCDD/TR-99/122**, pg. 1-75, September 2000
7. Borg, J.P. *Introduction to Hydrodynamic Instability: Application of Rayleigh-Taylor Instability Applied to an Expanding Shell***, NSWCDD/TR-00/11**, Dahlgren Virginia, pg. 1-47, June 2000
8. Borg, J.P. and Cogar, J.R. *Fluid-Slit Interaction*, **NSWCDD/TR-99/92**, Dahlgren Virginia, pg. 1-36, May 2000
9. Ference, S.L., Borg, J.P. and Cogar, J.R. *Source Term Investigation of TBM Bulk Chemical Target Intercepts: Phase I1 Test Report*, **NSWCDD/TR 99-83**, Dahlgren Virginia, pg. 1-83, May 2000
10. Ference, S.L., Borg, J.P. and Cogar, J.R. *Source Term Investigation of TBM Bulk Chemical Target Intercepts: Phase 1 Test Report*, **NSWCDD/TR 99-82**, Dahlgren Virginia, pg. 1-60, May 2000
11. Borg, J.P., Cogar, J.R. and Ference, S.L., *Source Term Investigation of TBM Bulk Chemical Intercepts: Computational Analysis and Test Data Review,* **NSWCDD/TR-00/3**, Dahlgren Virginia, pg. 1-103, February 2000
12. Borg, J.P. *Dimensional Analysis of the Penetration Dynamics of Spherical Projectile Impacts on a Bulk Liquid Target,* **NSWCDD/TR-99/154**, Dahlgren Virginia, pg. 1-18, January 2000

13. Borg, J.P. and Cogar, J.R. *Standard Missile-3 Third Stage Rocket Motor Barrier Deployment: Computational Results*, **SMPO Pub 031298**, pg. 1-15, December 1998
14. Ference, S.L., Borg, J.P. and Cogar, J.R. *Test & Analysis Plan for Source Term Investigation of TBM Bulk Chemical Target Intercepts,* **SMPO Pub 010698**, Dahlgren Virginia, pg. 1-23*,* June 1998

UN-REFEREED CONFERENCE PRESENTATIONS

1. LaJeunesse, J. and Borg, J. Dynamic Behavior of Earth Materials Subjected to Pressure-Shear Loading**,** **67th Meeting of the Aeroballistic Range Association**, 2-7 October 2016, Toledo, Spain
2. LaJeunesse, J. and Borg, J. Dynamic Construction and Characterization of a Single Stage Dual Diaphragm Gun**,** **67th Meeting of the Aeroballistic Range Association**, 2-7 October 2016, Toledo, Spain
3. Borg, J.P. and Vogler, T.J. **Meso-scale Hydrodynamic Calculations Of Porous Granular Material,** TMS Annual Meeting and Exhibition, Orlando, Florida, February 2007
4. Borg, JP and Lloyd, AN. Aeroballistic and Shock Phenomenology, **WSGC Annual Conference**, Milwaukee WI, pg. VI:1-7, Aug. 2006
5. Borg, J. and Lloyd, A., Cogar, J.R., Chapman, D., and Proud, W. G., *Computational Simulations of the Dynamic Compaction of Porous Media*, **Hypervelocity Impact Symposium,** Lake Tahoe, CA, Oct 2005
6. T. J. Downs and John P. Borg, *Development of a Velocity Measurement System Using Laser and Photodiodes For Use in a Light Gas Gun*, **WSGC Annual Conference**, Madison WI, pg. IX:9-16, Aug. 2005
7. Borg, J. and Downs, T. *Design, construction and operation of a light gas gun,* **APS 58th Annual Meeting of the Division of Fluid Dynamics**, Chicago, IL, Nov. 20-22, 2005
8. Borg, J., Downs, T. and Lloyd, A. *High Strain Rate Fragmentation of Liquid Systems at Atmospheric Pressure*, **Hypervelocity Impact Symposium,** Lake Tahoe, CA, Oct 2005
9. Borg, J.P. *Light Gas Gun Development for High Strain rate material Testing* **WSGC Annual Conference,** Lacrosse, WI, pg. V:27-35, Aug. 2004
10. Borg, J.P. *Breakup of planar stretched liquid sheets*, **2003 Corporate Lethality Program Review,** Sandia National Laboratory, May 20, 2003

UN-REVIEWED CONFERENCE PRESENTATIONS

11. Borg, J.P., Grady, D. and Cogar, J.R. *Instability and fragmentation of expanding liquid system* **Hyper Velocity Impact Symposium**, Galveston TX, Nov 6-10, 2000
12. Borg, J.P., *Experimentally Observed Fluid Expansion Compared to Hydrodynamic Computational Analysis*, **Ballistic Missile Defense Organization (BMDO) - Lethality Review**, Columbus OH, September 13-17, 1999
13. Borg, J.P., *Fluid-Slit Interaction* **Ballistic Missile Defense Organization (BMDO) Annual Meeting - High Altitude Working Group**, Huntsville AL, May 11-13, 1999
14. Borg, J.P., *Phenomenology of fluid expansion after being impacted by a high speed projectile* **Ballistic Missile Defense Organization (BMDO) Annual Meeting - High Altitude Working Group**, Huntsville AL, May 11-13, 1999

PROFESSIONAL SOCIETIES AND MEMBERSHIPS

Organization	**Offices Held**
Aeroballistics Range Association	Institutional Representative, Conference Host 2019
Sigma Xi – The Scientific Research Society	
American Physical Society (APS)	Outgoing Chair (2022-2023), Chair (2021-2022) Vice Chair (2019-2020) Conference Organizer (2011 APS-Shock Compression of Condensed Matter) Subcommittee for Invited Speakers, 2009 SCCM Conference Nomination Committee Member for Topical Group SCCM (2006-08)
American Society of Mechanical Engineering (ASME)	Marquette Institutional Representative & Faculty Advisor Faculty Advisor (Fall 05 - Present)
Engineers Without Borders (EWB)	Faculty Advisor (2005-2007)
Hypervelocity Impact Society (HVIS)	Special Editor (2022) Educational Outreach Chair (2016) Technical Committee - 2012 Baltimore Conference
Society of Automotive Engineering (SAE)	

INVITED TALKS AND COLLOQUIA

Venue	Title	Location	Date(s)
American Physical Society SCCM Conference - Ballistics studies	Projectile Penetration into Sand Targets	St. Louis, MS	7/12/17
Hopkins Extreme Materials Institute, John Hopkins University	Developing Photon Doppler Velocimetry Techniques for pressure shear configurations	Baltimore, MD	11/11/16
LLNL *Workshop on the Kinetic Response of Materials at Extreme Conditions*	Discussion leader: Mesoscale Response	Livermore, CA	8/22-24/16
Air Force Workshop on "Dynamics of Heterogeneous Materials"	Mesoscale Modeling and Simulation	Arlington, VA	9/23/15
California Institute of Technology, **GALCIT Colloquium**	Dynamic Simulations of Mesoscale Phenomena	Pasadena, CA	5/23/14
Air Force Research Laboratory Eglin Air Force Base	Peridynamics: Dynamic Behavior of Granular Brittle Material	Eglin, FL	12/18/12
Geological Society of America Annual Meeting	Direct Simulation of Shock and Release Processes in Geological Materials	Charlotte, NC	11/1012
KIT Mechanics Seminar Karlsruher Institut für Technologie (KIT) Institut für Technische Mechanik	Mesoscale Simulations of Heterogeneous Simulations Undergoing Dynamic Loading	Karlsruh, Germany	5/10/12
58th Annual Berlin Seminar for American Fulbright Scholars	Kurzzeitdynamik: Physics in the Blink of an Eye	Berlin, Germany	3/ 21/12
Imperial College London Institute for Shock Physics, Invited Lecturer	Mesoscale Modeling	London, England	2/23/12 2/24/12
European Office of Aerospace Research and Development (EOARD)	Mesoscale Simulations: Approach and Applications	London, England	February 23, 2012
US Air Force Workshop on "High-Rate Deformation Physics of Heterogeneous Materials"	Mesoscale Response of Heterogeneous Materials: Simulation and Experiment"	Washington, DC	28 July 2011
Livermore National Laboratory Particulate Mechanics in Extreme Environments Workshop	Dynamic Compaction of Heterogeneous Material	Livermore, CA	Sept. 23, 2010
International Shock Wave Institute The Shock and High Strain Rate Properties of Matter - ISWI2010	Dynamic compaction of Aluminum Foam	Cambridge, England	Sept. 7, 2010
TCG-XI Penetration Technology	Penetration Dynamics of Lose Dry Granular Material	Picatinny Arsenal, NJ	4/8/10
Purdue University The AAE Spring 2010 Colloquium Series	Two and three-dimensional compaction of porous heterogeneous materials	West Lafayette, IN	3/25/10
The Royal Society London Institute of Shock Physics,	A comparison of two and three dimensional multi-scale simulations as applied to porous heterogeneous materials	London, England	02/22/10
American Physical Society SCCM Conference	A Review of Mesoscale Simulations of Granular Materials	Nashville, TN	07/02/09
Army Corps of Engineers Eng. Research and Development Center	Experiments and Simulations of Heterogeneous Materials	Vicksburg, MS	02/10/09
Air Force Office of Scientific Research Particulate Mechanics in Extreme Environments Workshop	Mesoscale Simulations and Experiments of a Dart Penetrating Sand	University of Florida	January 29, 2008
Air Force Office of Scientific Research Particulate Mechanics in Extreme Environments Workshop	Dynamic Behavior of Porous Granular Materials	University of Florida	01/23/07
Sandia National Laboratory	Dynamic Compaction of Porous Silica Powder	Albuquerque	3/5/06

GRANTS AND PROPOSALS

AWARDED PROPOSALS - EXTERNAL

Date	Sponsor	Project Title	Role
In Procs.	AFOSR	DURIP	Borg, PI
10/19-9/22	National Science Foundation	ADVANCE: Moving Beyond Boundaries to Promote Inclusive Faculty Success : NSF-1936148	Hossenlopp, PI Ababei , *et. al.*, Co-PI Borg, Participant
1/19	Sandia National Laboratories	Micromechanics of Additively Manufactured Materials under Complex Dynamic Loading Purchase Order: 1995285	Borg, PI
2/19	Office of Naval Research (ONR)	Estimating Acoustic Noise Generated by a Supersonic Flow With Entrained Solid Particles within a Nozzle SBIR Phase II with Oceanit Labs: N68335-17-C-0581	Borg, PI
9/18-9/23	Air Force Office of Sponsored Research (AFOSR)	Connecting Experiments and Simulations while Designing Functionality into the Dynamic Behavior of Surrogate Energetic Systems FA9550-18-1-0435 AFRL-BAA-AFRL-AFOSR-2016-0007-v3	Borg, PI, Ron Coutu, Co-Pi Simcha Singer, Co-Pi Somesh Roy, Co-Pi Jon Fleischmann, Co-Pi
4/16-4/18	United States Air Force	AF10-BT26: Shockwave Consolidation of Materials SBIR Phase II with Oceanit Laboratories	Borg, PI
5/16-4/19	Air Force Research Laboratory (AFRL)	A Parametric Evaluation of An Exploding Cylinder FA8651-16-2-0008	Borg, PI
10/15-4/18	Defense Threat Reduction Agency (DTRA)	Resolving the Dynamic Behavior of Earth Materials Using a Pressure Shear Configuration HDTRA1-15-1-0073	Borg, PI Argon National Lab-Co-PI
10/13-4/15	Office of Naval Research	US Navy Dive Helmet Noise Quieting ONR/STTR w/Oceanit, N00014-12-M-0362	Borg, PI
10/12-10/15	Air Force Office of Sponsored Research	Dynamic High-Pressure Behavior of Hierarchical Heterogeneous Geological Materials FA9550-12-1-0128	Borg,Co-PI, Thadhani, Georgia Tech , PI and Stewart Harvard, Co-PI
04/12-04/14	Defense Threat Reduction Agency (DTRA)	Phase II: Penetration into Granular Earth Materials (Topic H): A Multi-scale Physics-Based Approach Towards Developing a Greater Understanding of Dynamically Loaded Heterogeneous Systems HDTRA1-09-1-0045 (Renewal)	Borg,PI
09/11-03/12	Fulbright Commission	Dynamic Response of Heterogeneous Systems: A Mesoscale Approach	Borg,PI
1/09-12/10	Air Force Office of Sponsored Research	Multi-scale mechanical simulations of granular material under rapid loading conditions FA8651-09-1-0011	Borg,PI
01/09-12/11	Defense Threat Reduction Agency (DTRA)	Phase II: Penetration into Granular Earth Materials (Topic H): A Multi-scale Physics-Based Approach Towards Developing a Greater Understanding of Dynamically Loaded Heterogeneous Systems HDTRA1-09-1-0045	Borg,PI
8/09-10/09	Department of Energy: Sandia National Laboratories	Mesoscale simulations of shock compaction of granular ceramics, Phase III DOE-SOW-888224	Borg, PI
5/08-5/09	Corvid Technologies	Improved Computational Modeling of Hypervelocity Impact Flash Phenomena	Borg,PI
12/07-5/08	Department of Energy: Sandia National Laboratories	Mesoscale simulations of shock compaction of granular ceramics, Phase II DOE-SOW-888224	Borg, PI
9/07-9/08	KERN Family Foundation	Student Transformation through Innovation Exercises	Schimmels , PI Borg, Rice, Corliss, Co-PI
2/07-9/07	Department of Energy: Sandia National Laboratories	Mesoscale simulations of shock compaction of granular ceramics DOE-SOW-888224	Borg, PI

8/06-7/09	National Science Foundation-Office of Naval Research	Impact and Shock Effects on Nanoscale Multi-Phase Energetic Materials NSF-CTS-0521602	Borg, PI Koch, Co-PI Goldsborough, Co-PI
9/04-8/06	National Science Foundation	Acquisition of a Linux Cluster to Support College-wide Research & Teaching Activities, NSF-CTS-0521602	Goldsborough, PI Borg, Co-PI
4/04-8/04	Missile Defense Agency (MDA)	Bulk Chemical Breakup: A Predictive Capability Validation, N00178-04-M-1075	Borg, PI
1/04-9/06	National Science Foundation	Acquisition of High Speed Camera and Instrumentation Suite for Visualization and Three Dimensional Field Reconstruction NSF-CMS-0421580	Borg, PI Goldsborough, Co-PI
1/03-8/03	Naval Surface Warfare Center	Liquid Instability and Breakup on a Planar Slide Wire, N000178-03-M-1032	Borg, PI

3/03-9/04	Wisconsin Space Grant Consortium	Preliminary Investigation of Material Damage as a Result of Space Debris Impact	Borg, PI
11/03-5/04	Wisconsin Space Grant Consortium	Low Pressure/Micro-Gravity Liquid Drop Experiment	Borg, PI
7/96-7/97	National Science Foundation	International Research Fellow Awards Program (IRFP) (Post-Doc): An Investigation of Secondary Vortex Structure in the Near Wake of a Circular Cylinder, NSF –INT-9600313	Borg, PI