Stewart A. Silling

Computational Multiscale Department
Sandia National Laboratories
Albuquerque, New Mexico 87185-1322

Phone: 505-844-3973
Email: sasilli@sandia.gov
Homepage: www.sandia.gov/~sasilli

Education

Ph.D. , Applied Mechanics, California Institute of Technology, 1986.
Dissertation Title: *Phase Transitions and Singularities in Elastic Solids: Numerical Studies and Stability Analysis*.

M.Eng., Nuclear Engineering, University of California, Berkeley, 1980.

B.S., Physics and Nuclear Engineering, Massachusetts Institute of Technology, 1977.

Professional Appointments

Sandia National Laboratories, Albuquerque, New Mexico
Distinguished Member of the Technical Staff, 10/2003-present
Principal Member of the Technical Staff, 10/1997-9/2003
Senior Member of the Technical Staff, 1/1990-9/1997

Primary research areas:

- Peridynamic theory of continuum mechanics.
- Computational mechanics and physics.
- Mechanics of impact and penetration.
- Aerospace composite materials and structures.

The Boeing Company, Seattle, Washington
Visiting Scholar, 5/2004-8/2004.

California Institute of Technology, Pasadena, California
Visiting Researcher, 6/1998-5/1999.

Brown University, Providence, Rhode Island
Assistant Professor of Engineering, 8/1986-12/1989.

U.S. Nuclear Regulatory Commission, Washington, DC
Project Manager, 1/1981-8/1982

Science Applications, Inc. (now SAIC), San Leandro, California
Engineer, 9/1977-1/1981.

Awards, Fellowships, and Professional Activities

Co-editor-in-chief, *Journal of Peridynamics and Nonlocal Modeling* (Springer Nature).

Panel member, National Academies Panel on Materials Science and Engineering, Technical Advisory Board for the U.S. Army Research Laboratory, 2015-2016.

Belytschko Medal (US Association for Computational Mechanics), 2015.

Guest Editor, *Journal of Mechanics of Materials and Structures*, 2015.

Co-organizer, Minisymposium on Peridynamic Theory, U.S. National Congress on Theoretical and Applied Mechanics, East Lansing, MI, 2014.

Sandia Employee Recognition Award for Individual Technical Excellence, 2011.

Best Paper Award, *Journal of Aerospace Engineering*, 2008.

Sandia Award for Excellence, 1992, 1997, 2000, 2002, 2003, 2006, 2008.

ASM Certificate of Appreciation, 2001.

Sandia Employee Recognition Award for Meritorious Achievement, 2001, 2002, 2004, 2009.

Nuclear Regulatory Commission Certificate of Appreciation, 2003.

Sandia Computational Science Prize (3rd Place), 2001.

NNSA Award of Excellence, 2000.

DARPA Certificate of Appreciation, 1992.

National Science Foundation Presidential Young Investigator Award, 1987.

Institute Fellowship, California Institute of Technology, 1982- 83.

Department of Energy Traineeship, University of California, Berkeley, 1977-79.

Journal Articles and Book Chapters

1. S. A. Silling, "Kinetics of failure in an elastic peridynamic material," accepted, *Journal of Peridynamics and Nonlocal Modeling* (2020).

2. S. A. Silling, “Attenuation of waves in a viscoelastic peridynamic medium,” Mathematics and Mechanics of Solids 24 (2019): 3597-3613.

3. X. Song and S. A. Silling, “Thermodynamic aspect on state-based peri-poromechanics for modeling multiphysics processes in three-phase porous media,” (under review).

4. S. A. Silling, “Peridynamics: Introduction,” Chapter in *Handbook of Nonlocal Continuum Mechanics for Materials and Structures*, G. Z. Voyiadjis, ed., Springer (2017).

5. S. A. Silling, “Stability of peridynamic correspondence material models and their particle discretizations.” *Computer Methods in Applied Mechanics and Engineering* 322 (2017): 42-57.

6. S. A. Silling, M. L. Parks, J. R. Kamm, O. Weckner, and M. Rassaian, “Modeling shockwaves and impact phenomena with Eulerian peridynamics.” *International Journal of Impact Engineering* 107 (2017): 47-57.

7. S. A. Silling, "Solitary waves in a peridynamic elastic solid." *Journal of the Mechanics and Physics of Solids* 96 (2016): 121-132.

8. S. A. Silling, “Why peridynamics?” Chapter 1 in *Handbook of Peridynamics*, F. Bobaru, J. T. Foster, P. Geubelle, and S. A. Silling, eds., CRC Press (2016).

9. S. A. Silling, “Introduction to peridynamics,” Chapter 2 in *Handbook of Peridynamics*, F. Bobaru, J. T. Foster, P. Geubelle, and S. A. Silling, eds., CRC Press (2016).

10. A. Askari, Y. Azdoud, F. Han, G. Lubineau, and S. Silling, “Peridynamics for analysis of failure in advanced composite materials,” Chapter 12 in *Numerical Modelling of Failure in Advanced Composite Materials,* P. P. Camanho and S. Hallett, eds., Elsevier (2016).

11. S. A. Silling, D. Littlewood, and P. Seleson, “Variable horizon in a peridynamic medium” *Journal of Mechanics of Materials and Structures* 10 (2015): 591-612.

12. Mitchell, J. A., and S. A. Silling, “A position-aware linear solid constitutive model for peridynamics” *Journal of Mechanics of Materials and Structures* 10 (2015): 539-557.

13. Silling, S. A. "Origin and effect of nonlocality in a composite." *Journal of Mechanics of Materials and Structures* 9 (2014): 245-258.

14. Breitenfeld, M. S., P. H. Geubelle, O. Weckner, and S. A. Silling. "Non-ordinary state-based peridynamic analysis of stationary crack problems." *Computer Methods in Applied Mechanics and Engineering* 272 (2014): 233-250.

15. Hu, W., Y. D. Ha, F. Bobaru, and S. A. Silling. "The formulation and computation of the nonlocal J-integral in bond-based peridynamics." *International journal of fracture* 176, no. 2 (2012): 195-206.

16. Silling, S. A. "A coarsening method for linear peridynamics." *International Journal for Multiscale Computational Engineering* 9, no. 6 (2011).

17. Foster, J. T., S. A. Silling, and W. Chen. "An energy based failure criterion for use with peridynamic states." *International Journal for Multiscale Computational Engineering* 9, no. 6 (2011).

18. Silling, S. A., and R. B. Lehoucq. "Peridynamic theory of solid mechanics." *Advances in Applied Mechanics* 44, no. 1 (2010): 73-166.

19. Silling, S. A., O. Weckner, E. Askari, and Florin Bobaru. "Crack nucleation in a peridynamic solid." *International Journal of Fracture* 162, no. 1-2 (2010): 219-227.

20. Silling, S. A. "Linearized theory of peridynamic states." *Journal of Elasticity* 99, no. 1 (2010): 85-111.

21. Foster, J. T., S. A. Silling, and W. Chen. "Viscoplasticity using peridynamics." *International Journal for Numerical Methods in Engineering* 81, no. 10 (2010): 1242-1258.

22. Bobaru, F., M. Yang, L. F. Alves, S. A. Silling, E. Askari, and J. Xu. "Convergence, adaptive refinement, and scaling in 1D peridynamics." *International Journal for Numerical Methods in Engineering* 77, no. 6 (2009): 852-877.

23. Weckner, O., G. Brunk, M. A. Epton, S. A. Silling, and E. Askari. "Green's functions in non-local three-dimensional linear elasticity." *Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, (2009): rspa20090234.

24. Warren, T. L., S. A. Silling, A. Askari, O. Weckner, M. A. Epton, and J. Xu. "A non-ordinary state-based peridynamic method to model solid material deformation and fracture." *International Journal of Solids and Structures* 46, no. 5 (2009): 1186-1195.

25. Xu, J., A. Askari, O. Weckner, and S. Silling. "Peridynamic analysis of impact damage in composite laminates." *Journal of Aerospace Engineering* 21, no. 3 (2008): 187-194.

26. Parks, M. L., R. B. Lehoucq, S. J. Plimpton, and Stewart A. Silling. "Implementing peridynamics within a molecular dynamics code." *Computer Physics Communications* 179, no. 11 (2008): 777-783.

27. Silling, S. A., and R. B. Lehoucq. "Convergence of peridynamics to classical elasticity theory." *Journal of Elasticity* 93, no. 1 (2008): 13-37.

28. Askari, E., F. Bobaru, R. B. Lehoucq, M. L. Parks, S. A. Silling, and O. Weckner. "Peridynamics for multiscale materials modeling." *Journal of Physics: Conference Series*, 125, no. 1 (2008): 012078.

29. Gerstle, W., S. Silling, D. Read, V. Tewary, and R. Lehoucq. "Peridynamic simulation of electromigration." *Computers Materials and Continua* 8, no. 2 (2008): 75-92.

30. Lehoucq, R. B., and S. A. Silling. "Force flux and the peridynamic stress tensor." *Journal of the Mechanics and Physics of Solids* 56, no. 4 (2008): 1566-1577.

31. Silling, S. A., M. Epton, O. Weckner, J. Xu, and E. Askari. "Peridynamic states and constitutive modeling." *Journal of Elasticity* 88, no. 2 (2007): 151-184.

32. Gerstle, W., N. Sau, and S. Silling. "Peridynamic modeling of concrete structures." *Nuclear Engineering and Design* 237, no. 12 (2007): 1250-1258.

33. Silling, S. A., and M. J. Forrestal. "Mass loss from abrasion on ogive-nose steel projectiles that penetrate concrete targets." *International Journal of Impact Engineering* 34, no. 11 (2007): 1814-1820.

34. Macek, R. W., and S. A. Silling. "Peridynamics via finite element analysis." *Finite Elements in Analysis and Design* 43, no. 15 (2007): 1169-1178.

35. Silling, S. A., and E. Askari. "A meshfree method based on the peridynamic model of solid mechanics." *Computers and Structures* 83, no. 17 (2005): 1526-1535.

36. Silling, S. A., and F. Bobaru. "Peridynamic modeling of membranes and fibers." *International Journal of Non-Linear Mechanics* 40, no. 2 (2005): 395-409.

37. Silling, S. A., M. Zimmermann, and R. Abeyaratne. "Deformation of a peridynamic bar." *Journal of Elasticity* 73, no. 1-3 (2003): 173-190.

38. Silling, S. A. "Reformulation of elasticity theory for discontinuities and long-range forces." *Journal of the Mechanics and Physics of Solids* 48, no. 1 (2000): 175-209.

39. Silling, S. A., and P. A. Taylor. "The simulation of composite material response under dynamic compressive loading." *Modelling and Simulation in Materials Science and Engineering* 2, no. 3A (1994): 689.

40. Silling, S. A. "Stability and accuracy of differencing methods for viscoplastic models in wavecodes." *Journal of Computational Physics* 104, no. 1 (1993): 30-40.

41. Silling, S. A. "Dynamic growth of martensitic plates in an elastic material." *Journal of Elasticity* 28, no. 2 (1992): 143-164.

42. Silling, S. A. "Creasing singularities in compressible elastic materials." *Journal of Applied Mechanics* 58, no. 1 (1991): 70-74.

43. Silling, S. A. "Linear Elastic Materials Sustaining a Prescribed Deformation." *Journal of Applied Mechanics* 56, no. 2 (1989): 479-481.

44. Silling, S. A. "Numerical analysis of crack-tip fields using the hodograph transformation." *International Journal for Numerical Methods in Engineering* 28, no. 11 (1989): 2503-2515.

45. Silling, S. A. "Phase changes induced by deformation in isothermal elastic crystals." *Journal of the Mechanics and Physics of Solids* 37, no. 3 (1989): 293-316.

46. Silling, S. A. "Finite difference modeling of phase changes and localization in elasticity." *Computer Methods in Applied Mechanics and Engineering* 70, no. 3 (1988): 251-273.

47. Silling, S. A. "Two-dimensional effects in the necking of elastic bars." *Journal of Applied Mechanics* 55, no. 3 (1988): 530-535.

48. Silling, S. A. "Consequences of the Maxwell relation for anti-plane shear deformations of an elastic solid." *Journal of Elasticity* 19, no. 3 (1988): 241-284.

49. Silling, S. A. "Numerical studies of loss of ellipticity near singularities in an elastic material." *Journal of Elasticity* 19, no. 3 (1988): 213-239.

50. Silling, S. A. "Incompressibility in dynamic relaxation." *Journal of Applied Mechanics* 54, no. 3 (1987): 539-544.

51. Horgan, C. O., and S. A. Silling. "Stress concentration factors in finite anti-plane shear: numerical calculations and analytical estimates." *Journal of Elasticity* 18, no. 1 (1987): 83-91.

Technical Reports and Conference Papers

1. Weckner, O., Cuenca, F., Silling, S., Rassaian, M., & Pang, J., Determination of Ballistic Limit for IM7/8552 Using Peridynamics. In 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference (2018).

2. Littlewood, D. J., S. A. Silling, J. A. Mitchell, P. D. Seleson, S. D. Bond, M. L. Parks, D. Z. Turner, D. J. Burnett, J. Ostien, and M. Gunzburger. *Strong Local-Nonlocal Coupling for Integrated Fracture Modeling.* No. SAND2015-7998. Sandia National Laboratories (2015).

3. Preece, D. S., A. Tawadrous, S. A. Silling, and B. Wheeler, "Modelling full-scale blast heave with three-dimensional distinct elements and parallel processing." In *11th International Symposium on rock Fragmentation by Blasting, Sydney, Australia* (2015).

4. Silling, S. A., and A. Askari. *Peridynamic model for fatigue cracking*. No. SAND2014-18590. Sandia National Laboratories (2014).

5. Silling, S. A., and J. V Cox. *Hierarchical multiscale method development for peridynamics*. No. SAND2014-18565. Sandia National Laboratories (2014).

6. Parks, M. L., D. J. Littlewood, J. A. Mitchell, and S. A. Silling. *Peridigm Users' Guide v1. 0.0.* No. SAND2012-7800. Sandia National Laboratories (2012).

7. Parks, M. L., S. J. Plimpton, R. B. Lehoucq, and S. A. Silling. *Peridynamics with LAMMPS: A user guide*. No. SAND2008-0135. Sandia National Laboratories (2008).

8. Weckner, O., S. Silling, and A. Askari, "Dispersive wave propagation in the nonlocal peridynamic theory." In *ASME 2008 International Mechanical Engineering Congress and Exposition, Boston, Massachusetts. Volume 12: Mechanics of Solids, Structures and Fluids*. IMECE2008-67894. (2008).

9. Weckner, O., A. Askari, J. Xu, H. Razi, and S. A. Silling. "Damage and failure analysis based on peridynamics–-theory and applications." In *48th AIAA Structures, Structural Dynamics, and Materials Conference*. AIAA 2007-2314. (2007).

10. Xu, J., A. Askari, O. Weckner, H. Razi, and S. Silling, "Damage and failure analysis of composite laminates under biaxial loads." In *48th AIAA Structures, Structural Dynamics, and Materials Conference*. AIAA 2007-2315. (2007).

11. Colavito, K. W., B. Kilic, E. Celik, E. Madenci, E. Askari, and S. Silling. "Effect of nano particles on stiffness and impact strength of composites." In *Proceedings of 48th AIAA/ASME/ASCE/AHS/ASC structures, structural dynamics, and materials conference, Honolulu, Hawaii*. AIAA 2007-2021. (2007).

12. Lehoucq, R. B., and S. A. Silling. *Statistical coarse-graining of molecular dynamics into peridynamics*. No. SAND2007-6410, Sandia National Laboratories (2007).

13. Askari, E., J. Xu, and S. Silling. "Peridynamic analysis of damage and failure in composites." In *44th AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada. Reston, VA*. AIAA 2006-88. (2006).

14. Gerstle, W., N. Sau, and S. A. Silling. "Peridynamic modeling of plain and reinforced concrete structures." In *SMiRT18, International Conference on Structural Mechanics in Reactor Technology, Beijing, China* (2005).

15. Silling, S. A., and E. Askari. "Peridynamic modeling of impact damage." In *ASME/JSME 2004 Pressure Vessels and Piping Conference*, pp. 197-205. PVP2004-3049 (2004).

16. Silling, S. A. *Brittle failure kinetics model for concrete*. No. SAND97-0439C; CONF-970726-7. Sandia National Laboratories (1997).

17. Hertel Jr, E. S., R. L. Bell, M. G. Elrick, A. V. Farnsworth, G. I. Kerley, J. M. McGlaun, S. V. Petney, S. A. Silling, P. A. Taylor, and L. Yarrington. "CTH: A software family for multi-dimensional shock physics analysis." In *Shock Waves@ Marseille I*, pp. 377-382. Springer Berlin Heidelberg (1995).

18. Silling, S. A. *CTH reference manual: boundary layer algorithm for sliding interfaces in two dimensions*. No. SAND93-2487. Sandia National Laboratories (1994).

19. Silling, S. A., P. A. Taylor, J. L. Wise, and M. D. Furnish. *Micromechanical modeling of advanced materials.* No. SAND94-0129, Sandia National Laboratories (1994).

20. Silling, S. A. *Shear band formation and self-shaping penetrators*. No. SAND92-2692. Sandia National Laboratories (1993).

21. Silling, Stewart A. "An algorithm for Eulerian simulation of penetration." PVP Vol. 246, American Society of Mechanical Engineers, 123-123 (1993).

22. Silling, S. A. *CTH reference manual: Johnson-Holmquist ceramic model*. No. SAND92-0576, Sandia National Laboratories, (1992).

23. Silling, S. A. *Eulerian simulation of the perforation of aluminum plates by nondeforming projectiles*. No. SAND-92-0493. Sandia National Laboratories (1992).

24. Silling, S. A. *CTH reference manual: Viscoplastic models*. No. SAND91-0292, Sandia National Laboratories (1991).

25. Silling, S. A. "Micromechanical studies of partially saturated porous media." In *Sixth Symposium on Containment of Underground Nuclear Explosions,* Reno, NV, CONF-9109114, Vol. 2 (1991) 104-118.

26. Silling, S. A., M. B. Gross, G. E. Santee Jr, and F. H. Chang. "Method for coupled three-dimensional analysis of reactor vessel blowdowns with internal structures." Vol. PVP-46, American Society of Mechanical Engineers (1981).

27. Santee Jr, George E., and Stewart A. Silling. " Application of STEALTH-HYDRO 1D, 2D and 3D to the calculation of hydraulic transients in reactor systems." In *Proc. ANS/ENS Topical Meeting on Thermal Reactor Safety*, CONF- 800403, pp. 168 (1980).

28. Silling, S. A., and M. B. Gross. "A method for coupling three-dimensional grids in a hydrodynamic code." In *ASME Pressure Vessels and Piping Technology Conference*. 80-C2/PVP-102 (1980).

29. Silling, S. A., and V. E. Schrock. "Assessment of the TRAC-PIA equation-of-state for water." In *Transactions of the American Nuclear Society* Vol. 35, CONF-801107 (1980).

30. Silling, S. A., and K. F. Hansen, "Integration of the kinetics equations with improved steady- state behavior." In *Transactions of the American Nuclear Society* Vol. 27 p. 356-357 (1977).

31. Chang, F. H., G. E. Santee Jr, G. A. Mortensen, G. F. Brockett, M. B. Gross, S. A. Silling, and T. Belytschko. "LOCA hydroloads calculations with multidimensional nonlinear fluid/structure interaction." No. EPRI-NP-1401 (Vol. 2) Electric Power Research Institute (1997).

Recent Invited Presentations

1. "Modeling microstructure and defects with peridynamics," Plenary lecture, SIAM Conference on Mathematical Aspects of Materials Science, Portland, OR (2018).

2. "Peridynamic models for complex materials," World Congress on Computational Mechanics, New York, NY (2018).

3. "Application of multiscale peridynamics to material failure," Engineering Mechanics Institute Conference, Cambridge, MA (2018).

4. "Modeling penetration and perforation with peridynamics," USACM Workshop on Meshfree and Particle Methods Application and Theory, Santa Fe, NM (2018).

5. "Why peridynamics?" USACM Workshop on Nonlocal Methods in Fracture, Austin, TX (2018).

6. "Nonlocal waves in continuous media," Department of Mathematics Seminar, University of Nebraska – Lincoln (2018).

7. "Peridynamic modeling of sintering," International Conference on Sintering, San Diego, CA (2017).

8. "Attenuation of waves in a peridynamic medium," ASME International Mechanical Engineering Conference and Exposition, Tampa, FL (2017).

9. "Material stability and numerical stability in peridynamics," SIAM Conference on Computational Science and Engineering, Atlanta, GA (2017).

10. "Nonlocality in modeling the physical world," Workshop on Modeling, Analysis and Numerics for Nonlocal Applications, Santa Fe, NM (2017).

11. "Stabilization of peridynamic correspondence material models," US National Congress on Computational Mechanics, Montreal, Quebec, Canada (2017).

12. "Using peridynamics to understand fracture," Applied Mathematics Seminar, Columbia University, New York, NY (2016).

13. “Application of peridynamics to large deformations and soft materials,” Mechanical and Nuclear Engineering Seminar, Virginia Commonwealth University, Richmond, VA (2016).

14. “Meshfree peridynamics for soft materials,” USACM Conference on Isogeometric Analysis and Meshfree Methods, La Jolla, CA (2016).

15. “Solitary waves and phase boundaries in peridynamics,” SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA (2016).

16. “Fundamental studies of dynamic fracture with multiscale peridynamics,” SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (2016).

17. “Peridynamic modeling of impact damage and erosion,” Air Force Research Laboratory, Dayton, OH (2016).

18. “The thermodynamic form of peridynamics with application to phase transformations,” International Conference on Theoretical and Applied Mathematics, Montreal, Quebec, Canada (2016).

19. “Combined Lagrangian and Eulerian approaches in peridynamic material modeling,” ASME International Mechanical Engineering Conference and Exposition, Phoenix, AZ (2016).

20. “Predictivity in fracture modeling”, Workshop for Nonlocal Models in Mathematics, Computation, Science, and Engineering, Oak Ridge, TN (2015).

21. “Three-dimensional simulation of fractographic features with multiscale peridynamics” (with F. Bobaru and Y. Wang), Materials Science & Technology conference, Columbus, OH (2015).

22. “Energy balance and transport in peridynamics”, Continuum Mechanics Seminar, University of Nebraska, Lincoln, NE (2015).

23. “Peridynamics as a multiscale theory,” Applied Mathematics Colloquium,University of Nebraska, Lincoln, NE (2015).

24. “Simulation of fractographic features in glass with multiscale peridynamics” (with F. Bobaru and Y. Wang), USNCCM13, San Diego, CA (2015).

25. “Upscaling material properties and damage in peridynamics”, Conference on Recent Developments in Continuum Mechanics and Partial Differential Equations, Lincoln, NE (2015).

26. “Defects and interfaces in peridynamics: A multiscale approach”, USACM Workshop on Meshfree Methods for Large-Scale Computational Science and Engineering, Tampa, FL (2014).

27. “Peridynamics and continuum damage mechanics”, ASME IMECE, Montreal, Canada (2014).

28. “Bird-strike analysis using an Eulerian peridynamic formulation” (with O. Weckner and M. Rassaian), USNCTAM 2014, East Lansing, MI (2014).

29. “Peridynamics in multiscale analysis”, USNCTAM 2014, East Lansing, MI (2014).

30. “Unifying the mechanics of continua, cracks, and particles”, Mechanical Engineering Seminar, Wayne State University, Detroit, MI (2014).

31. “Peridynamic model for fatigue cracks” (with A. Askari), Society of Engineering Science Annual Technical Meeting, West Lafayette, IN (2014).

32. “Practical peridynamics” (with A. Askari), seminar at Livermore Software Technology Corp., Livermore, CA (2014).

33. “Unifying the mechanics of continua, cracks, and particles” (with J. Mitchell), seminar at 3M Company, St. Paul, MN (2014).

34. “Unifying the mechanics of continua, cracks, and particles”, Mechanical and Aerospace Engineering Seminar, New Mexico State University, Las Cruces, NM (2014).

35. “The role of peridynamics in multiscale analysis”, USACM/IUTAM Workshop on Computational Aspects of Multiscale Materials Modeling, Evanston, IL, (2014).

36. “Variable horizon in a peridynamic body” (with P. Seleson), USNCCM12, Raleigh, NC, (2013).

37. “Peridynamic balance laws” (with R. B. Lehoucq, Q. Du. and M. Gunzburger), SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (2013).

38. “Variable length scale in a peridynamic body” (with P. Seleson), SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (2013).

39. “Opportunities and challenges in peridynamics, USACM Workshop on Nonlocal Damage Modeling, San Antonio, TX (2013).

40. “Multiscale modeling of brittle fracture with peridynamics,” American Ceramic Society ICACC, Daytona Beach, FL (2013).

41. “Multiscale modeling of fracture with peridynamics,” ASME International Mechanical Engineering Conference and Exposition, Houston, TX (2012).

42. “Multiscale modeling of fracture with peridynamics,” Applied Analysis Seminar, Department of Mathematics, Louisiana State University, Baton Rouge, LA (2012).

43. “Multiscale modeling of crack growth in peridynamics” (with J. V. Cox), Society of Engineering Science Annual Technical Meeting, Atlanta, GA (2012).

44. “The peridynamic *J*-integral” (with F. Bobaru and W. Hu), 2012 SIAM Annual Meeting, Minneapolis, MN, (2012).

45. “Introduction to peridynamics,” Workshop on Peridynamics, Dissipative Particle Dynamics, and the Mori-Zwanzig Formulation, Brown University, Providence, RI (2012).

46. “Multiscale modeling of fracture with peridynamics,” Mechanical Engineering Department Seminar, University of Texas, San Antonio, TX (2012).

47. “Peridynamics and coarse graining,” Department of Materials Science and Engineering Seminar, North Carolina State University, Raleigh, NC (2011).

48. “Coarse graining in peridynamics,” Society of Engineering Science Annual Technical Meeting, Evanston, IL (2011).

49. “Coarse graining in peridynamics,” ICIAM, Vancouver, BC, (2011).

50. “Recent developments in peridynamics” (with R. B. Lehoucq, A. Askari, and O. Weckner), USNCCM11, Minneapolis, MN, July, 2011.

51. “Peridynamics and coarse graining,” Workshop on Macroscopic Modeling of Materials with Fine Structure, Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh, PA, (2011).

52. “Length scales and time scales in peridynamics,” SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (2010).

53. “Unifying the mechanics of continua, cracks, and particles,” Aerospace Engineering Department Seminar, University of Illinois at Urbana-Champaign, IL (2010).

54. “Unifying the mechanics of continua, cracks, and particles,” IAMCS Workshop in Mathematical and Computational Challenges in Multiscale Materials Modeling, College Station, TX (2009).