

Dr. Lucas Lindsay

Materials Science and Technology Division
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Research:

2014-pres. Research scientist, Materials Sciences and Technology Division, Oak Ridge National Laboratory

2011-2014 National Research Council Fellowship, U.S. Naval Research Laboratory

Computational materials physics:

- develop microscopic first-principles methods to predict vibrational and thermal properties of bulk and nanoscale materials for thermal management applications
- advance fundamental understanding of phonon-defect interactions

Education:

2010 Ph.D. in Physics, Boston College, Chestnut Hill, MA

Dissertation Title: *Theory of phonon thermal transport in single-walled carbon nanotubes and graphene (supervisor: Dr. David Broido)*

2004 B.S. in Physics, Magna Cum Laude, College of Charleston, Charleston, SC

Teaching Experience:

2009-2011 Instructor, Department of Physics, Computer Science and Engineering, Christopher Newport University, Newport News, VA

- planned and taught introductory physics courses for majors and non-majors

2004-2007 Teaching Assistant, Department of Physics, Boston College, Boston, MA

- guided students in introductory physics and physiology laboratory courses

Funding and Awards:

2022-2023 SEED project lead (\$189k)

2021 Clarivate Highly Cited Researcher in Physics

2019-2024 DOE Early Career Award (\$2500k)

2018 Outstanding Referee for the *Physical Review*

2017-2019 LDRD project lead (\$839k)

2013-2014 NRC/ASEE Postdoctoral Research Publication Award, NRL

2011 NRC Research Associateship Award, NRL

Professional Service:

2023 MRS Spring Symposium Organizer

2022 MRS Fall Symposium Organizer

2022-2025 Editorial board member for *Physical Review B*

2021 Co-organized DOE-BES-TCMP PI meeting

2019 MRS Spring Symposium Organizer

2017 Breakout session lead at DOE HEATER workshop

2016 STEM outreach at USA Science and Engineering Festival

2015-2017 Knoxville Jewish Day School STEAM advisory board

Refereed proposals for NSF and DOE and numerous papers for *Science*, *Nature journals*, *Physical Review journals*, *Physics Today*, *Scientific Reports*, *European Physics Letters*, *Applied Physics Letters*, *ACS Nano*, *Carbon*, *Nanoscale*, etc.

Mentoring:

Postdoctoral fellows: Parul Raghuvanshi (2023-), Xun Li (2021-2023), Rinkle Juneja (2020-2023), Simon Thébaud (2019-2022), Carlos Polanco (2016-2019), Saikat Mukhopadhyay (2015-2017)

Graduate students: Rajmohan Muthaiah (Jivtesh Garg – University of Oklahoma), Wencong Shi (Lilia Woods – University of South Florida), Bradley Baer (Greg Walker – Vanderbilt University)

Patent:

2018 US Patent 9,986,663 B2, “*High Thermal Conductivity Materials for Thermal Management Applications*,” D. A. Broido, T. L. Reinecke and L. Lindsay.

Publications:

(Web of Science: citations=10,770, *h*-index=43)

2024 107. “*Phonon transport governed by intrinsic scattering in short-period AlN/GaN superlattices*,” B. Baer, D. G. Walker, and L. Lindsay, *Physical Review B* 109, 104310 (2024).

106. “*Dynamics of nonequilibrium magnons in gapped Heisenberg antiferromagnets*,” C. Hua, L. Lindsay, Y. Shinohara, and D. A. Tennant, *Physical Review B* 109, 054306 (2024).

105. “*Normal mode description of phases of matter: Application to heat capacity*,” J. Moon, S. Thébaud, L. Lindsay, and T. Egami, *Physical Review Research* 6, 013206 (2024).

104. “*Angular-momentum transfer mediated by a vibronic-bound-state*,” Y.-Y. Pai, C. E. Marvinney, G. Pokharel, J. Xing, H. Li, X. Li, M. Chilcote, M. Brahleck, L. Lindsay, H. Miao, A. S. Sefat, D. Parker, S. D. Wilson, J. S. Gardner, L. Liang, and B. J. Lawrie, *Advanced Science* 11, 2304698 (2024).

2023 103. “*Magnon orbital angular momentum of ferromagnetic honeycomb and zig-zag lattice models*,” R. S. Fishman, T. Berlijn, J. Villanova, and L. Lindsay, *Physical Review B* 108, 214402 (2023).

102. “*Remarkable heat conduction mediated by non-equilibrium phonon polaritons*,” Z. Pan, G. Lu, X. Li, J. R. McBride, R. Juneja, M. Long, L. Lindsay, J. D. Caldwell, and D. Li, *Nature* 623, 307 (2023).

101. “*Nonperturbative determination of isotope-induced anomalous vibrational physics*,” H. Wu, Z. Qin, S. Li, L. Lindsay, and Y. Hu, *Phys. Rev. B* 108, 140302 (2023).

100. “*Primitive to conventional geometry projection for efficient phonon transport calculations*,” X. Li, S. Thébaud, and L. Lindsay, *npj Computational Materials* 9, 193 (2023).

99. “Vibrations and phase stability in mixed valence antimony oxide,” D. H. Moseley, R. Juneja, L. L. Daemen, I. Sergeev, R. Steinbrügge, O. Leupold, Y. Cheng, V. R. Cooper, L. Lindsay, M. K. Kidder, M. E. Manley, and R. P. Hermann, *Inorganic Chemistry* 62, 16464 (2023).

98. “Origins of heat transport anisotropy in MoTe_2 and other bulk van der Waals materials,” H. Li, T. Pandey, Y. Jiang, X. Gu, L. Lindsay, Y. K. Koh, *Materials Today Physics* 37, 101196 (2023).

97. “Differential multi-probe thermal transport measurements of multi-walled carbon nanotubes grown by chemical vapor deposition,” Q. Jia, Y. Zhou, X. Li, L. Lindsay, and L. Shi, *International Journal of Heat and Mass Transfer* 216, 124535 (2023).

96. “Breaking Rayleigh’s law with spatially correlated disorder to control phonon transport,” S. Thébaud, L. Lindsay, and T. Berlijn, *Physical Review Letters* 131, 026301 (2023).

95. “Atomic dynamics in liquids: Normal mode analysis revisited,” J. Moon, L. Lindsay, and T. Egami, *Physical Review E* 108, 014601 (2023).

94. “Modeling phonons in nanomaterials,” L. Lindsay and T. Pandey, chapter in Modeling, Characterization, and Production of Nanomaterials: Electronics, Photonics, and Energy Applications, 2nd edition, pgs. 125-150, eds. V. K. Tewary and Y. Zhang (Woodhead Pub., Cambridge, 2023).

2022

93. “Determination of single-crystal elastic moduli of LiREF_4 ($RE=Y, \text{Gd}, \text{and Tb}$) by resonant ultrasound spectroscopy,” A. Balodhi, J. Torres, R. Juneja, K. B. Chang, A. Brady, S. K. Chakrapani, L. Lindsay, R. P. Hermann, and A. Zevalkink, *Journal of Applied Physics* 132, 175110 (2022).

92. “Exact results for the orbital angular momentum of magnons on honeycomb lattices,” R. S. Fishman, L. Lindsay, and S. Okamoto, *Journal of Physics: Condensed Matter* 51, 015801 (2022).

91. “Origin of ultralow phonon transport and strong anharmonicity in the lead-free halide perovskites,” T. Pandey, M.-H. Du, D. S. Parker, and L. Lindsay, *Materials Today Physics* 28, 100881 (2022).

90. “Phonons and phase symmetries in bulk CrCl_3 from scattering measurements and theory,” X. Li, S.-H. Do, J. Yan, M. A. McGuire, G. E. Granroth, S. Mu, T. Berlijn, V. C. Cooper, A. D. Christianson, and L. Lindsay, *Acta Materialia* 241, 118390 (2022).

89. “Phonons in complex twisted crystals: Angular momenta, interactions, and topology,” R. Juneja, X. Li, S. Thébaud, D. H. Moseley, Y. Q. Cheng, M. E. Manley, R. P. Hermann, and L. Lindsay, *Physical Review B* 106, 094310 (2022).

88. “Competing magnetic and nonmagnetic states in monolayer VSe_2 with charge density wave,” L. Yin, T. Berlijn, R. Juneja, L. Lindsay, and D. S. Parker, *Physical Review B* 106, 085117 (2022).

87. “First principles thermal transport modeling in GaN and related materials,” L. Lindsay, chapter in Thermal Management of Gallium Nitride Electronics, pgs. 21-44, eds. Marko Tadjer and Travis Anderson (Elsevier, Cambridge, 2022).

86. "Perturbation theory and thermal transport in mass-disordered alloys: Insights from Green's function methods," S. Th baud, T. Berlijn, and L. Lindsay, *Physical Review B* 105, 134202 (2022).
85. "Mesoscale interplay between phonons and crystal electric field excitations in quantum spin liquid candidate $CsYbSe_2$," Y.-Y. Pai, C. E. Marvinney, L. Liang, J. Xing, A. Scheie, A. A. Poretzky, G. B. Hal sz, X. Li, R. Juneja, A. S. Sefat, D. Parker, L. Lindsay, and B. J. Lawrie, *Journal of Materials Chemistry C* 10, 4148 (2022).
84. "Dislocation-limited thermal conductivity in LiF: Revisiting perturbative models," L. Lindsay, R. Hanus, and C. A. Polanco, *JOM* 74, 547 (2022).
- 2021 83. "Phonon engineering of boron nitride via isotopic enrichment," M. He, L. Lindsay, T. E. Beechem, T. Folland, J. Matson, K. Watanabe, A. Zavalin, A. Ueda, W. E. Collins, T. Taniguchi, and J. D. Caldwell, *Journal of Materials Research* 36, 4394 (2021).
82. "Quasiparticle twist dynamics in non-symmorphic materials," R. Juneja, S. Th baud, T. Pandey, C. A. Polanco, D. H. Moseley, M. E. Manley, Y. Q. Cheng, B. Winn, D. L. Abernathy, R. P. Hermann, and L. Lindsay, *Materials Today Physics* 21, 100548 (2021).
81. "Thermal transport in defective and disordered materials," R. Hanus, R. Gurunathan, L. Lindsay, M. T. Agne, J. Shi, S. Graham, and G. J. Snyder, *Applied Physics Reviews* 8, 031311 (2021).
80. "Intrinsic anharmonicity and thermal properties of ultralow thermal conductivity $Ba_6Sn_6Se_{13}$," W. D. C. B. Gunatilleke, R. Juneja, O. P. Ojo, A. F. May, H. Wang, L. Lindsay, and G. S. Nolas, *Physical Review Materials* 5, 085002 (2021).
79. "Acoustic cavities in 2D heterostructures," M. K. Zalalutdinov, J. T. Robinson, J. J. Fonseca, S. W. LaGasse, T. Pandey, L. R. Lindsay, T. L. Reinecke, D. M. Photiadis, J. C. Culbertson, C. D. Kresse, and B. H. Houston, *Nature Communications* 12, 3267 (2021).
78. "Vibrational properties and thermal transport in quaternary chalcogenides: The case of Te-based compositions," W. Shi, T. Pandey, L. Lindsay, and L. M. Woods, *Physical Review Materials* 5, 045401 (2021).
77. "Semihard iron-based permanent-magnet materials," L. Yin, R. Juneja, L. Lindsay, T. Pandey, and D. S. Parker, *Physical Review Applied* 15, 024012 (2021).
- 2020 76. "Phonons, Q -dependent Kondo spin fluctuations, and $4f$ phonon resonance in $YbAl_3$," A. D. Christianson, V. R. Fanelli, L. Lindsay, S. Mu, M. C. Rahn, D. G. Mazzone, A. H. Said, F. Ronning, E. D. Bauer, and J. M. Lawrence, *Physical Review B* 102, 205135 (2020).
75. "Temperature dependent lattice dynamics in iridium," D. H. Moseley, S. J. Th baud, L. R. Lindsay, Y. Cheng, D. L. Abernathy, M. E. Manley, and R. P. Hermann, *Physical Review Materials* 4, 113608 (2020).

74. “Lattice chain theories for dynamics of acoustic flexural phonons in nonpolar nanomaterials,” Y. Kuang, L. Lindsay, Q. Wang, and L. He, *Physical Review B* 102, 144301 (2020).

73. “Space-time dependent thermal conductivity in nonlocal thermal transport,” C. Hua and L. Lindsay, *Physical Review B* 102, 104310 (2020).

72. “Success and breakdown of the T-matrix approximation for phonon-disorder scattering,” S. Thébaud, C. A. Polanco, L. Lindsay, and T. Berlijn, *Physical Review B* 102, 094206 (2020).

71. “GaN thermal transport limited by the interplay of dislocations and size effects,” H. Li, R. Hanus, C. A. Polanco, A. Zeidler, G. Koblmüller, Y. K. Koh, and L. Lindsay, *Physical Review B* 102, 014313 (2020).

70. “Lattice instabilities and phonon thermal transport in TlBr,” T. Pandey, L. Lindsay, B. C. Sales, and D. S. Parker, *Physical Review Materials* 4, 045403 (2020).

69. “Unfolding the complexity of phonon quasi-particle physics in disordered materials,” S. Mu, R. Olsen, B. Dutta, L. Lindsay, G. D. Samolyuk, T. Berlijn, E. D. Specht, K. Jin, H. Bei, T. Hickel, B. C. Larson, and G. M. Stocks, *npj Computational Materials* 6, 4 (2020).

68. “Defect-limited thermal conductivity in MoS₂,” C. A. Polanco, T. Pandey, T. Berlijn, and L. Lindsay, *Physical Review Materials* 4, 014004 (2020).

2019

67. “Long mean free paths of room-temperature THz acoustic phonons in a high thermal conductivity material,” T.-H. Chou, L. Lindsay, A. A. Maznev, J. S. Gandhi, D. W. Stokes, R. L. Forrest, A. Bensaoula, K. A. Nelson, and C.-K. Sun, *Physical Review B* 100, 094302 (2019).

66. “Generalized Fourier’s law for non-diffusive thermal transport: Theory and experiment,” C. Hua, L. Lindsay, X. Chen, and A. J. Minnich, *Physical Review B* 100, 085203 (2019).

65. “High-pressure nuclear inelastic scattering with backscattering monochromatization,” I. Sergueev, K. Glazyrin, M. G. Herrmann, P. Alexeev, H.-C. Wille, O. Leupold, A. F. May, T. Pandey, L. Lindsay, K. Friese, and R. P. Hermann, *Journal of Synchrotron Radiation* 26, 5 (2019).

64. “Ab initio investigation of single-layer high thermal conductivity boron compounds,” H. Fan, H. Wu, L. Lindsay, and Y. Hu, *Physical Review B* 100, 085420 (2019).

63. “Perspective on ab initio phonon thermal transport,” L. Lindsay, A. Katre, A. Cepellotti, and N. Mingo, *Journal of Applied Physics* 126, 050902 (2019).

62. “Phonon interaction with ripples and defects in thin layered molybdenum disulfide,” B. Smith, L. Lindsay, J. Kim, E. Ou, R. Huang, and L. Shi, *Applied Physics Letters* 114, 221902 (2019).

61. “Modulating the thermal conductivity in hexagonal boron nitride via controlled boron isotope concentration,” C. Yuan, J. Li, L. Lindsay, D. Cherns, J. W. Pomeroy, S. Liu, J. H. Edgar, and M. Kuball, *Communication Physics* 2, 43 (2019).

60. “Phonons, magnons, and lattice thermal transport in antiferromagnetic semiconductor *MnTe*,” S. Mu, R. P. Hermann, S. Gorsse, H. Zhao, M. E. Manley, R.S. Fishman, and L. Lindsay, *Physical Review Materials* 3, 025403 (2019).
59. “Phonon thermal conductance across *GaN-AlN* interfaces from first principles,” C. A. Polanco and L. Lindsay, *Physical Review B* 99, 075202 (2019).
58. “Dislocation-induced thermal transport anisotropy in single-crystal group-III nitride films,” B. Sun, G. Haunschild, C. A. Polanco, J. Ju, L. Lindsay, G. Koblmüller, and Y. K. Koh, *Nature Materials* 18, 136 (2019).
57. “Phonon-induced multicolor correlations in *hBN* single-photon emitters,” M. A. Feldman, A. Poretzky, L. Lindsay, E. Tucker, D. P. Briggs, P. G. Evans, R. F. Haglund, and B. J. Lawrie, *Physical Review B* 99, 020101(R) (2019).
- 2018 56. “Survey of *ab initio* thermal transport calculations,” L. Lindsay, C. Hua, X. Ruan, and S. Lee, *Materials Today Physics* 7, 106 (2018).
55. “Symmetry-driven phonon chirality and transport in one-dimensional and bulk *Ba₃N*-derived materials,” T. Pandey, C. A. Polanco, V. R. Cooper, D. S. Parker, and L. Lindsay, *Physical Review B* 98, 241405(R) (2018).
54. “Thermal transport by first-principles anharmonic lattice dynamics,” L. Lindsay and C. A. Polanco, book chapter in *Handbook of Materials Modeling*, Eds: W. Adreoni and S. Yip (Springer, Cham, Switzerland, 2020), pp. 735-765.
53. “Fermi surface nesting and phonon frequency gap drive anomalous thermal transport,” C. Li, N. K. Ravichandran, L. Lindsay, and D. Broido, *Physical Review Letters* 121, 175901 (2018).
52. “Antisite pairs suppress the thermal conductivity of *BAs*,” Q. Zheng, C. A. Polanco, M.-H. Du, L. Lindsay, M. Chi, J. Yan, and B. C. Sales, *Physical Review Letters* 121, 105901 (2018).
51. “Thermal conductivity of *InN* with point defects from first principles,” C. A. Polanco and L. Lindsay, *Physical Review B* 98, 014306 (2018).
50. “Two-channel model for ultralow thermal conductivity of crystalline *Tl₃VSe₄*,” S. Mukhopadhyay, D. S. Parker, B. C. Sales, A. A. Poretzky, M. A. McGuire, and L. Lindsay, *Science* 360, 1455 (2018).
49. “Anisotropic thermal transport in bulk hexagonal boron nitride,” P. Jiang, X. Qian, R. Yang, and L. Lindsay, *Physical Review Materials* 2, 064005 (2018).
48. “Interfacial phonon scattering and transmission loss in $>1 \mu\text{m}$ thick silicon-on-insulator thin films,” P. Jiang, L. Lindsay, X. Huang, and Y. K. Koh, *Physical Review B* 97, 195308 (2018).
47. “Propagation of THz acoustic wave packets in *GaN* at room temperature,” A. A. Maznev, T.-C. Hung, Y.-T. Yao, T.-H. Chou, J. S. Gandhi, L. Lindsay, H. D. Shin, D. W. Stokes, R. L. Forrest, A. Bensaoula, C.-K. Sun, and K. A. Nelson, *Applied Physics Letters* 112, 061903 (2018).
46. “Ultralow-loss polaritons in isotopically pure boron nitride,” A. J. Giles, S. Dai, I. Vurgaftman, T. Hoffman, S. Liu, L. Lindsay, C. T. Ellis, N. Assefa, I.

Chatzakis, T. L. Reinecke, J. G. Tischler, M. M. Fogler, J. H. Edgar, D. N. Basov, and J. D. Caldwell, *Nature Materials* 17, 134 (2018).

45. “*Ab initio* phonon point defect scattering and thermal transport in graphene,” C. A. Polanco and L. Lindsay, *Physical Review B* 97, 014303 (2018).

2017

44. “*High temperature magneto-structural transition in van der Waals-layered α - MoCl_3* ,” M. A. McGuire, J. Yan, P. Lampen-Kelly, A. F. May, V. R. Cooper, L. Lindsay, A. Puretzy, L. Liang, Santosh KC, E. Cakmak, S. Calder and B. C. Sales, *Physical Review Materials* 1, 064001 (2017) “*Editor’s Suggestion*”.

43. “*Four-phonon scattering significantly reduces intrinsic thermal conductivity of solids*,” T. Feng, L. Lindsay, and X. Ruan, *Physical Review B* 96, 161201(R) (2017).

42. “*Ab initio* phonon thermal transport in monolayer InSe , GaSe , GaS and alloys,” T. Pandey, D. S. Parker, and L. Lindsay, *Nanotechnology* 28, 455706 (2017).

41. “*The curious case of cuprous chloride: Giant thermal resistance and anharmonic quasiparticle spectra driven by dispersion nesting*,” S. Mukhopadhyay, D. Bansal, O. Delaire, D. Perrodin, E. Bourret-Courchesne, D. J. Singh and L. Lindsay, *Physical Review B* 96, 100301(R) (2017).

40. “*Phonon thermal transport in 2H, 4H and 6H silicon carbide from first principles*,” N. H. Protik, A. Katre, L. Lindsay, N. Mingo, and D. Broido, *Materials Today Physics* 1, 31 (2017).

39. “*Lattice thermal transport in $\text{La}_3\text{Cu}_3\text{X}_4$ ($\text{X}=\text{P}$, As , Sb , Bi) compounds: Interplay of anharmonicity and scattering phase space*,” T. Pandey, C. A. Polanco, L. Lindsay and D. S. Parker, *Physical Review B* 95, 224306 (2017).

38. “*Hydrodynamic phonon drift and second sound in a (20,20) single-wall carbon nanotube*,” S. Lee and L. Lindsay, *Physical Review B* 95, 184304 (2017).

37. “*Effects of functional group mass variance on thermal transport in graphene*,” L. Lindsay and Y. Kuang, *Physical Review B* 95, 121404(R) (2017).

2016

36. “*Boron arsenide phonon dispersion from inelastic x-ray scattering: Potential for ultrahigh thermal conductivity*,” H. Ma, C. Li, S. Tang, J. Yan, A. Alatas, L. Lindsay, B. C. Sales, and Z. Tian, *Physical Review B* 94, 220303(R) (2016).

35. “*Optic phonons and anisotropic thermal conductivity in hexagonal $\text{Ge}_2\text{Sb}_2\text{Te}_5$* ,” S. Mukhopadhyay, L. Lindsay, and D. J. Singh, *Scientific Reports* 6, 37076 (2016).

34. “*Isotope scattering and phonon thermal conductivity in light atom systems: LiH and LiF* ,” L. Lindsay, *Physical Review B* 94, 174304 (2016).

33. “*Physically founded phonon dispersions of few-layer materials and the case of borophene*,” J. Carrete, W. Li, L. Lindsay, D. A. Broido, L. J. Gallego, and N. Mingo, *Materials Research Letters* 4, 204 (2016).

32. “*Basal-plane thermal conductivity of nanocrystalline and amorphized thin germanane*,” G. Coloyan, N. Cultrara, A. Katre, J. Carrete, M. Heine, E. Ou, J. Kim, S. Jiang, L. Lindsay, N. Mingo, D. A. Broido, J. Heremans, J. Goldberger, and L. Shi, *Applied Physics Letters* 109, 131907 (2016).

31. "First principles Peierls-Boltzmann thermal transport: A topical review," L. Lindsay, *Nanoscale and Microscale Thermophysical Engineering* 20, 67 (2016).
30. "Role of low-energy phonons with mean-free-paths $>0.8 \mu\text{m}$ in heat conduction in silicon," P. Jiang, L. Lindsay, and Y. K. Koh, *Journal of Applied Physics* 119, 245705 (2016).
29. "Electronic structure and electron-phonon coupling in TiH_2 ," K. V. Shanavas, L. Lindsay and D. S. Parker, *Scientific Reports* 6, 28102 (2016).
28. "Thermal conductivity of graphene mediated by strain and size," Y. Kuang, L. Lindsay, S. Shi, X. Wang, and B. Huang, *International Journal of Heat and Mass Transfer* 101, 772 (2016).
27. "Optic phonon bandwidth and lattice thermal conductivity: the case of Li_2X ($\text{X}=\text{O}, \text{S}, \text{Se}, \text{Te}$)," S. Mukhopadhyay, L. Lindsay and D. S. Parker, *Physical Review B* 93, 224301 (2016).
26. "Tensile strains give rise to strong size effects for thermal conductivities of silicene, germanene and stanene," Y. D. Kuang, L. Lindsay, S. Q. Shi, and G. P. Zhen, *Nanoscale* 8, 3760 (2016).
- 2015 25. "Calculated transport properties of CdO : thermal conductivity and thermoelectric power factor," L. Lindsay and D. Parker, *Physical Review B* 92, 144301 (2015).
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23. "Reexamination of basal plane thermal conductivity of suspended graphene samples measured by electro-thermal micro-bridge methods," I. Jo, M. T. Pettes, L. Lindsay, E. Ou, A. Weathers, A. L. Moore, Z. Yao, and L. Shi, *AIP Advances* 5, 053206 (2015).
22. "Low-loss, infrared and terahertz nanophotonics using surface phonon polaritons," J. D. Caldwell, L. Lindsay, V. Giannini, I. Vurgaftman, T. L. Reinecke, S. A. Maier, and O. J. Glembocki, *Nanophotonics* 4, 44 (2015).
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- 2014 20. "The Seebeck coefficient and phonon drag in silicon," G. D. Mahan, L. Lindsay, and D. A. Broido, *Journal of Applied Physics* 116, 245102 (2014).
19. "Phonon thermal transport in strained and unstrained graphene from first principles," L. Lindsay, W. Li, J. Carrete, N. Mingo, D. A. Broido, and T. L. Reinecke, *Physical Review B* 89, 155426 (2014).
18. "Ab initio thermal transport," chapter in *Length-Scale Dependent Phonon Interactions, Topics in Applied Physics*, Vol. 128, pp. 137-173, N. Mingo, D. A. Stewart, D. A. Broido, L. Lindsay, and W. Li, edited by S. L. Shinde and G. P. Srivastava (Springer, New York, 2014).

- 2013
17. “*Ab initio study of the unusual thermal transport properties of boron arsenide and related materials*,” D. A. Broido, L. Lindsay, and T. L. Reinecke, *Physical Review B* 88, 214303 (2013).
16. “*Phonon-isotope scattering and thermal conductivity in materials with a large isotope effect: A first-principles study*,” L. Lindsay, D. A. Broido, and T. L. Reinecke, *Physical Review B* 88, 144306 (2013).
15. “*First-principles determination of ultrahigh thermal conductivity of boron arsenide: A competitor for diamond?*,” L. Lindsay, D. A. Broido, and T. L. Reinecke, *Physical Review Letters* 111, 025901 (2013) “*Editor’s Suggestion*”.
Selected for a Viewpoint in *Physics* (<http://physics.aps.org/articles/v6/76>) and featured in *Physics Today* 67(8), 27 (2014).
14. “*Ab initio thermal transport in compound semiconductors*,” L. Lindsay, D.A. Broido, and T. L. Reinecke, *Physical Review B* 87, 165201 (2013) “*Editor’s Suggestion*”.
- 2012
13. “*Thermal conductivity of bulk and nanowire $Mg_2Si_xSn_{1-x}$ alloys from first principles*,” W. Li, L. Lindsay, N. Mingo, D. A. Broido, and D. A. Stewart, *Physical Review B* 86, 195436 (2012).
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11. “*Thermal conductivity and large isotope effect in GaN from first principles*,” L. Lindsay, D. A. Broido, and T. L. Reinecke, *Physical Review Letters* 109, 095901 (2012).
10. “*Thermal conductivity of diamond nanowires from first principles*,” W. Li, N. Mingo, L. Lindsay, D. A. Broido, D. A. Stewart, and N. A. Katcho, *Physical Review B* 85, 195436 (2012).
9. “*Theory of thermal transport in multilayer hexagonal boron nitride and nanotubes*,” L. Lindsay and D. A. Broido, *Physical Review B* 85, 035436 (2012).
- 2011
8. “*Enhanced thermal conductivity and isotope effect in single-layer hexagonal boron nitride*,” L. Lindsay and D. A. Broido, *Physical Review B* 84, 155421 (2011).
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- 2010
6. “*Diameter dependence of carbon nanotube thermal conductivity and extension to the graphene limit*,” L. Lindsay, D. A. Broido, and N. Mingo, *Physical Review B* 82, 161402(R) (2010).
5. “*Flexural phonons and thermal transport in graphene*,” L. Lindsay, D. A. Broido, and N. Mingo, *Physical Review B* 82, 115427 (2010) “*Editor’s Suggestion*”.
4. “*Optimized Tersoff and Brenner empirical potential parameters for lattice dynamics and phonon thermal transport in carbon nanotubes and graphene*,” L. Lindsay and D. A. Broido, *Physical Review B* 81, 205441 (2010).

3. “Two-dimensional phonon transport in supported graphene,” J. H. Seol, I. Jo, A. L. Moore, L. Lindsay, Z. H. Aitken, M. T. Pettes, X. Li, Z. Yao, R. Huang, D. A. Broido, N. Mingo, R. S. Ruoff, and L. Shi, *Science* 328, 213 (2010).
- 2009 2. “Lattice thermal conductivity of single-walled carbon nanotubes: Beyond the relaxation time approximation and phonon-phonon scattering selection rules,” L. Lindsay, D. A. Broido, and N. Mingo, *Physical Review B* 80, 125407 (2009).
- 2008 1. “Three-phonon phase space and lattice thermal conductivity in semiconductors,” L. Lindsay and D. A. Broido, *Journal of Physics: Condensed Matter* 20, 165209 (2008).

Invited Presentations:

- 2024 “Simulations guiding phonon thermal conductivity reductions,” invited talk at Materials Research Society spring meeting, Seattle, WA (April)
- “Vibrational thermal transport modeling: background and insights,” invited virtual talk for Prof. Sanvito group at Trinity College Dublin (February)
- 2023 “Phonons and phase symmetries in non-symmorphic twisted and layered materials,” invited talk at Materials Research Society fall meeting, Boston, MA (November)
- “Modeling phonon behaviors driven by symmetry,” invited talk at International Materials Research Congress (MRS-Mexico), Cancun, Mexico (August)
- “Vibrational dynamics driven by structural symmetries and complexities,” invited talk at APS March Meeting (March)
- 2021 “Mentoring sneaks up on you,” invited virtual talk at ASME InterPACK 2021, virtual (October)
- “Phonons and twisting symmetries in non-symmorphic materials,” invited virtual talk at Materials Science and Technology 2021, Columbus, OH (October)
- “Phonons and symmetry in chiral and layered materials,” invited virtual talk at Rice University, Houston, TX (October)
- “Modeling phonon-defect interactions,” invited virtual talk at International Materials Research Congress, Cancun, Mexico (August)
- “Dislocation-limited thermal transport in III-Nitride materials,” invited talk at virtual TMS 2021 (March)
- 2020 “Vibrations and transport governed by symmetry, chirality, and selection rules,” invited virtual talk at Dalhousie University, Nova Scotia, Canada (November)
- “Advancing insights into phonon thermal transport with theory/experiment interactions,” invited talk at the TMS annual meeting, San Diego, CA (February)
- 2019 “Phonon thermal transport in 2D materials (and 1D and bulk),” invited talk at the International Institute of Physics Workshop: 2D Materials: From Fundamentals to Spintronics, Natal, Brazil (September)

- “*My struggles with phonon transport*,” invited talk at the Telluride Science Research Center, Thermal Transport at the Nanoscale workshop, Telluride, CO (June)
- “*Phonon thermal transport in nanostructured materials*,” invited talk at the International Workshop on Computational Nanotechnology, Evanston, IL (May)
- “*Building understanding of phonon thermal transport – Calculations and experiment*,” Tutorial at Materials Research Society spring meeting, Phoenix, AZ, (April)
- “*Predicting thermal transport in materials: Challenges and insights*,” invited colloquium at the University of South Florida, Tampa, FL (February)
- “*Phonon thermal transport: Reconciling predictions with reality*,” invited talk at the Electronic Materials and Applications conference (American Ceramics Society), Orlando, FL (January)
- 2018 “*Predicting anharmonic phonon lifetimes and lattice properties*,” invited tutorial at American Physical Society March meeting, Los Angeles, CA (March)
- “*Lattice thermal transport: Barriers and channels, challenges and insights*,” invited seminar at University of California, LA, Los Angeles, CA (March)
- 2017 “*Phonon thermal transport: Barriers and channels, challenges and insights*,” invited seminar at Vanderbilt University, Nashville, TN (September)
- “*Enhanced thermal conductivity in new materials*,” invited talk at Highly Efficient Advanced Thermal Energy Research (HEATER) workshop, Berkeley, CA (July)
- “*Nanoscale phonon thermal transport: insights and predictions*,” invited talk at IEEE International Conference on Nanotechnology, Pittsburgh, PA (July)
- “*First principles nanoscale phonon transport: insights and predictions*,” invited talk at the 9th US-Japan Joint Seminar on Nanoscale Transport Phenomena, Tokyo, Japan (July)
- “*Phonon thermal transport: barriers and channels, challenges and insights*,” invited colloquium at Missouri University of Science and Technology, Rolla, MO (April)
- 2016 “*Phonons from first principles: scattering and transport in bulk and nanoscale systems*,” invited seminar/guest lecture at University of Texas at Austin, Austin, TX
- “*First principles phonon thermal transport: from bulk to the nanoscale*,” invited talk at the International Institute of Physics Workshop: *Thermal and Electronic Transport in Nanostuctures*, Natal, Brazil
- 2015 “*Lattice thermal transport from first principles: predictive power?*” invited seminar at Carnegie Mellon University, Pittsburgh, PA
- “*First principles lattice thermal transport: nanoscale systems*,” invited talk at Materials Research Society spring meeting, San Francisco, CA
- 2014 “*First principles phonon thermal transport*,” invited talk at Stony Brook University, Stony Brook, NY

“First principles phonon thermal transport,” invited talk at the University of Texas at Austin, Austin, TX