Cary L. Pint

Department of Mechanical Engineering
Vanderbilt University
VU Station B #351592
Nashville, TN 37235-1592
Tel: Office: (615) 322-3720; Cell: (713) 540-8038
Email: cary.l.pint@vanderbilt.edu; carypint@gmail.com
Web page: https://my.vanderbilt.edu/pintlab/

EDUCATION

Doctor of Philosophy, Applied Physics
Rice University, Houston, TX, Defended, 2010; Awarded 2011
Ph.D. Advisor(s): Robert Hauge, Matteo Pasquali (Richard E. Smalley Laboratory)

Master of Science, Applied Physics
Rice University, Houston, TX, 2009

Bachelor of Science, Physics
University of Northern Iowa, Cedar Falls, IA, 2005

Professional Appointments

2012-present **Assistant Professor**, Mechanical Engineering *and* Interdisciplinary Materials Science Program, Vanderbilt University – *PI of Research Group*

2018-present **Associate Editor,** *Energy Storage Materials* (Elsevier)

2017-present **Chief Technology Officer and Co-Founder**, SkyNano LLC (TN)

2017-present **Advisory Board Member**, Gridspan Energy (Boston, MA)

2011-2012 **Research Scientist**, Extreme Technology Research Group, Intel Labs
Project Manager: Mike Graf

2010-2011 **Postdoctoral Fellow**, Department of Electrical Engineering, University of California, Berkeley. *Advisor: Ali Javey*

National Awards and Recognition

2014 **American Society of Engineering Education (ASEE) "Top 20 under 40"** Talent in Academia

2013 **Kavli Frontiers Fellow of the National Academy of Sciences**, Named for work on nanomaterials for energy devices.
2013 **Ralph E. Powe Junior Faculty Award**, Oak Ridge Associated Universities (ORAU).
2012 ***Forbes Magazine* "Top 30 under 30" Rising Stars of Science and Innovation**, Named for work on solid-state carbon nanotube energy storage.
2011 **Intel Corporation "High Five" Patent Award**, for innovative patent technology over the 2011 calendar year.
2010 **Dorothy M. and Earl S. Hoffman Award**, from the *American Vacuum Society* (AVS)
2006 **Outstanding Research Award in Physics**, National *Society of Physics Students (SPS)*.
2006 (Runner-up) **Vanderbilt Prize for Undergraduate Research in Physics**, Vanderbilt University
2005 (Runner-up) **LeRoy Apker Award**, *American Physical Society (APS)*

BRIEF SUMMARY OF RESEARCH, TEACHING, AND SERVICE ACTIVITY

Publications and Scholarship

- 115 peer-reviewed journal articles in print, several in submission
- > 5100 citations (Google Scholar), *h-index* 39 (Google Scholar)
- 7 "Highly Cited Papers" top 1% in field by number of citations (Web of Science)
- Dissemination of work through high impact press such as NBC News, BBC News, Forbes Magazine, MIT Technology Review, NPR News, Time Magazine, among others
- 13 granted US Patents, numerous applications pending
- 14 peer-reviewed conference papers in print; 1 book chapter in print
- > 80 invited and contributed presentation by Pint and group since 2012

Research Funding

- > $2M in funds to support research program, combining external PI led support from NSF (2 PI awards), BSF (1 PI award), NASA (1 PI subcontract), DOE (1 award), and corporate sponsored research.
- 1 Summer Faculty Fellowship and 3 user proposals granted (over $30,000 in facilities use, $25,000 in student/faculty salary support).

Teaching and Advising

- Research Advisor for 8 granted Ph.D.s and 1 granted M.S. degree
- Research Advisor for more than 40 undergraduate researchers
- Course evaluations far exceeding Vanderbilt Averages: Average undergraduate instructor rating 4.76/5 (9 sections); average graduate rating 4.83/5.00 (2 sections)
- Significantly better instructor performance than VUSE average: ~ 4.1/5.00.

Entrepreneurship Activities

- Co-founder and Chief Technology Officer, SkyNano, LLC
- Advisory Board Member, Gridspan Energy

External Service

- Technical reviewer for numerous journals (> 300 reviews) including Nature Materials, Nature Nanotechnology, Nature Communications, Nano Letters, ACS Nano, Advanced Materials, Chemistry of Materials, Journal of Physical Chemistry C, Carbon, Journal of Materials Chemistry, ACS Applied Materials and Interfaces, Chemical Engineering Journal
- Associate Editor; *Energy Storage Materials* (ENSM). Citescore 13.31 (compared to Nano Letters of 13.06). ENSM is the premier high impact outlet for energy storage research worldwide.
- Organizer for Guadalupe Carbon Nanotube Synthesis Workshop (Gordon Conference Equivalent for CNT community), 2018-2019
- Track Organizer, ASME IMECE, Advanced Manufacturing (2013-2014)
- Chaired 9 conference sessions (5 at ASME conferences)

PUBLICATIONS AND SCHOLARSHIP

Scholarly Productivity Indexes as of 4/2019:

- **Google Scholar**: Citations 5100, h-index 39, i10-index 91

Refereed Journal Publications

-Pint's graduate students in **bold**;
-Pint's undergraduate/high school researchers in *italic/underline*;
-other Vanderbilt graduate students not advised by Pint in *italic.*
***Note: Several manuscripts currently under submission (2019).**

Published

115. **K. Moyer**, **R. Carter**, *T. Hanken*, **A. Douglas**, **L. Oakes**, and *C.L. Pint**, "Electrophoretic Deposition of LiFePO4 onto 3D Current Collectors for High Areal Loading Battery Cathodes," **Materials Science and Engineering B** 241, 42-47 (2019).

114. E.S. Avraham, **A.S. Westover**, O. Girshevitz, *C.L. Pint*, and G.D. Nessim, "Modulating the Height of Carbon Nanotube Forests by Controlling Molybdenum Thin Film Reservoir Thickness," **Nanoscale** 11, 1929-1936 (2019).

113. *C. Meng,* **N. Muralidharan,** E. Teblum, **K. Moyer**, G.D. Nessim, and *C.L. Pint**, "A Multifunctional Structural Ultra-Battery Composite," **Nano Letters** 18, 7761-7768 (2018).

112. R. Rao*, *C.L. Pint*, A.E. Islam, R. Weatherup, S. Hofmann, E. Meshot, F. Wu, C. Zhou, N.T. Dee, P. Amama, W. Shi, D. Plata, J. Carpena, E. Penev, B.I. Yakobson, P. Balbuena, C.

Bichara, D. Futaba, S. Noda, H. Shin, K.S. Kim, B. Simard, F. Mirri, M. Pasquali, F. Fornasiero, E.I. Kauppinen, M.S. Arnold, B.A. Cola, P. Nikolaev, S. Arepalli, H-M. Cheng, D. Zakharov, E.A. Stach, M. Terrones, D.B. Geohegan, B. Maruyama, S. Maruyama, J. Zhang, Y. Li, W.W. Adams, A.J. Hart, "Carbon Nanotubes and Related Nanomaterials: Critical Advances and Challenges for Synthesis towards Mainstream Commercial Applications" **ACS Nano** 12, 11756-11784 (2018).

111. **A. Cohn**, *T. Metke*, *J. Donohue*, **N. Muralidharan**, **K. Share**, *C.L. Pint**, "Rethinking Na-Ion Anodes as Nucleation Layers for Anode-Free Sodium Batteries," **Journal of Materials Chemistry A** 6, 23875-23884 (2018).

110. **N. Muralidharan**, **A. Westover**, E. Teblum, **D. Schauben**, A. Yitzhak, M. Muallem, G.D. Nessim, and *C.L. Pint**, "Carbon Nanotube Reinforced Structural Composite Supercapacitor," **Scientific Reports** 8, 17662 (2018).

109. **K. Moyer,** *J. Donohue*, *N. Ramanna*, **A.P. Cohn, N. Muralidharan, J. Eaves,** and *C.L. Pint**, "High-Rate Potassium Ion and Sodium Ion Batteries by Co-Intercalation Anodes and Open Framework Cathodes" **Nanoscale** 10, 13335-13342 (2018).

108. **M. Li, N. Muralidharan, K. Moyer,** and *C.L. Pint**, "Solvent Mediated Hybrid 2D Materials: Black Phosphorus - Graphene Heterostructured Building Blocks Assembled for Sodium Ion Batteries," **Nanoscale** 10, 10443-10449 (2018).

107. **N. Muralidharan**, *J. Afolabi*, **K. Share**, **M. Li**, and *C.L. Pint**, "A Fully Transient Mechanical Energy Harvester," **Advanced Materials Technologies** 1800083 (2018).

106. **A. Douglas**, **R. Carter**, **M. Li**, and *C.L. Pint**, "Toward Small Diameter Carbon Nanotubes Synthesized from Captured Carbon Dioxide: Critical Role of Catalyst Coarsening," **ACS Applied Materials and Interfaces** 10, 19010-19018 (2018).

105. E. Shawat Avraham, **A. S. Westover**, A. Itzhak, L. Shani, V. Mor, O. Girshevitz, *C. L. Pint*, and G. D. Nessim, "Patterned Growth of Carbon Nanotube Forests using Cu and Cu/Ag Thin Film Reservoirs as Growth Inhibitors," **Carbon** 130, 273-280 (2018).

104. **R. Carter**, B. Davis, **L. Oakes**, M.R. Maschmann, and *C.L. Pint**, "High areal capacity lithium sulfur battery cathode by site-selective vapor infiltration of hierarchical carbon nanotube arrays," **Nanoscale** 9, 15018-15026 (2017).

103. **N. Muralidharan**, **M. Li**, **R. Carter**, *N. Galioto*, and *C.L. Pint**, "Ultralow Frequency Electrochemical – Mechanical Strain Energy Harvester using 2D Black Phosphorus Nanosheets," **ACS Energy Letters** 2, 1797-1803 (2017). [News coverage by NBC News, Forbes Magazine, C&EN News, among other news outlets]

102. **A. Douglas**, **N. Muralidharan**, **R. Carter**, and *C.L. Pint**, "Sustainable Processing of Metal Scraps using Air as a Strategy to Transform Carbon Dioxide into Multi-Walled Carbon Nanotubes," **ACS Sustainable Chemistry & Engineering** 5, 7104-7110 (2017).

101. **N. Muralidharan**, *C.N. Brock*, **A.P. Cohn**, **D.N. Schauben**, **R. Carter**, **L. Oakes**, D.G. Walker, and *C.L. Pint**, "Tunable MechanoChemistry of Lithium Battery Electrodes," **ACS Nano**, 11, 6243-6251 (2017).

100. **M. Li**, **R. Carter**, **A. Douglas**, **L. Oakes**, and *C.L. Pint**, "Sulfur vapor-infiltrated 3-D carbon nanotube foam for binder-free high areal capacity lithium sulfur battery composite cathodes," **ACS Nano** 11, 4877-4884 (2017). [Top 1% ISI Highly Cited Paper]

99. E.S. Avraham, O. Flecker, L. Benisvy, **L. Oakes**, *C.L. Pint*, and G.D. Nessim, "Inducing porosity and growing carbon nanofibers in ferroin perchlorate: An example of morphological transitions in coordination complexes," **Journal of Solid State Chemistry** 253, 21-28 (2017).

98. **R. Carter**, **L. Oakes**, **N. Muralidharan**, and *C.L. Pint**, "Isothermal sulfur condensation into carbon scaffolds: Improved loading, performance, and scalability for lithium sulfur battery cathodes," **Journal of Physical Chemistry C** 121, 7718-7727 (2017).

97. **M. Li**, **R. Carter**, **L. Oakes**, **A. Douglas**, **N. Muralidharan**, and *C.L. Pint**, "Role of carbon defects in the reversible alloying states of red phosphorus composite anodes for efficient sodium ion batteries," **Journal of Materials Chemistry A** 5, 5266-5272 (2017).

96. **R. Carter**, **L. Oakes**, **A. Douglas**, **N. Muralidharan**, and *C.L. Pint**, "A sugar derived room temperature sodium sulfur battery with long term cycling stability," **Nano Letters** 17, 1863-1869 (2017). [News release by IOP Nanotechweb.org]

95. **A. Douglas**, **R. Carter**, **N. Muralidharan**, **L. Oakes**, and *C.L. Pint**, "Iron catalyzed growth of crystalline multi-walled carbon nanotubes from ambient carbon dioxide mediated by molten carbonates," **Carbon** 116, 572-578 (2017).

94. **R. Carter**, **L. Oakes**, **N. Muralidharan**, **A.P. Cohn**, **A. Douglas**, and *C.L. Pint**, "Polysulfide anchoring mechanism revealed by atomic layer deposition of V2O5 and sulfur-filled carbon nanotubes for lithium-sulfur batteries," **ACS Applied Materials and Interfaces** 9, 7185-7192 (2017).

93. **A.P. Cohn**, **N. Muralidharan**, **R. Carter**, **K. Share**, and *C.L. Pint**, "An anode free sodium battery through in-situ plating of sodium metal," **Nano Letters** 17, 1296-1301 (2017). [Top 1% ISI Highly Cited Paper]

92. **A. Douglas** and *C.L. Pint**, "Electrochemical Growth of Carbon Nanotubes and Graphene from Ambient Carbon Dioxide; Synergy With Conventional Gas-Phase Growth Mechanisms," **Journal of Solid State Science and Technology** 6, M3084 – M3089 (2017). [invited review article in Sir Harry Kroto memorial issue].

91. **N. Muralidharan**, **A.S. Westover**, *H. Sun*, *N. Galioto*, **R. Carter**, **A.P. Cohn**, **L. Oakes**, and *C.L. Pint**, "From the junkyard to the power grid; Ambient processing of scrap metals into nanostructured electrodes for ultrafast rechargeable batteries," **ACS Energy Letters** 1, 1034-1041 (2016). [News release by NPR, AAU, Discovery News, Forbes Magazine, among others]

90. **L. Oakes**, **R. Carter**, and *C.L. Pint**, "Nanoscale Defect Engineering of Lithium-Sulfur Battery Composite Cathodes for Improved Performance," **Nanoscale** 8, 19368-19375, (2016).

89. **L. Oakes**, **N. Muralidharan**, **A.P. Cohn**, and *C.L. Pint**, "Catalyst morphology matters for lithium-oxygen battery cathodes," **Nanotechnology** 27, 495404 (2016).

88. **K. Share**, **A.P. Cohn**, **R. Carter**, B. Rodgers, and *C.L. Pint**, "Role of nitrogen doped graphene for improved high capacity potassium ion battery anodes," **ACS Nano** 10, 9738-9744, (2016). [Top 1% ISI Highly Cited Paper]

87. B. Davis, X. Yan, **N. Muralidharan**, **L. Oakes**, *C.L. Pint*, and M. Maschmann, "Electrically conductive hierarchical carbon nanotube networks with tunable mechanical response," **ACS Applied Materials and Interfaces** 8, 28004-28011 (2016).

86. **A.P. Cohn**, **N. Muralidharan**, **R. Carter**, **K. Share**, **L. Oakes**, and *C.L. Pint**, "Durable potassium ion battery electrodes from high-rate cointercalation into graphitic carbons," **Journal of Materials Chemistry A** 4, 14954 – 14959 (2016).

85. **R. Carter**, *D. Ejorh*, **K. Share**, **A.P. Cohn**, **A. Douglas**, **N. Muralidharan**, *T. Tovar*, and *C.L. Pint**, "Surface oxidized mesoporous carbons derived from porous silicon as dual polysulfide confinement and anchoring cathodes in lithium sulfur batteries," **Journal of Power Sources** 330, 70-77, (2016).

84. **K. Share**, **A.P. Cohn**, **R. Carter**, and *C.L. Pint**, "Mechanism of Electrochemical Potassium Ion Intercalation Staging in Few Layered Graphene from *In-Situ* Raman Spectroscopy, **Nanoscale** 8, 16435-16439 (2016).

83. **A.S. Westover**, J. Choi, K. Cui, T. Ishikawa, T. Inoue, R. Xiang, S. Chiashi, T. Kato, S. Maruyama*, and *C.L. Pint**, "Load dependent frictional response of vertically aligned single-walled carbon nanotube films." **Scripta Materialia** 125, 63-67 (2016).

82. **M. Li**, **A. Westover**, **R. Carter**, **L. Oakes**, **N. Muralidharan**, *T. Boire*, H-J. Sung, and *C.L. Pint**, "Noncovalent pi-pi stacking at the carbon-electrolyte interface; Controlling the voltage window of electrochemical supercapacitors." **ACS Applied Materials and Interfaces** 8, 19558-19566 (2016).

81. D. Gardner, C. Holzwarth, Y. Liu, S. Clendenning, W. Jin, B. Moon, *C.L. Pint*, Z. Chen, E. Hannah, C. Chen, C. Wang, E. Makila, R. Chen, T. Aldridge, J. Gustafson, "Integrated on-chip energy storage using passivated nanoporous-silicon electrochemical capacitors," **Nano Energy** 25, 68-79 (2016).

80. **K. Share**, **R. Carter**, P. Nikoleav, D. Hooper, **L. Oakes**, **A.P. Cohn**, R. Rao, A.A. Puretzky, D.B. Geohegan, B. Maruyama, and *C.L. Pint**, "Nanoscale silicon as a catalyst for graphene growth; Mechanistic insight from in-situ Raman Spectroscopy," **Journal of Physical Chemistry C** 120, 14180-14186 (2016).

79. **N. Muralidharan**, **R. Carter**, **L. Oakes**, **A.P. Cohn**, and *C.L. Pint**, "Strain engineering to modify the electrochemistry of energy storage electrodes," **Scientific Reports** 6, 27542 (2016).

78. **K. Share**, **A.S. Westover**, **M. Li**, and *C.L. Pint**, "Surface engineering of nanomaterials for improved energy storage – a review" **Chemical Engineering Science** 154, 3-19 (2016).

77. **L. Oakes**, **R. Carter**, *T. Hanken*, **A.P. Cohn**, **K. Share**, B. Schmidt, and *C.L. Pint**, "Interface strain in vertically stacked two-dimensional heterostructured carbon-MoS2 nanosheets controls electrochemical reactivity," **Nature Communications** 7, 11796 (2016). [Top 1% ISI Highly Cited Paper]

76. **M. Li**, **R. Carter**, **A.P. Cohn**, and *C.L. Pint**, "Interconnected foams of helical carbon nanofibers grown with ultrahigh yield for high capacity sodium ion battery anodes," **Carbon** 107, 109-115 (2016).

75. *T. Metke*, **A.S. Westover**, **R. Carter**, **L. Oakes**, **A. Douglas**, and *C.L. Pint**, "Particulate-free porous silicon networks for efficient capacitive deionization water desalination," **Scientific Reports** 6, 24680 (2016).

74. **A. Douglas**, **N. Muralidharan**, **R. Carter**, **K. Share**, and *C.L. Pint**, "Ultrafast triggered transient energy storage by atomic layer deposition into porous silicon for integrated transient electronics," **Nanoscale** 8, 7384-7390 (2016).

73. S. Licht*, **A. Douglas**, J. Ren, **R. Carter**, M. Lefler, and *C.L. Pint**, "Carbon nanotubes produced from ambient carbon dioxide for environmentally sustainable lithium-ion and sodium-ion battery anodes," **ACS Central Science** 2, 162-168 (2016). [Press release picked up by MIT Technology Review, Forbes Magazine, among others].

72. **A.P. Cohn**, **K. Share**, **R. Carter**, **L. Oakes**, and *C.L. Pint**, "Ultrafast solvent-assisted sodium ion intercalation into highly crystalline few-layered graphene," **Nano Letters**, 9, 44-49 (2016). [Top 1% ISI Highly Cited Paper]

71. **K. Share**, *J. Lewis*, **L. Oakes**, **R. Carter**, **A.P. Cohn**, and *C.L. Pint**, "Tungsten Diselenide (WSe2) as a high capacity, low overpotential conversion electrode for sodium ion batteries," **RSC Advances** 5, 101262-101267 (2015).

70. **A. Douglas**, **R. Carter**, **L. Oakes**, **K. Share**, **A.P. Cohn**, and *C.L. Pint**, "Ultrafine iron pyrite (FeS2) nanocrystals improve sodium-sulfur and lithium-sulfur conversion reactions for efficient batteries," **ACS Nano** 9, 11156-11165 (2015).

69. **A.S. Westover**, *B. Baer*, *B.H. Bello*, *H. Sun*, **L. Oakes**, L. Bellan, and *C.L. Pint**, "Multifunctional high strength and high energy epoxy composite structural supercapacitors with wet-dry operational stability," **Journal of Materials Chemistry A** 3, 20097-20102 (2015).

68. **R. Carter**, S. Chatterjee, *E. Gordon*, **K. Share**, *W.R. Erwin*, **A.P. Cohn**, R. Bardhan, and *C.L. Pint**, "Corrosion resistant three-dimensional nanotextured silicon for water photo-oxidation," **Nanoscale** 7, 16755-16762 (2015).

67. **L. Oakes**, *D. Zukifli*, *H. Azmi*, **K. Share**, *T. Hanken*, **R. Carter**, and *C.L. Pint**, "One Batch Exfoliation and Assembly of Two-Dimensional Transition Metal Dichalcogenide Nanosheets using Electrophoretic Deposition," **Journal of the Electrochemical Society** 162, D3063-D3070 (2015). *(JES Special Focus Issue on Electrophoretic Deposition)*

66. **L. Oakes**, **A.P. Cohn**, **A.S. Westover**, and *C.L. Pint**, "Electrophoretic stabilization of freestanding pristine graphene foams with carbon nanotubes for enhanced optical and electrical response," **Materials Letters** 159, 261-264 (2015).

65. **L. Oakes**, *T. Hanken*, **R. Carter**, *W. Yates*, and *C.L. Pint**, "Roll-to-roll nanomanufacturing of hybrid nanostructures for energy storage device design," **ACS Applied Materials and Interfaces** 7, 14201-14210 (2015).

64. **A.P. Cohn**, *W.R. Erwin*, **K. Share**, **L. Oakes**, **A.S. Westover**, **R. Carter**, R. Bardhan, and *C.L. Pint**, "All silicon electrode photo-capacitor for integrated energy storage and conversion," **Nano Letters** 15, 2727-2731, (2015).

63. L.V. Titova, *C.L. Pint*, Q. Zhang, R.H. Hauge, J. Kono, and F.A. Hegmann, "Generation of terahertz radiation by optical excitation of aligned carbon nanotubes," **Nano Letters** 15, 3267-3272, (2015).

62. **A.S. Westover**, *D. Freudiger*, *Z.S. Gani*, **K. Share**, **L. Oakes**, **R.E. Carter**, and C.L. Pint*, "On-chip high power porous silicon lithium ion batteries with stable capacity over 10,000 cycles," **Nanoscale** 7, 98-103, (2015).

61. **R. Carter**, **L. Oakes**, **A.P. Cohn**, *J. Holzgrafe*, *H.F. Zarick*, S. Chatterjee, R. Bardhan, and *C.L. Pint**, "Solution assembled single walled carbon nanotube foams; Superior performance in supercapacitors, lithium ion, and lithium air batteries," **Journal of Physical Chemistry C** 118, 20137-20151 (2014).

60. E. Shawat, I. Perelshtein, **A. Westover**, *C.L. Pint*, and G.D. Nessim, "Ultra high-yield one-step synthesis of conductive and superhydrophobic three-dimensional mats of carbon nanofibers via full catalysis of unconstrained thin film," **Journal of Materials Chemistry A**, 2, 15118-15123 (2014).

59. *W.R. Erwin*, **L. Oakes**, S. Chatterjee, *H.F. Zarick*, C.L. Pint*, and R. Bardhan*, "Engineered porous silicon counter electrodes for high efficiency dye sensitized solar cells," **ACS Applied Materials and Interfaces**, 6, 9904-9910 (2014).

58. **A.S. Westover**, **K. Share**, **R. Carter**, **A.P. Cohn**, **L. Oakes**, and *C.L. Pint**, "Direct integration of a supercapacitor into the backside of a silicon photovoltaic device," **Applied Physics Letters** 104, 213905 (2014).

57. **A.S. Westover**, *J.W. Tian*, *S. Bernath*, **L. Oakes**, *R. Edwards*, *F.N. Shabab*, S. Chatterjee, A. Anilkumar, and *C.L. Pint**, "A multifunctional load-bearing solid-state supercapacitor," **Nano**

Letters, 14, 3197-3202 (2014). [Press release picked up by Physics World Magazine, Pacific Standard, ASME News, among others]

56. S. Chatterjee, **R. Carter**, **L. Oakes**, *W.R. Erwin*, R. Bardhan, and *C.L. Pint**, "Electrochemical and corrosion stability of nanostructured silicon by graphene coatings; Toward high power porous silicon supercapacitors," **Journal of Physical Chemistry C**, 118, 10893-10902 (2014).

55. **A.S. Westover**, *F.N. Shabab*, *J. Tian*, *S. Bernath*, **L. Oakes**, *W.R. Erwin*, **R. Carter**, R. Bardhan, and *C.L. Pint**, "Stretching ion conducting polymer electrolytes; in-situ correlation of mechanical, ionic transport, and optical properties," **Journal of the Electrochemical Society** 161, E112 – E117 (2014).

54. *H. Zarick*, *W.R. Erwin*, *J. Aufrecht*, A. Coppola, B.R. Rogers, *C.L. Pint*, and R. Bardhan, "Morphological modulation of bimetallic nanostructures for accelerated catalysis," **Journal of Materials Chemistry A** 2, 7088-7098 (2014).

53. **A.P. Cohn**, **L. Oakes**, **R. Carter**, S. Chatterjee, **A.S. Westover**, **K. Share**, and *C.L. Pint**, Assessing the improved performance of freestanding, flexible graphene and carbon nanotube hybrid foams for lithium-ion battery anodes," **Nanoscale** 6, 4669-4675 (2014).

52. *J. Webb*, *W.R. Erwin*, *H. Zarick*, *J. Aufrecht*, *H. Manning*, M. Lang, *C.L. Pint*, and R. Bardhan, "Geometry dependent plasmonic tunability and photothermal characteristics of multibranched gold nanoantennas, **Journal of Physical Chemistry C** 118, 3696-3707 (2014).

51. E. Shawat, V. Mor, **L. Oakes**, Y. Fleger, *C.L. Pint*, and G.D. Nessim, "What is below the support layer affects carbon nanotube growth: an iron catalyst reservoir yields taller nanotube carpets," **Nanoscale** 6, 1545-1551 (2014).

50. **L. Oakes**, **A. Westover**, M. Mahjouri-Samani, S. Chatterjee, A. Puretzky, C. Rouleau, D.B. Geohegan, and *C.L. Pint**, "Uniform, homogenous coatings of carbon nanohorns on arbitrary substrates from common solvents," **ACS Applied Materials and Interfaces**, 5, 13153-13160 (2013).

49. **L. Oakes**, **A. Westover**, J. Mares, S. Chatterjee, *W.R. Erwin*, R. Bardhan, S.M. Weiss, and *C.L. Pint**, "Surface engineered porous silicon for stable, high performance electrochemical capacitors," **Nature Scientific Reports** 3, 3020 (2013). [Press release picked up by BBC News, Discover News, MRS 360, among others]

48. R. Bardhan, *H.F. Zarick*, A. Schwartzburg, and *C.L. Pint*, "Size-dependent phononic properties of PdO nanocrystals probed by nanoscale optical thermometry**," Journal of Physical Chemistry C** 117, 21558-21568 (2013).

47. R. Bardhan, L.O. Hedges, *C.L. Pint*, A. Javey, S. Whitelam, and J.J. Urban, "Uncovering the intrinsic size dependence of hydriding phase transformations of nanocrystals." **Nature Materials** 12, 905-912 (2013).

46. A. Orbaek, A. Owens, C. Crouse, *C.L. Pint*, R. Hauge, and A. Barron, "Single-walled carbon nanotube growth and chirality dependence on catalyst composition," **Nanoscale** 5, 9848-9859 (2013).

45. D.T. Morris, *C.L. Pint*, R.S. Arvidson, A. Luttge, R.H. Hauge, A.A. Belyanin, G.L. Woods, and J. Kono, "Midinfrared third harmonic generation from macroscopically aligned ultralong single-wall carbon nanotubes," **Physical Review B** 87, 161405 (rapid communication) (2013).

44. L. Ren, Q. Zhang, *C.L. Pint*, A.K. Wojcik, M. Bunney Jr., T. Arikawa, K. Takeya, I. Kawayama, M. Tonouchi, R.H. Hauge, A.A. Belyanin, and J. Kono, "Collective antenna effects in the terahertz and infrared response of highly aligned carbon nanotube arrays," **Physical Review B** 87, 161401 (rapid communication) (2013).

43. S. Nanot, A. Cummings, *C.L. Pint*, A. Ikeuchi, T. Akiho, K. Sueoka, R.H. Hauge, F. Leonard, and J. Kono, "Broadband polarization-sensitive photodetector based on optically-thick films of macroscopically long, dense, and aligned carbon nanotubes," **Nature Scientific Reports** 3, 1335 (2013).

42. E. Teblum, Y. Goffer, *C.L. Pint*, and G.D. Nessim, "Role of catalyst oxidation state in the growth of vertically aligned carbon nanotubes," **Journal of Physical Chemistry C** 116, 24522 (2012).

↑ Papers In Print Since I moved to Vanderbilt in August 2012 (Vanderbilt affiliation)

↓ Papers In Print Before moving to Vanderbilt (Intel, UC Berkeley, Rice affiliations)

41. M. Majumder, C. Rendall, J.A. Eukel, J. Wang, N. Behabtu, *C.L. Pint*, T-Y. Liu, A. Orbaek, A. Barron, J. Nam, R.H. Hauge, H.K. Schmidt, and M. Pasquali, "Overcoming "Coffee-Stain" Effects by Compositional Marangoni Flow Assisted Drop-Drying." **Journal of Physical Chemistry C** 116, 6536-6542 (2012).

40. P.B. Amama, *C.L. Pint*, F. Mirri, R.H. Hauge, and B. Maruyama, "The role of catalyst-underlayer interactions in termination of water-assisted carbon nanotube array growth," **Carbon** 50, 2396-2406 (2012).

39. L. Ren, *C.L. Pint*, M.Z. Jin, T. Arikawa, K. Takeya, I. Kawayama, M. Tonouchi, R.H. Hauge, and J. Kono, "Broadband terahertz polarizers based on aligned carbon nanotube stacks," **Nano Letters** 12, 787-790 (2012).

38. Z.Z. Sun, *C.L. Pint*, D. Marcano, C. Zhang, J. Yao, G. Ruan, Z. Yan, R.H. Hauge, and J.M. Tour, "Toward hybrid superlattices in graphene," **Nature Communications** 2, 559 (2011). (***Highlight*** **article by MRS Bulletin, Feb. 2012**)

37. *C.L. Pint*, K. Takei, R. Kapadia, M. Zheng, J. Moon, A.C. Ford, A. Jamshidi, R. Bardhan, J.J. Urban, M. Wu, J.W. Ager, B. Cruden, and A. Javey, "Rationally designed three dimensional carbon nanotube back contacts for efficient solar devices," **Advanced Energy Materials** 1, 1040-1045 (2011).

36. *C.L. Pint**, Z.Z. Sun, S. Moghazy, J.M. Tour, Y. Xu, R.H. Hauge, "Super growth of nitrogen-doped single-walled carbon nanotube arrays: decomposition chemistry, characterization, and doped/undoped heterostructures," **ACS Nano** 5, 6925-6934 (2011).

35. B. Dan, T.B. Wingfield, J.S. Evans, F. Mirri, *C.L. Pint*, M. Pasquali, and I.I. Smalyukh, "Spontaneous ordering of anisotropic gold nanoparticles in highly aligned SWNT macrostructures," **ACS Applied Materials & Interfaces** 3, 3718-3724 (2011).

34. P. Dong, *C.L. Pint*, M. Hainey, F. Mirri, Y. Zhan, M. Pasquali, R.H. Hauge, R. Verduzco, J. Mian, H. Lin, J. Lou, "Dye-sensitized solar cells using vertically aligned single-walled carbon nanotubes as a counter-electrode," **ACS Applied Materials & Interfaces** 3, 3157-3161 (2011).

33. *C.L. Pint**, N.W. Nicholas, S. Xu, Z.Z. Sun, J.M. Tour, H.K. Schmidt, R.G. Gordon, R.H. Hauge, R.H., "Three-dimensional solid-state supercapacitors from single-walled carbon nanotube array templates." **Carbon** 49, 4890-4897 (2011).

32. X. Zhang, *C.L. Pint*, M.H. Lee, B.E. Schubert, A. Jamshidi, K. Takei, H. Ko, A. Gillies, R. Bardhan, J.J. Urban, M. Wu, R. Fearing, and A. Javey, "Rapid optically- and thermally-responsive actuator materials based on single-walled carbon nanotube-polymer hydrogel composites." **Nano Letters** 11, 3239-3244 (2011). **[*Highlight in* Nature, 475, 426 (2011)]** [Top 1% ISI Highly Cited Paper]

31. N.T. Alvarez, F. Li, *C.L. Pint*, E. Fischer, J.M. Tour, V. Colvin, and R.H. Hauge, "Uniform, large-diameter carbon nanotubes in vertical arrays from monodisperse catalyst nanoparticle films," **Chemistry of Materials** 23, 3466-3475 (2011).

30. L.G. Booshehri, *C.L. Pint*, G.D. Sanders, L. Ren, C. Sun, E.H. Haroz, J.-H. Kim, K.-Y. Yee, Y.-S. Lim, R.H. Hauge, C.J. Stanton, and J. Kono, "Polarization dependence of coherent phonon generation and detection in highly-aligned single-walled carbon nanotubes." **Physical Review B** 83, 195411 (2011).

29. M.J. Green, C.C. Young, A.N.G. Parra-Vasquez, M. Majumder, V. Juloori, N. Behabtu, *C.L. Pint*, J. Schmidt, E. Kesselman, R.H. Hauge, Y. Cohen, Y. Talmon, M. Pasquali, "Direct imaging of carbon nanotubes spontaneously filled with solvent." **Chemical Communications** 47, 1228-1230 (2011).

28. S.M. Kim, *C.L. Pint*, P.B. Amama, R.H. Hauge, B. Maruyama, and E.A. Stach, "Catalyst and catalyst support morphology evolution in single-walled carbon nanotube supergrowth: growth deceleration and termination," (*invited feature article*) **Journal of Materials Research** 25, 1875-1885 (2010).

27. A.N.G. Parra-Vasquez, N. Behabtu, M.J. Green, *C.L. Pint*, C.C. Young, J. Schmidt, E. Kesselman, A. Goyal, P.M. Ajayan, Y. Cohen, Y. Talmon, R.H. Hauge, and M. Pasquali, "Spontaneous dissolution of ultra-long single- and multi-walled carbon nanotubes," **ACS Nano** 4, 3969-3978 (2010).

26. N.T. Alvarez, C.E. Hamilton, C.L. Pint, A. Orbaek, J. Yao, A.R. Barron, J.M. Tour, and R.H. Hauge, "Wet catalyst-support films for production of vertically aligned carbon nanotubes," **ACS Applied Materials & Interfaces** 2, 1851-1856 (2010).

25. L. Ren, C.L. Pint, A. Wojcik, T. Arikawa, Y. Takemoto, K. Takeya, I. Kawayama, A.A. Belyanin, M. Tonouchi, R.H. Hauge, and J. Kono, "Anisotropic terahertz dynamics of highly-aligned single-walled carbon nanotubes." **Journal of Terahertz Science and Technology** 3, 26-32 (2010).

24. S.M. Kim, C.L. Pint, P. Amama, D. Zahkarov, R.H. Hauge B. Maruyama, and E.A. Stach, "Evolution in catalyst morpology leads to carbon nanotube growth termination" **Journal of Physical Chemistry Letters** 1, 918-922 (2010).

23. P.B. Amama, C.L. Pint, S.M. Kim, L. McJilton, K.G. Eyink, E.A. Stach, R.H. Hauge, and B. Maruyama, "Influence of alumina type on the evolution and activity of alumina-supported Fe catalysts in single walled carbon nanotube carpet growth." **ACS Nano** 4, 895-904 (2010).

22. C.L. Pint, Y-Q. Xu, S. Moghazy, T. Cherukuri, N.T. Alvarez, E.H. Haroz, S. Mahzooni, S. Doorn, J. Kono, M. Pasquali, and R.H. Hauge, "Dry contact transfer printing of aligned carbon nanotube patterns and characterization of their optical properties for diameter distribution and alignment," **ACS Nano** 4, 1131-1145 (2010). (***Highlight in BBC News, "The Big Picture"***)

21. N.T. Alvarez, C.L. Pint, R.H. Hauge, J.M. Tour, "Abrasion as a catalyst deposition technique for carbon nanotube growth," **Journal of the American Chemical Society** 131, 15041-15048 (2009).

20. C.L. Pint, S.M. Kim, E.A. Stach, and R.H. Hauge, "Rapid and scalable reduction of dense surface-supported metal-oxide catalyst with hydrazine vapor," **ACS Nano** 3, 1897-1905 (2009).

19. C.L. Pint, N.T. Alvarez, and R.H. Hauge, "Odako growth of dense arrays of single-walled carbon nanotubes attached to carbon surfaces," **Nano Research** 2, 526-534 (2009).

18. L. Ren, C.L. Pint, L.G. Booshehri, W.D. Rice, X. Wang, D.J. Hilton, K. Takeya, M. Tonouchi, R.H. Hauge, and J. Kono, "Carbon Nanotube Terahertz Polarizer," **Nano Letters** 9, 2610-2613 (2009).

17. C.L. Pint, Y-Q. Xu, E. Morosan, and R.H. Hauge, "Alignment dependence of one-dimensional electronic hopping transport observed in films of highly aligned, ultralong single-walled carbon nanotubes," **Applied Physics Letters** 94, 182107 (2009).

16. C.L. Pint, N. Nicholas, J.G. Duque, A.N.G. Parra-Vasquez, M. Pasquali, and R.H. Hauge, "Recycling ultra-thin catalyst layers for multiple single-walled carbon nanotube array regrowth cycles and selectivity in catalyst activation," **Chemistry of Materials** 21, 1550-1556 (2009).

15. C.L. Pint, S.T. Pheasant, A.N.G. Parra-Vasquez, C.C. Horton, Y-Q. Xu, and R.H. Hauge, "Investigation of optimal parameters for oxide-assisted growth of vertically aligned single-walled carbon nanotubes," **Journal of Physical Chemistry C** 113, 4125 (2009).

14. P. Amama, *C.L. Pint*, L. McJilton, S.M. Kim, D.N. Zakharov, M.J. Pender, E.A. Stach, T.P. Murray, R.H. Hauge, and B. Maruyama, "The role of water in super growth of single-walled carbon nanotube carpets," **Nano Letters** 9, 44 (2009). [Top 1% ISI Highly Cited Paper]

13. *C.L. Pint*, Y.-Q. Xu, M. Pasquali, and R. Hauge, "Formation of highly dense, aligned ribbons and ultra-thin films of single-walled carbon nanotubes from carpets," **ACS Nano** 2, 1871 (2008).

12. *C.L. Pint*, G.H. Bozzolo, and R.H. Hauge, "Catalyst design for carbon nanotube growth using atomistic modeling," **Nanotechnology** 19, 405704 (2008).

11. *C.L. Pint*, N. Nicholas, S. Pheasant, J. Duque, N. Parra-Vasquez, G. Eres, M. Pasquali, and R. Hauge, "Temperature and gas pressure effects on vertically aligned carbon nanotube growth from Fe-Mo catalyst," **Journal of Physical Chemistry C** 112, 14041 (2008).

10. *C.L. Pint*, S.T. Pheasant, K. Coulter, M. Pasquali, H. Schmidt, and R. Hauge, "Synthesis of high aspect-ratio carbon nanotube 'flying carpets' from nanostructured flake substrates," **Nano Letters** 8, 1879 (2008).

9. *C.L. Pint*, S. Pheasant, N. Nicholas, C.C. Horton, and R.H. Hauge, "The role of the substrate surface morphology and water in the growth of vertically aligned single-walled carbon nanotubes," **Journal of Nanoscience and Nanotechnology** 8, 6158 (2008).

8. D.S. Todd, D. Leitner, *C. Pint*, and D.P. Grote, "Improving extraction and transport simulations of the superconducting ECR ion source VENUS," **Physics Procedia** 1, 265-272 (2008).

7. *C.L. Pint*, G.H. Bozzolo, and J.E. Garces, "Growth and alloy formation of Fe on flat and stepped Pt surfaces," **Surface Science** 602, 559 (2008).

6. *C.L. Pint*, G.H. Bozzolo, and J. Garces, "Atomistic simulation of Fe deposition and alloy formation on Pt substrates," **Applied Surface Science** 254, 92 (2007).

5. *C.L. Pint* and M.W. Roth, "Simulated effects of odd-alkane impurities in a hexane monolayer on graphite," **Physical Review B** 73, 115404 (2006).

4. *C.L. Pint*, M.W. Roth, and C. Wexler, "Behavior of hexane on graphite at near-monolayer coverages; molecular dynamics study," **Physical Review B** 73, 85422 (2006).

3. *C.L. Pint*, "Simulations of the chain-length dependence of the melting transition in short-chained n-alkanes on graphite," **Surface Science** 600, 921 (2006).

2. *C.L. Pint*, "Different melting behavior in pentane and heptane monolayers on graphite; Molecular dynamics simulations," **Physical Review B** 73(4), 45415 (2006).

1. M.W. Roth, *C.L. Pint*, and C. Wexler, "Phase transitions in hexane monolayers physisorbed onto graphite," **Physical Review B** 71, 155427 (2005).

Book Chapters

1. S. Nanot, N.A. Thompson, J.H. Kim, X. Wang, W.D. Rice, E.H. Haroz, Y. Ganesan, *C.L.*

Pint, and J. Kono, "Single-Walled Carbon Nanotubes", Chapter 4, pp. 105-146, in "The Springer Handbook of Nanomaterials" edited by Robert Vajtai, Springer-Verlag Publishers, 2013.

Granted Patents

13. **US Patent 9,978,533**: D.S. Gardner, T.V. Aldridge, C.W. Holzwarth, C.L. Pint, Z. Chen, W. Jin, Y. Liu, J.L. Gustafson "Energy storage device, method of manufacturing same, and mobile electronic device containing same." (2018)

12. **US Patent 9,963,781:** H.K. Schmidt, R.H. Hauge, *C.L. Pint*, S.T. Pheasant, K.E. Coulter, "Carbon nanotubes grown on nanostructured flake substrates and methods for production thereof," (2018).

11. **US Patent 9,928,966:** Z. Chen, D. Gardner, B.K. Moon, C.W. Holzwarth, *C.L. Pint*, S. Clendenning, "Nanostructured electrolytic energy storage devices," (2018)

10. **US Patent 9,793,061:** D. Gardner, *C.L. Pint*, S.B. Clendenning, "Energy storage device, method of manufacturing same, and mobile electronic device containing same," (2017)

9. **US Patent 9,685,278:** C. W. Holzwarth, *C. L. Pint*, M. C. Graf, and B. K. Moon, "Energy storage devices having enhanced specific energy and associated methods." (2017)

8. **US Patent 9,449,765:** D. Gardner, *C.L. Pint*, S.B. Clendenning, "Energy storage device, method of manufacturing same, and mobile electronic device containing same." (2016)

7. **US Patent 9,396,883:** P. Pande, *C. L. Pint*, Y. Liu, W. Jin, C. Holzwarth, and D. S. Gardner, "Faradaic energy storage device structures and associated techniques and configurations." (2016)

6. **US Patent 9,355,790:** C. W. Holzwarth, *C. L. Pint*, M. C. Graf, and B. K. Moon, "Energy storage devices having enhanced specific energy and associated methods." (2016)

5. **US Patent 9,299,505**: E. Hannah, *C.L. Pint*, C.W. Holzwarth, J.L. Gustafson, "Overcoming variance in stacked capacitors." (2016)

4. **US Patent 9,245,695**: D.S. Gardner, *C.L. Pint*, C.W. Holzwarth, W. Jin, Z. Chen, J.L. Gustafson, "Integration of energy storage devices onto substrates for microelectronics and mobile devices." (2016)

3. **US Patent 9,093,226**: D. S. Gardner, W. Jin, Z. Chen, C. W. Holzwarth, *C. L. Pint*, B. K. Moon, and J. L. Gustafson, "Energy storage device, method of manufacturing same, and mobile electronic device containing same." (2015)

2. **US Patent 8,816,465**: D. S. Gardner and C. L. Pint, "Energy conversion and storage device and mobile electronic device containing same." (2014)

1. **US Patent 8,709,373**: R.H. Hauge, *C.L. Pint*, N. Alvarez, C.W. Kittrell, "Strongly bound carbon nanotube arrays directly grown on substrates and methods for production thereof." (2014)

Refereed Conference Publications

14. *C.L. Pint*, "Capillary Force Guided Nanomanufacturing of Composite Materials for Advanced Battery Applications," Proceedings of the ASME 2017 International Mechanical Engineering Congress and Exposition, Paper No. IMECE2017-71738.

13. L. Prozorovska, **N. Muralidharan**, **A.S. Westover**, *C.L. Pint*, and D. Adams, "Cure Monitoring and Characterization of Epoxy/Amine Networks Modified with Ionic Liquids," Proceedings of the American Society for Composites, 32nd Annual Technical Conference.

12. B. Davis, **N. Muralidharan**, *C.L. Pint*, and M. Maschmann, "Electrically Addressable Hierarchical Carbon Nanotube Forests," Proceedings of the ASME 2016 International Mechanical Engineering Congress and Exposition, Paper No. IMECE2016-67226.

11. **R. Carter**, **L. Oakes**, and *C.L. Pint*, Three Dimensional Single-Walled Carbon Nanotube Foams for Ultrahigh Energy Density Lithium Air Battery Cathodes," Proceedings of the 2014 ASME International Mechanical Engineering Congress and Exposition (IMECE), Paper No. IMECE2015-52333.

10. **A.S. Westover**, *J. Tian*, *S. Bernath*, **L. Oakes**, *R. Edwards*, *F.N. Shabab*, S. Chatterjee, A. Anilkumar, and *C.L. Pint*, "Multifunctional load-bearing energy storage materials." Proceedings of the 2014 ASME International Mechanical Engineering Congress and Exposition (IMECE), p. V06AT07A033 (2014).

↑ Papers In Print Since I moved to Vanderbilt in August 2012 (Vanderbilt affiliation)

↓ Papers Prior to Vanderbilt (Intel, UC Berkeley, Rice affiliation)

9. S. Nanot, *C.L. Pint*, A.W. Cummings, F. Leonard, R.H. Hauge, and J. Kono, "Large area, broadband, and polarization-sensitive photodetectors based on aligned carbon nanotubes," Proceedings of 2012 Conference on Lasers and Electro-Optics (CLEO), OSA Technical Digest, paper JTu1M.4 (2012) (2 pages).

8. D.E. Lobo, *C.L. Pint*, B. Corry, and M. Majumder, "Building carbon nanotube fluidic devices," Proceedings of CHEMECA 2011, pgs. 1821 (1-5) (2011).

7. D.T. Morris, *C.L. Pint*, R.H. Hauge, G.L. Woods, A. Belyanin, and J. Kono, "Mid-infrared third harmonic generation in highly-aligned single-walled carbon nanotubes," Proceedings of 36th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)," doi: 10.1109/irmmw-THz.2011.6105016 (2011) (2 pages).

6. L. Ren, T. Arikawa, J. Kono, *C.L. Pint*, R.H. Hauge, A.K. Wojcik, A.A. Belyanin, Y. Takemoto, K. Takeya, I. Kawayama, and M. Tonouchi, "Anisotropic terahertz conductivity of one-dimensional electrons in single-walled carbon nanotubes," Proceedings of 2010 Conference on Lasers and Electro-Optics (CLEO), OSA Technical Digest, paper CMZ4 (2010) (2 pages).

5. P.B. Amama, *C.L. Pint*, S.M. Kim, K. Eyink, E. Stach, R.H. Hauge, and B. Maruyama, "Evolution, activity, and lifetime of supported Fe catalyst during super growth of SWNT carpets: Influence of the type of alumina," MRS Proceedings, 1258, 1258-RO3-02 (2010).

4. S.M. Kim, *C.L. Pint*, P.B. Amama, D.N. Zakharov, R.H. Hauge, B. Maruyama, and E.A. Stach, "Exploiting environmental transmission electron microscopy approaches to understand the origin of carbon nanotube growth termination," Microsc. Microanal. 16, 306-307 (2010).

3. S.M. Kim, *C.L. Pint*, P.B. Amama, D.N. Zakharov, R.H. Hauge, B. Maruyama, and E.A. Stach, "Understanding growth termination of single-walled carbon nanotube carpets by documenting the evolution of catalyst morphology with the transmission electron microscope," Microscopy and Microanalysis 15, 1176-1177 (2009).

2. *C.L. Pint*, M.W. Roth, "Confinement effects on the melting transition in hexane and decane monolayers between two graphite slabs," MRS Proceedings, 899, 0899-N07-21 (2005).

1. *C.L. Pint*, C. Wexler, and M.W. Roth, "Transition mechanisms and phases of hexane physisorbed onto graphite," Proc. NSTI Nanotechnology and Trade Show 2, 365 (2005).

CONFERENCE TALKS AND SEMINARS

Invited Conference Talks and Seminars (28) (+6 invited seminars in 2019)

28. June, 2018: "Interface Controlled Anode Free Sodium Batteries" invited talk at the Canadian Association of Physics (CAP) Annual Meeting, hosted by Dalhousie University Halifax, Nova Scotia, Canada (Invited by Prof. Jeff Dahn)

27. May, 2018: "Mechano-Electrochemical Coupling in 2D Materials: Toward Wearable Biomechanical Energy Harvesters" invited talk at the Techtextil North America Conference in Session "Smart and Wearable Textiles", Atlanta, GA (Invited by Prof. Wei Gao)

26. May, 2018: "New Electrochemically Controlled Synthesis and Applications of Nanomaterials for Energy Technologies" invited talk at 3M in the distinguished TechForum seminar series, Minneapolis, MN. (Invited by Dr. James Zhu)

25. March, 2018: "Economical Carbon Nanotubes from Environmentally Sustainable Transformation of Waste CO2," Invited presentation in panel entitled "EnergyTech: Powering a Cleaner Environment," MIT Global Start-up Workshop 2018, Bangkok, Thailand, March 27, 2018. (Pint was invited by Paula do Vale Pereira, and A. Douglas provided talk on behalf of Pint)

24. March, 2018: "Mechano-Chemical Response of Battery Materials for Biomechanical Energy Harvesting" invited talk at the International Battery Seminar & Exhibit, Alternatives in Energy Storage track, Fort Lauderdale, FL. (Invited by Conference Committee)

23. February, 2018: "From Electrochemistry to Mechanochemistry for New Sustainable and

Multifunctional Applications," joint invited talk at Massachusetts Institute of Technology (MIT), Department of Mechanical Engineering (invited by Prof. Brian Wardle), and Harvard University School of Engineering and Applied Sciences (invited by Prof. Chad Vecitis), Boston, MA (2/1/2018)

22. January, 2018: "From Electrochemistry to Mechanochemistry for Sustainable CO2 Conversion and Multifunctional Energy Storage and Harvesting" invited talk at Yale University, Joint between Departments of Chemical Engineering and Mechanical Engineering, New Haven, CT (1/31/2018). (invited by Prof. Desiree Plata)

21. November, 2017: "Controlling Interfaces for Stable Metal Anodes and Sulfur Cathodes" invited talk at the Materials Research Society (MRS) meeting, Symposium: Interfaces for Energy Storage; paper ES04.04.01, Boston, MA (11/27/2017). (Invited by Prof. Cengiz Ozkan)

20. November, 2017: "Capillary Force Guided Nanomanufacturing of Composite Materials for Advanced Battery Applications" invited talk at the American Society of Mechanical Engineering (ASME) International Mechanical Engineering Congress & Exposition (IMECE), Tampa, FL (Invited by Dr. Marinner Merill)

19. October, 2017: "Overcoming Manufacturing Limitations for Lithium-Sulfur Batteries with over 500 Wh/kg Energy Density" invited talk at the 2017 Sustainable Industrial Processing Summit & Exhibition in the International Symposium on Sustainable Secondary Battery Manufacturing and Recycling, 10/23/2015, Cancun, Mexico. (Invited by Prof. Katerina Aifantis)

18. October, 2017: "Engineered Materials and Devices for Efficient Energy Technologies" invited talk at the University of Maryland, College Park, Materials Science Department, 10/20/2017, College Park, MD. (Invited by Profs. Liangbing Hu and Gary Rubloff)

17. October, 2017: "Engineered Materials and Devices for Efficient Energy Technologies" invited talk at the Naval Research Laboratory (NRL), 10/18/2017, Washington DC. (Invited by Dr. Corey Love)

16. August, 2017 "Extreme Volume Change Two Dimensional Materials for Efficient Electrochemical Strain Energy Harvesting," invited talk at the 254th American Chemical Society (ACS) National Meeting and Exposition, Paper no. ENFL 317, 8/22/2017, Washington DC. (Invited by 2D Materials Organizing Committee)

15. August, 2017: "Highly Efficient Strain Energy Harvester through Electrochemical Cointercalation into Few Layered Graphene" invited talk SPIE Nanoscience + Engineering, Paper number 10349-9, 8/9/2017, San Diego, CA. (Invited by Organizing Committee)

14. May, 2017: "Toward the Growth of Single-Walled Carbon Nanotubes from Ambient Carbon Dioxide," invited talk at the Electrochemical Society (ECS) Meeting, New Orleans, LA. (Invited by Prof. Bruce Weisman)

13. May, 2017: "Engineered Materials and Devices for Efficient Energy Technologies" invited talk at the University of Missouri, Columbia, Mechanical Engineering Department, 5/1/2017, Columbia, MO. (invited by Prof. Chad Xing)

12. April, 2017: "Toward the Growth of Single-Walled Carbon Nanotubes from Ambient Carbon Dioxide," invited talk at the 8th "Guadalupe Workshop on Nucleation and Growth Mechanisms of Atomically-Thin Nanomaterials (the Gordon Conference equivalent for Nanomaterials)," San Antonio, TX. (Invited by Dr. Rahul Rao and Prof. John Hart)

11. March, 2017: "Engineered Materials and Devices for Efficient Energy Technologies" invited talk at the Advanced Connected Sustainable Technologies (ACST) Seminar Series at Honeywell Incorporated, Minneapolis, MN. (Invited by Dr. Steven Eickhoff)

10. November, 2016: "Engineering Materials and Devices for Efficient Next-Generation Energy Storage," Oak Ridge National Laboratory, Battery Research Facility (Materials Sciences Division). (Invited by Dr. Jagjit Nanda)

9. October, 2016: "Revealing Mechanisms and Rational Design for the Growth of Carbon Nanotubes from Carbon Dioxide," Invited talk at the 2016 Glen Helen Air Force Research Lab Collaborators Workshop, Yellow Springs, OH. (Invited by Dr. Benji Maruyama)

8. August, 2016: "Controlling Chemical and Electrochemical Properties of Low-Dimensional Nanostructures using Mechanical Strain" Invited talk at the American Chemical Society (ACS) Annual Meeting, Philadelphia, PA. (Invited by 2D Materials Organizing Committee)

7. October, 2015: "Growth of carbon nanomaterials on 3-D structures and investigation into adhesion properties of single-walled carbon nanotube materials to solid surfaces," Invited talk at the annual Yellow Springs Carbon Nanotube Collaborators workshop, Glen Helen Nature Reserve, Yellow Springs, OH. (Invited by Dr. Benji Maruyama)

6. August, 2015: "On-chip high power porous silicon lithium ion batteries with stable capacity over 10000 cycles," *invited talk* presented at SPIE Nanoscience + Engineering Conference, San Diego, CA. (Invited by Conference Organizing Committee)

5. July, 2014: "Integration of high power energy storage into silicon materials," invited seminar in the Emerging Innovation seminar series, Dow Corning Corporation, Midland, MI. (invited by Dr. Matthew Gave)

4. October, 2013 "Size-dependent phenomena in catalyst nanoparticles and nanoscale silicon catalyzed silicon nanoarchitectures," *invited seminar* at annual Yellow Springs Carbon Nanotube Collaborators workshop, Glen Helen Nature Reserve, Yellow Springs, OH. (invited by Dr. Benji Maruyama)

3. September, 2013 "Toward integrated and efficient energy storage devices," *invited seminar* given at the Materials and Manufacturing Directorate, Air Force Research Laboratory, WPAFB, OH. (invited by Dr. Benji Maruyama)

2. August, 2013: "Transformational nanomaterials for efficient energy storage and conversion devices," *invited seminar* given to the National Academy of Sciences (NAS) at the 2013 NAS Kavli Symposium, Irvine, CA. (Invited by the National Academy of Sciences)

1. November, 2012: "Challenges in Engineering Carbon Nanotube Arrays: Electrical Addressability, Mechanical Strength, and Controllable Catalyst Lifetimes," *invited seminar* at Carbon Nanotube Collaborators workshop, Air Force Research Laboratory, Dayton OH. (invited by Dr. Benji Maruyama)

Contributed Conference Presentations (53)

53. K. Wolfe, A. Cohn, K. Moyer, N. Muralidharan, and C.L. Pint, "Low-Cost Grid Energy Storage – A Novel Sodium-Lead Battery Chemistry from Recycled Lead-Acid Batteries," contributed talk by Kody Wolfe at the 2018 Materials Research Society (MRS) Spring Meeting (talk EN14.14.05), Phoeniz, AZ, April 6, 2018.

52. K. Moyer, A. Cohn, J. Donohue, and C.L. Pint, "Understanding Co-Intercalation into Graphitic Carbons," contributed talk by Kathleen Moyer at the 2018 Materials Research Society (MRS) Spring Meeting (talk EN14.04.02), Phoenix, AZ, April 3, 2018.

51. N. Muralidharan, C. Meng, E. Teblum, G. Nessim, and C.L. Pint, "Toward Multifunctional Structural Supercapacitors and Ultra-Battery Composites," contributed talk by Nitin Muralidharan at the 2018 Materials Research Society (MRS) Spring Meeting (talk EN13.09.03), Phoeniz, AZ, April, 6, 2018.

50. K. Moyer, R. Carter, K. Share, T. Hanken, L. Oakes, and C.L. Pint, "Electrophoretic Deposition as a Manufacturing Strategy for High Areal Capacity Cathodes," contributed poster presentation by K. Moyer at the 2018 Materials Research Society (MRS) Spring Meeting (talk EN06.07.06), Phoeniz, AZ, April 4, 2018.

49. J. Donohue, K. Moyer, A. Cohn, and C.L. Pint, "High Power Alternative Ion Batteries via Cointercalation," contributed poster presentation by J. Donohue at the 2018 Materials Research Society (MRS) Spring Meeting (poster EN06.04.07), Phoenix, AZ, April 3, 2018.

48. N. Muralidharan, A. Cohn, M. Li, E. Matijevich, K. Zelik, and C.L. Pint, "Harvesting Low Frequency Ambient Mechanical Energy using Battery Electrochemistry," contributed oral presentation by Nitin Muralidharan at the 2018 Materials Research Society (MRS) Spring Meeting (talk EN05.04.07), Phoenix, AZ, April 4, 2018.

47. M. Li, R. Carter, A. Douglas, L. Oakes, and C.L. Pint, "How thick should an ideal high areal capacity lithium-sulfur cathode be?" contributed poster presentation by Mengya Li at the Battery Gordon Research Conference, Ventura, CA, Feb. 25th – March 2nd, 2018.

46. E. Shawat Avraham, O. Fleker, L. Benisvy, L. Oakes, C.L. Pint, and G.D. Nessim, "Inducing Porosity and Growing Carbon Nanofibers in Ferroin Perchlorate—An Example of Morphological Transitions in Coordination Complexes" contributed poster presentation by Efrat

Shawat Avraham at the 2017 Materials Research Society (MRS) Fall meeting (poster NM.03.04.19), Boston, MA, Nov. 27, 2017.

45. E. Shawat Avraham, L. Shani, V. Mor, O. Girshevitz, A.S. Westover, C.L. Pint, G.D. Nessim, "Thin-Film Metal Reservoirs as Growth Inhibitor/Enhancers to Modulate the Height of Carbon Nanotubes Forests" contributed oral presentation by Efrat Shawat Avraham at the 2017 Materials Research Society (MRS) Fall meeting (talk NM.02.03.02), Boston, MA, Nov. 28, 2017.

44. N. Muralidharan, C. Brock, G. Walker, and C.L. Pint, "Strain Engineering to Control the Electrochemistry of Battery Electrodes," contributed oral presentation by C.L. Pint at the 231st ECS Meeting (talk A05-0321), New Orleans, LA, May 29, 2017.

43. A. S. Westover, N. Muralidharan, H. Sun, N. Galioto, R. Carter, A.P. Cohn, L. Oakes, and C.L. Pint, "From the Junkyard to the Power Grid: Ambient Processing of Scrap Metals into Nanostructured Electrodes for Ultrafast Rechargeable Batteries," contributed oral presentation by A.S. Westover at the 231st ECS Meeting (talk A02-0158).

42. A. S. Westover, E. Teblum, D. Schauben, A. Yitzhak, N. Muralidharan, M. Muallem, G.D. Nessim, and *C.L. Pint*, "Carbon Nanotube Reinforced Structural Composite Supercapacitors," contributed poster presentation by A.S. Westover at the 231st ECS Meeting (poster B03-0693), New Orleans, LA, May 30, 2017.

41. A.P. Cohn and C.L. Pint, "Anode Free High Energy Density Sodium Batteries" contributed oral presentation by C.L. Pint at the 231st ECS Meeting (Talk A05-0397), New Orleans, LA, May 31, 2017.

40. C. Brock, N. Muralidharan, C.L. Pint, and D.G. Walker, "Ab Initio Modeling of Strain Effects on Lithiation of Vanadium Pentoxide," contributed oral talk by Casey Brock at the Materials Research Society (MRS) Spring Meeting, talk ES6.1.03, Phoenix, AZ (April 18. 2017).

39. K. Share, A. Cohn, R. Carter, and C.L. Pint, "Nitrogen Doped Few Layered Graphene as a High Capacity Potassium Ion Battery and Investigation of Defect Storage with In Situ Raman Spectroscopy," Materials Research Society (MRS) Fall Meeting, Boston, MA, Oral presentation by Keith Share. (December, 2016).

38. A.P. Cohn and C.L. Pint, "Cointercalation for Alternative Ion Storage," Materials Research Society (MRS) Fall Meeting, Boston, MA, Oral presentation by Adam Cohn. (December, 2016).

37. A.P. Cohn and C.L. Pint, "Developing an Anode-Free Sodium Battery," Materials Research Society (MRS) Fall Meeting, Boston, MA, Oral presentation by Adam Cohn. (December, 2016).

36. L. Oakes, R. Carter, A. Cohn, and C.L. Pint, "Controlling Nanomaterial Assembly to Improve Material Performance in Energy Storage Electrodes using Electrophoretic Deposition" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Landon Oakes, Talk number MS-MoM8 (November, 2016)

35. K. Share, R. Carter, P. Nikolaev, D. Hooper, L. Oakes, A. Cohn, R. Rao, A. Puretzky, D. Geohegan, B. Maruyama, and C.L. Pint, "Nanoscale Silicon as a Catalyst for Graphene Growth: Mechanistic Insight from In-Situ Raman Spectroscopy" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Keith Share, Talk number SS+AS+HC-MoM8. (November, 2016)

34. A. Douglas, N. Muralidharan, R. Carter, K. Share, and C.L. Pint, "Ultrafast Triggered Transient Energy Storage by Atomic Layer Deposition Into Porous Silicon for Integrated Transient Electronics" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Anna Douglas, Talk number TF+EM-MoA2. (November, 2016)

33. R. Carter, A.P. Cohn, N. Muralidharan, A. Douglas, K. Share, C.L. Pint, "Anchoring Down Soluble Polysulfides for Lithium and Sodium Sulfur Battery Cathodes using Atomic Layer Deposition" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Rachel Carter, Talk number TF+EM-MoA8. (November, 2016)

32. N. Muralidharan, R. Carter, A. Cohn, L. Oakes, C.L. Pint, "Strain Engineering of Ultrathin Metal Oxide Coatings Deposited using Atomic Layer Deposition for Controlled Electrochemical Energy Storage" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Nitin Muralidharan, Talk number EM+SS+TF-ThA1. (November, 2016)

31. A.P. Cohn, and C.L. Pint, "In-situ Raman of Sodium Ion Cointercalation into Highly Crystalline Few-Layered Graphene" American Vacuum Society 64th International Symposium, Nashville, TN. Oral presentation by Adam Cohn, Talk number EM+SS+TF-ThA7. (November, 2016)

30. A. Westover, J. Choi, K. Cui, X. Rong, T. Inoue, S. Chiashi, T. Ishikawa, E.I. Kauppinen, T. Kato, S. Maruyama, and C.L. Pint, "Materials Science and Engineering (MSE) Congress, Darmstadt, Germany, Oral presentation by Andrew Westover (September, 2016).

29. A. Westover, E. Teblum, D. Schauben, A. Yitzhak, N. Muralidharan, M. Muallen, G.D. Nessim, and C.L. Pint, "Carbon Nanotube Reinforced Multifunctional Energy Storage Composites," Materials Science and Engineering (MSE) Congress, Darmstadt, Germany, Poster presentation by Andrew Westover (September, 2016).

28. D. Ejorh, R. Carter, and C.L. Pint, "Porous Silicon Templated Nanoporous Carbons for Tunable Li-S Battery Electrodes," National Society of Back Engineers (NSBE) National Convention Research Symposium. March 2016, Boston, MA

27. M. Li, R. Carter, and C.L. Pint, "Fabrication of Three Dimensional Carbon Nanotube – Nickel Nanofoam Heterostructures for Energy Storage Applications," 2016 TMS Annual Meeting & Exhibition, Nashville, TN, Oral presentation by Mengya Li (February, 2016).

26. A.S. Westover, J. Choi, K. Cui, X. Rong, T. Inoue, S. Chiashi, T. Ishikawa, E.I. Kauppinen, T. Kato, S. Maruyama, and C.L. Pint, "Measuring the Adhesion of Carbon Nanotube Films to

Substrates via Microscratch Testing," 2016 TMS Annual Meeting & Exhibition, Nashville, TN, Oral presentation by Andrew Westover (February, 2016).

25. R. Carter, D. Ejorh, K. Share, A.P. Cohn, A. Douglas, N. Muralidharan, and C.L. Pint, "Strategic Polysulfide Confinement in Mesoporous Carbon Developed through Porous Silicon Template," 2016 Gordon Research Conference on Batteries, Ventura, CA, Poster presentation by Rachel Carter (February, 2016).

24. A.P. Cohn, C.L. Pint, "Ultrafast Solvent-Assisted Sodium Ion Intercalation into Highly Crystalline Few Layered Graphene," 2016 Gordon Research Conference on Batteries, Ventura, CA, Poster presentation by Adam Cohn (February, 2016).

23. A. Douglas, R. Carter, L. Oakes, K. Share, A.P. Cohn, and C.L. Pint, "Ultrafine Iron Pyrite Nanocrystals Improve Sodium-Sulfur and Lithium-Sulfur Conversion Reactions for Efficient Batteries," 2016 Gordon Research Conference on Batteries, Ventura, CA, Poster presentation by Anna Douglas (February, 2016).

22. E. S. Avraham, I. Perelshtein, A. Westover, G. D. Nessim, and C. L. Pint, "High-yield synthesis of floating three-dimensional carbon nanofiber mats using controllable substrate-catalyst detachment," contributed oral presentation by E.S. Avraham at MRS Fall Meeting, Boston, MA, December, 2015 (presentation Q9.04).

21. E. S. Avraham, A. Westover, C. L. Pint, and G. D. Nessim, "Catalyst reservoirs to enhance or inhibit carbon nanotube growth," contributed oral presentation by E.S. Avraham at MRS Fall Meeting, Boston, MA, December, 2015 (presentation Q12.10).

20. L. V. Titova, C. L. Pint, Q. Zhang, R. Hauge, J. Kono, and F. A. Hegmann, "THz generation in optically excited aligned carbon nanotube arrays," contributed oral presentation by L. Titova at MRS Fall Meeting, Boston, MA, December, 2015 (presentation Q16.07).

19. A. Westover, B. Baer, J. Tian, S. Bernath, B. Bello, H. Sun, R. Edwards, L. Oakes, F. Shabab, S. Chatterjee, A. Anilkumar, and C. L. Pint, "Multifunctional load bearing structural energy storage systems using 3D nanoporous electrodes and polymer-ionic liquid electrolytes," contributed oral presentation by A. Westover at MRS Fall Meeting, Boston, MA, December, 2015 (presentation LL1.07).

18. K. Share, J. Lewis, L. Oakes, A. P. Cohn, and C. L. Pint, "Tungsten diselenide as a high capacity anode for sodium ion batteries," contributed poster by K. Share at MRS Fall Meeting, Boston, MA, December, 2015 (presentation LL3.11).

17. A. S. Westover, T. Metke, J. Afolabi, K. Share, R. Carter, A. P. Cohn, L. Oakes, and C. L. Pint, "Low-temperature chemical passivation routes for integration of supercapacitors directly into silicon solar cells," contributed oral presentation by A. Westover at MRS Fall Meeting, Boston, MA, December, 2015 (presentation NN18.04).

16. W. R. Erwin, A. P. Cohn, L. Oakes, S. Chatterjee, H. Zarick, K. Share, R. Carter, C. L. Pint, and R. Bardhan, "Carbon passivated porous silicon counter electrodes for dye sensitized solar cells enable integrated energy conversion and energy storage," contributed poster presentation by W. R. Erwin at MRS Fall Meeting, Boston, MA, December, 2015 (presentation OO12.17).

15. A. P. Cohn, W. R. Erwin, C. Pint, "All silicon electrode photo-capacitor for integrated energy storage and conversion," contributed poster presentation by A. P. Cohn at MRS Fall Meeting, Boston, MA, December, 2015 (presentation OO12.29).

14. R. Carter, L. Oakes, and C. L. Pint, "Three dimensional single-walled carbon nanotube foams for ultrahigh energy density lithium air battery cathodes," contributed oral presentation by C. L. Pint at ASME International Mechanical Engineering Congress and Exposition (IMECE), Houston, TX, November 2015 (presentation IMECE2015-52333).

13. D. Ejorh, R. Carter, and C.L. Pint, "Porous Silicon Templated Nanoporous Carbons for Tunable Li-S Battery Electrodes," contributed oral and poster presentation by D. Ejorh at National Society of Black Engineers (NSBE) Region 3 Convention Research Presentation Competition.

12. A. S. Westover, T. Metke, J. Afolabi, K. Share, R. E. Carter, A. P. Cohn, L. Oakes, and C. L. Pint, "Low-temperature chemical passivation routes for the integration of supercapacitors directly into silicon solar cells," contributed oral presentation by A. Westover at the 228th Annual ECS Meeting, Phoenix, AZ, October, 2015. (presentation A09:576)

11. C. L. Pint, A. S. Westover, A. P. Cohn, W. R. Erwin, K. Share, T. Metke, R. Bardhan, "Embedding solar cell materials with on-board integrated energy storage for load-leveling and dark power delivery," contributed oral presentation by C. L. Pint at the SPIE Nanoscience + Engineering Conference, San Diego, CA, August, 2015.

10. A. P. Cohn, L. Oakes, R. Carter, K. Share, and C. L. Pint, "The effect of layer thickness on the Mg ion storage properties of graphenic foams," contributed poster presentation by A. P. Cohn, Beyond Lithium Ion VIII conference, Oak Ridge, TN, June, 2015.

9. K. Share, C. L. Pint, "Tungsten selenide as a high capacity electrode for sodium ion batteries," contributed poster presentation by K. Share, Beyond Lithium Ion VIII conference, Oak Ridge, TN, June, 2015.

8. A. S. Westover, K. Share, R. Carter, A. P. Cohn, L. Oakes, and C. L. Pint, "Direct integration of a supercapacitor into the backside of a silicon photovoltaic device," contributed poster presentation by A. Westover at MRS Fall Meeting, Boston, MA, December, 2014 (presentation Y4.02).

7. E. S. Avraham, I. Perelshtein, A. Westover, C. L. Pint, and G. D. Nessim, "Ultra high-yield synthesis of self-assembled, conductive, and superhydrophobic three-dimensional mats of carbon nanofibers via full catalysis of unconstrained thin film," contributed oral presentation by G. D. Nessim at MRS Fall Meeting, Boston, MA, December, 2014.

6. L. Oakes, W. Yates, A. Cohn, R. Carter, and C. L. Pint, "Electrophoretic roll-to-roll nanomanufacturing of carbon nanostructures," contributed oral presentation by C. L. Pint at ASME International Mechanical Engineering Congress and Exposition (IMECE), Montreal, CA, November 2014 (presentation IMECE2014-38912).

5. A. Westover, J. Tian, S. Bernath, L. Oakes, R. Edwards, F. Shabab, S. Chatterjee, A. Anilkumar, and C. L. Pint, "Multifunctional load-bearing energy storage materials," contributed oral presentation by C. L. Pint at ASME International Mechanical Engineering Congress and Exposition (IMECE), Montreal, CA, November 2014 (presentation IMECE2014-38931).

4. L. Oakes, C. L. Pint, "Nanomanufactured hybrid carbon nanomaterials for improved energy storage devices using electrophoretic assembly," contributed oral presentation by L. Oakes (on behalf of C. L. Pint) at EPD 2014: 5th International Conference on Electrophoretic Deposition: Fundamentals and Applications, Hernstein, Austria, October 2014.

3. L. Oakes, C. L. Pint, "Roll-to-roll manufacturing of pristine nanoarbon materials for energy devices applications," contributed poster presentation by L. Oakes at EPD 2014: 5th International Conference on Electrophoretic Deposition: Fundamentals and Applications, Hernstein, Austria, October 2014 (poster 13). Note: chosen for "Chair's choice best poster award" at conference.

2. E. Shawat, *C. L. Pint*, and G. D. Nessim, "Synthesis of dense carbon nanotube carpets with uniform distribution of holes using thermal chemical vapor deposition," *contributed* oral talk by G.D. Nessim at MRS Fall Meeting, Boston, MA, December, 2013 (presentation SS4.04).

1. L. Oakes, S. Chatterjee, and *C. L. Pint*, "Scalable assembly of carbon nanomaterials into three-dimensional structures using electrophoresis," *contributed* oral talk by C.L. Pint at ASME IMECE, San Diego, CA, November, 2013.

SELECTED HIGH IMPACT RESEARCH DISSEMINATION THROUGH PRESS

San Francisco Chronicle, "Levi's, Google Unveil $350 Denim Jacket that Connects to Smartphones," *quoted* Pint as an expert in the area of integrated energy storage and harvesting materials. Date: 9/25/2017, URL: http://www.sfgate.com/business/article/Levi-s-Google-unveil-350-denim-jacket-that-12223673.php

NBC News, "Why Energy Harvesting Clothes will be such a Big Deal" *Highlighted* research results from Pint Lab along with results from two other globally leading research teams in this area. Date: 8/30/2017 URL: https://www.nbcnews.com/mach/science/why-energy-harvesting-clothes-will-be-such-huge-deal-ncna797501

Association of American Universities (AAU), "Research to Secure our Energy Future" *Highlighted* research from Pint lab in article entitled, "Making High Performance Batteries from Junkyard Scraps," Date: 1/23/2017 URL: https://www.aau.edu/research-scholarship/featured-research-topics/making-high-performance-batteries-junkyard-scraps

NPR News, Marketplace and Tech Insider, "World Building," *Highlighted* and *Interviewed* Pint for batteries built from waste among other topics related to world building (including Bill Nye the Science Guy) on popular NPR Talk show. Date: 12/14.2016 URL (Audio only):

https://www.marketplace.org/2016/12/14/tech/codebreaker-marketplace-and-tech-insider/s02-5-world-building

Time Magazine, 5 Top Ideas *highlighting* Pint's research results on batteries made from junkyard scraps. Date: 11/3/2016 URL: http://time.com/4556286/trees-are-the-smartest-investment-to-clean-urban-air/

MIT Technology Review, "How Carbon Dioxide from the Air can Boost Batteries," *Highlighted* research results from Pint Lab. Date: 3/7/2016 URL: https://www.technologyreview.com/s/600939/how-carbon-dioxide-from-the-air-can-boost-batteries/#/set/id/600954/

American Society of Mechanical Engineers, "Batteries Begone" *Highlighted* research results from Pint Lab on the integration of batteries into structural materials. Date: September, 2014 URL: https://www.asme.org/engineering-topics/articles/energy/batteries-begone?cm_sp=Home-_-HomeContent-_-Batteries-Begone

BBC News, "Battery Boost from Coated Silicon," *Highlighted* research results from Pint Lab on energy storage integrated into silicon wafers. Date: 10/24/2013, URL: http://www.bbc.com/news/technology-24652659

SPONSORED RESEARCH AND GRANTS

Funding Overview and Statistics (since Fall, 2012):

Total Funding at Vanderbilt: ~$2.03M
Total Funding managed as PI: ~ $1.62M
Total Company Funds (SBIR): 225K
Total Support for Students (PI support + GFRP): $2.28M

Current/Active Grants:

1. NSF-DMR
Title: MRI: Acquisition of an Atomic Layer Deposition Tool for Research, Education, and Outreach at Vanderbilt University
Budget: $416,623
Contract Dates: 09/15/2017 – 09/15/2019
Role: Co-PI

2. Research Grant. Sponsor: Kuraray America
Title: Electrochemical Production of Onion-Like Carbon Materials (Phase I)
Total Budget: $120,000
Contract Dates: 03/01/2018 - 12/31/2019
Role: PI

3. Research Grant. Sponsor: National Aeronautics and Space Administration (NASA)
Title: Development of a Lightweight CubeSat with Multifunctional Structural Battery Systems
Budget: $25,000 (1 year)
Contract dates: 04/1/2018 – 02/2019
Role: PI of subcontract award

4. Research Grant. Sponsor: Industry Donation from ABB Group
Title: Development of a novel three-dimensional carbon nanotube sensor
Budget: $10,000
Contract dates: unlimited
Role: PI

5. Research Contract, ExxonMobil
Title: Mechanisms of Carbon Nanotube Growth from Carbon Dioxide Sources
Current Funds: $20,000; preliminary replication study

6. Research Grant. Sponsor: Department of Energy
Title: Ambient Capture and Conversion of Carbon Dioxide into Single-Walled Carbon Nanotubes
Budget: $525,208
Contract Dates: 05/2/2017 – 05/30/2019 (NCE through 5/30/2020)
Role: PI of research. Funds designated for research onsite at DOE laboratory facility. Provides full time support for 1 Ph.D. student, and funds for materials and collaborations for research onsite at DOE facility.

7. Company Grant. Sponsor: National Science Foundation
Title: Scalable Electrochemical Production of Carbon Nanotubes from Carbon Dioxide (Phase I)
Budget: $225,000
Contract Dates: 01/25/2019 – 10/25/2019
Role: Participant and CTO of awarded company. Co-wrote SBIR proposal with Dr. Anna Douglas.

Sponsored Research Activity: Completed (No longer active)

8. Research Grant. Sponsor: NSF-CMMI
Title: Controlled Manufacturing of Lightweight, All-Carbon High Performance Materials using Low-cost Solvent Assembly
Budget: $298,998
Contract Dates: 08/16/2014 – 05/31/2018, NSF contract # 1400424
Role: PI

9. Research Grant. Sponsor: US-Israel Bi-National Science Foundation (BSF)
Title: Carbon Nanotube-Substrate Interfaces to Enable Lightweight Structural Energy Storage
Budget: $75,000
Contract Dates: 09/1/2015 – 08/31/2017, BSF contract #2014041
Role: PI

10. Research Grant. Sponsor: NSF-CMMI
Title: Engineering Surface Stability of Porous Silicon in Electrochemical Environments
Budget: $436,865
Contract Dates: 09/1/2013 – 08/31/2016, NSF contract # 1334269
Role: PI

11. Research Grant. Sponsor: Vanderbilt University Discovery Grant
Title: Understanding the Role of Mechanics in the Electrochemistry of Energy Storage Materials
Budget: $50,000 (2 years)
Contract dates: 08/1/2016 – 08/1/2018
Role: PI

12. Research Internship. Sponsor: National Aeronautics and Space Administration (NASA)
Title: Development of a Lightweight CubeSat with Multifunctional Structural Battery Systems
Total Award: $7,000
Internship Dates: 06/01/2018 – 08/31/2018
Role: Awarded given as an extension of existing collaboration between PI and NASA on project, "Development of a Lightweight CubeSat with Multifunctional Structural Battery Systems"

13. Travel Grant. Sponsor: US-Israel Bi-National Science Foundation (BSF)
Title: Using ALD to Engineer the Surface Adhesion of CNT Forests
Budget: $4,000
Contract Dates: 02/1/2016 – 01/31/2017
Role: PI

14. Research/Travel Grant. Sponsor: NSF East Asia and Pacific Summer Institute
Title: EAPSI: Engineering Carbon Nanotube and Growth Electrode Surface Adhesion for Structural Energy Storage
Budget: $10,000
Contract Dates: 09/03/15 – 09/03/16
Role: Adviser to Funded Student Andrew Westover
Explanation: Competitive grant evaluated by NSF. Provided salary and travel for Pint's Graduate Student Andrew Westover to carry out collaborative research project at the University of Tokyo during Summer, 2016.

15. Research Grant. Sponsor: NASA (subaward from Prof. Al Strauss)
Title: Tennessee's NASA EPSCoR RID program, Contract #NNX13AB26A
Budget: $30,000 (1 year, subcontract)
Contract Dates: 08/15/2015 – 08/15/2016
Role: PI

16. Research Grant. Sponsor: Oak Ridge Associated Universities (Ralph E. Powe Award)
Title: Development of Structurally-Sound Multifunctional Energy Storage Materials
Budget: $10,000 (1 year)
Contract Dates: 09/1/2013 – 08/31/2014
Role: PI

Other Support Not Included Above:

1. National Science Foundation Graduate Student Research Fellowships
- **Total Amount: $660,000 (x 5 graduate students)**
- Awarded to all students based on research success in Pint Lab (not prior awards)
- Awardees: Keith Share, Adam Cohn, Kathleen Moyer, Anna Douglas, Janna Eaves
- Laboratory Success Ratio with NSF GRFP: >71% (5 of 7)

2. Summer Faculty Fellowship at Air Force Research Laboratory, Summer 2013
- **Total Amount: $25,000**
- Summer support for one graduate student to work on-site at AFRL
- 8 weeks of salary support for Pint

3. User Proposals, Oak Ridge National Laboratory
- **Total Amount: ~ $40,000 in equipment use (x 3 user proposals funded)**
- Supports ongoing regular (weekly) use of nanoscience facilities in the Center for Nanophase Materials Science, ORNL.

4. National Science Foundation Research Experience for Undergraduates (REU) Site
- **Total Budget: $358,534 (Contract Dates: 05/1/2016 – 04/30/2019)**
- Co-PI; Pint had no involvement in proposal writing/submission.

TEACHING

Undergraduate Courses Taught
A (*) indicates a required core course in the mechanical engineering curriculum

- (*)ME-220 **Thermodynamics**; Fall 2012; Final Enrollment: 9
- (*)ME-220 **Thermodynamics**; Spring 2013; Final Enrollment: 30
- (*)ME-220 **Thermodynamics**; Spring 2014; Final Enrollment: 31
- (*)ME-2220 **Thermodynamics**; Fall 2015; Final Enrollment: 22
- (*)ME-2220 **Thermodynamics**; Spring 2016; Final Enrollment: 16
- (*)ME-2190 **Dynamics**; Fall 2016; Final Enrollment: 17
- (*)ME-2190 **Dynamics**; Spring 2018; Final Enrollment: 18
- (*)ME-2190 **Dynamics**; Fall 2018; Final Enrollment: 10
- (*)ME-2220 **Thermodynamics**; Spring 2019; Final Enrollment: 26

Graduate Courses Taught

- ME-391-02 **Special Topics; Energy Storage Technology, Theory and Applications**; Fall, 2014, Final Enrollment: 9
- IMS-5320 **Nanoscale Science and Engineering**; Fall 2015, Final Enrollment: 26 (seminar style course)

- IMS-5320 **Nanoscale Science and Engineering**; Fall 2017, Final Enrollment: 20 (lecture-style core materials course)

Supervised Research for Credit

- ME 209C Mech. Eng. Undergraduate Research; Spring 2013; Enrollment 2
- ME 209C Mech. Eng. Undergraduate Research; Summer 2013; Enrollment 1
- ME 209C Mech. Eng. Undergraduate Research; Fall 2013; Enrollment 1
- ME 209A Mech. Eng. Undergraduate Project; Fall 2013; Enrollment 2
- ME 209C Mech. Eng. Undergraduate Research; Spring 2014; Enrollment 3
- ME 209C Mech. Eng. Undergraduate Research; Fall 2014; Enrollment 5
- ME 209A Mech. Eng. Undergraduate Project; Spring 2015; Enrollment 1
- ME 209C Mech. Eng. Undergraduate Research; Spring 2015; Enrollment 4
- ME 3860 Mech. Eng. Undergraduate Research; Spring 2016; Enrollment 1
- ME 3860 Mech. Eng. Undergraduate Research; Spring 2017; Enrollment 4
- ME 3842 Mech. Eng. Project; Spring 2017; Enrollment 1
- ME 3860 Mech. Eng. Undergraduate Research; Fall 2017; Enrollment 3
- ME 3860 Mech. Eng. Undergraduate Research; Spring 2018; Enrollment 2
- ME 3860 Mech. Eng. Undergraduate Research; Fall 2018; Enrollment 2
- ME 3860 Mech. Eng. Undergraduate Research; Spring 2019; Enrollment 2

Contribution to Other Courses

- EECE 223 Guest lecture: Introduction to Supercapacitors (Fall 2013) (S. Weiss)
- IMS 320 Guest lecture: Energy Storage Materials and Devices (Fall 2013) (K. Jennings)
- ChBE 290 Guest lecture: Electrochemical Energy Storage Devices (Spring 2013) (R. Bardhan)
- ChBE 290 Guest lecture: Challenges in Energy Storage (Spring, 2015) (R. Bardhan)
- EECE 3233 Guest lecture: Introduction to Supercapacitors (Fall 2015) (S. Weiss)
- ES 1115 Guest lecture: Nanotechnology for Energy Storage (Fall 2016) (K. Galloway)
- EECE 3233 Guest lecture: Introduction to Supercapacitors (Fall 2017) (S. Weiss)

Overall Course Rating Performance (VUSE Averages in Blue):

Undergraduate Courses Instructed:
Instructor Rating: 4.76/5.00 **Course Rating: 4.18/5.00** **(Pint Averages)**
Instructor Rating: 4.11/5.00 **Course Rating: 3.84/5.00** **(VUSE Averages)**

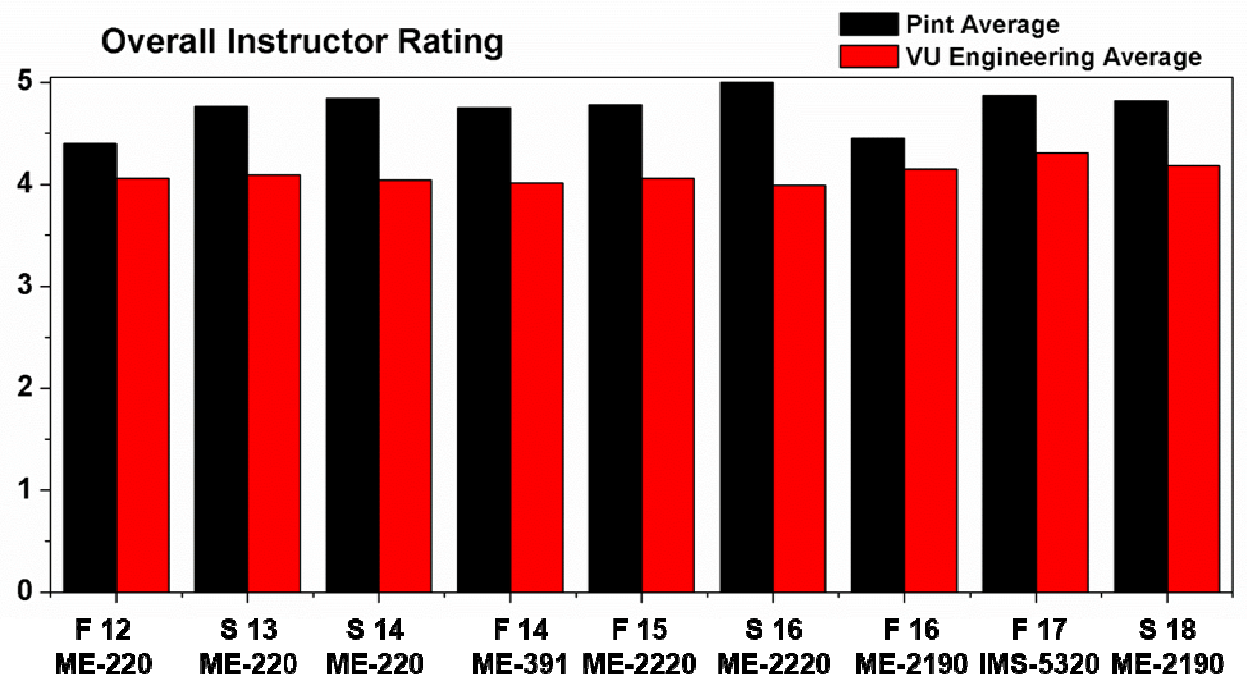
Graduate Courses Instructed:
Instructor Rating: 4.83/5.00 **Course Rating: 4.39/5.00** **(Pint Averages)**
Instructor Rating: 4.20/5.00 **Course Rating: 4.02/5.00** **(VUSE Averages)**

Rating Criteria: 1 – Poor, 2 – Marginal, 3 – Average, 4 – Very Good, 5 – Excellent

---

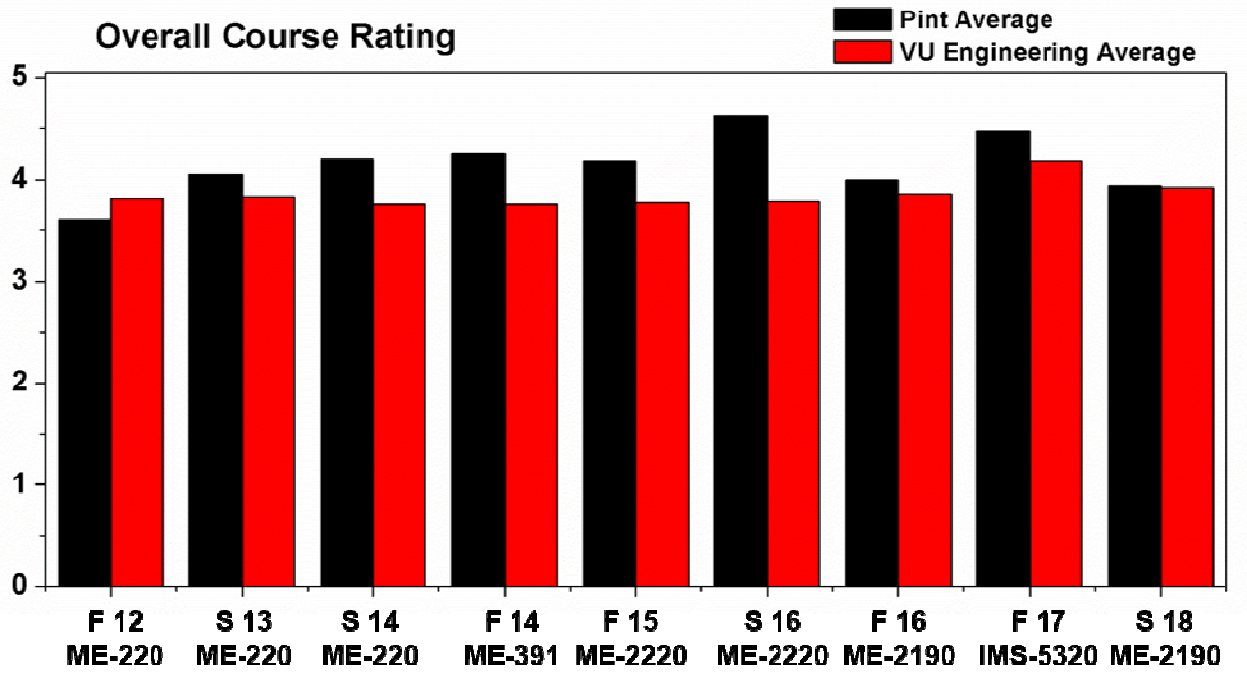
Individual Course Evaluations Can Be Made Available Upon Request

Primary Evaluation Questions for Each Course Pint Instructed



Additional data not shown in graph:

1. ME-2190 (Dynamics), Spring 2019: **Pint Rating: 5.0/5.0**; **VU Eng.: 4.14/5.0**
2. ME-2220 (Thermodynamics), Fall 2019: **Pint Rating: 4.69/5**; **VU Eng.: 4.24/5.0**



Additional data not shown in graph:
1. ME-2190 (Dynamics), Spring 2019: **Pint Rating: 5.0/5.0**; **VU Eng.: 3.85/5.0**
2. ME-2220 (Thermodynamics), Fall 2019: **Pint Rating: 4.38/5**; **VU Eng.: 3.96/5.0**

Rating Criteria: 1 – Poor, 2 – Marginal, 3 – Average, 4 – Very Good, 5 – Excellent

ADVISING

Ph.D. Students Advised (Successfully Defended Degree):

1. Dr. Andrew Westover
Ph.D. Defense November 18th, 2016
Dissertation title: "Challenging Conventional Approaches to Energy Storage"
Current Position: Staff Scientist at Oak Ridge National Laboratory (permanent staff)
*Finalist for Distinguished ORNL Director's Fellowship

2. Dr. Landon Oakes
Ph.D. Defense August 30th, 2016
Dissertation title: Controlling Nanomaterial Assembly to Improve Material Performance in Energy Storage Electrodes
Current Position: Battery Scientist at 24M

3. Dr. Rachel Carter
Ph.D. Defense April, 2017
Dissertation title: Room Temperature Sulfur Cathode Design and Processing Techniques
Current Position: Permanent Technical Staff Member at Naval Research Lab

4. Dr. Adam Cohn
Ph.D. Defense April 17, 2018
Dissertation Title: Cointercalation and In-situ Plating for Advanced Na Batteries
Current Position: Technical Consultant at Exponent Consulting Firm

5. Dr. Keith Share
Ph.D. Defense May 1, 2018
Dissertation Title: Engineering High Capacity Alternate Ion Battery Electrodes Through Mechanistic Insight
Current Position: Manager of Battery Fabrication, Panasonic Corporation (@ Gigafactory)

6. Dr. Nitin Muralidharan
Ph.D. Defense June 6, 2018
Dissertation Title: Mechano-Electrochemistry for Advanced Energy Storage and Harvesting Devices
Current Position: Postdoctoral Researcher at ORNL
*Finalist for Distinguished ORNL Director's Fellowship

7. Dr. Mengya Li
Ph.D. Defense July 2, 2018
Dissertation Title: Nanomanufacturing of Carbon Nanocomposites for Energy Storage and Environmental Applications
Current/Future Position: Postdoctoral Researcher at Battery Manufacturing Facility, ORNL

8. Dr. Anna Douglas
Ph.D. Defense March 22, 2019

Dissertation Title: Sustainable Manufacturing of Carbon Nanomaterials for Energy Storage Applications
Current Position: CEO of SkyNano LLC

M.S. Students Advised (Successfully Defended Research-based Thesis):

1. Deanna Schauben, Vanderbilt University Mechanical Engineering
M.S. Defense April 5, 2017
Dissertation Title: Mechano-Electrochemistry of Nickel Titanium
Current Position: Engineer at SmartWatt, Nashville, TN

Postdoctoral Fellows Advised:

1. Dr. Shahana Chatterjee, Ph.D. University of Pennsylvania
Mentored: 2013 – 2014
Current Position: Research Staff in Laboratory of Prof. Rod Ruoff @ UNIST

Current Graduate Students (3):

Kathleen Moyer, Vanderbilt University Materials Science Ph.D. expected 2021
Janna Eaves, Vanderbilt University Mechanical Engineering Ph.D. expected 2022
Murtaza Zohair, Vanderbilt University Materials Science Ph.D. expected 2022

Undergraduate Student Researchers Mentored (40)
1. Abdul Fahim Fauzi; 2012-2013, Vanderbilt Mechanical Engineering (now Schlumberger)
2. William Yates; 2012-2013, Vanderbilt Mechanical Engineering
3. John Wenpu Tian; 2013 – 2014, Vanderbilt Mechanical Engineering (now Baker Hughes)
4. Shivaprem Bernath; 2013, Vanderbilt Mechanical Engineering (now SpaceX)
5. John Paul Elizondo; 2013, NSF REU from Texas A&M
6. Rachel Carter; 2013, Vanderbilt Mechanical Engineering (now Naval Research Labs)
7. Jeffrey Holzgrafe; 2013, NSF REU from Olin College, (now Cambridge Univ.)
8. Farhan Nur Shabab; 2013-2014, Vanderbilt Mechanical Engineering (now Tesla)
9. Daniel Freudiger; 2013-2014; Vanderbilt Mechanical Engineering (now OSU)
10. Trevor Hanken; 2013 – 2017, Vanderbilt Mechanical Engineering (now National Instrument)
11. Supriyadi Tasim; 2014, Vanderbilt Mechanical Engineering
12. Babatunde Bello; 2014, Vanderbilt Engineering Sciences
13. Coleen Kerr; 2014, Vanderbilt Electrical Engineering (now Capitol One)
14. Grant Hebrank; 2014, Vanderbilt Electrical Engineering (now Univ. of Chicago)
15. Dzul Zulkifli; 2014, Vanderbilt Mechanical Engineering (now ExxonMobil)
16. Muhammad Hafiz Azmi; 2014-2015, Vanderbilt Mechanical Engineering
17. Deanna Schauben; 2014, Vanderbilt Mechanical Engineering
18. Supriyadi Tasim; 2014, Vanderbilt Mechanical Engineering (now Malaysia Airlines)
19. Ashton Davis; 2014, REU student from Lemoyne-Owen College
20. Thomas Metke; 2014 – present, Vanderbilt Mechanical Engineering (Princeton Fall 2018)
21. Zarif Gani; 2014-2015, Vanderbilt Mechanical Engineering (now Google)
22. Grant McNeil; 2015, Vanderbilt Mechanical Engineering (now consultant @ AlliantGroup)
23. John (Jack) Lewis; 2015, REU from Trinity College (now Georgia Tech)

24. Dennis Ejorh; 2015, REU from Tennessee Tech (now Google)
25. Haotian Sun; 2015, Vanderbilt Mechanical Engineering
26. Jeremiah Afolabi; 2015 – 2017, Vanderbilt Mechanical Engineering (now Apple Inc.)
27. Eric Speer; 2016, Vanderbilt Mechanical Engineering
28. Nicholas Galioto; 2016-2017, Vanderbilt Mechanical Engineering (U. Michigan Fall 2018)
29. Jonathan Tari; 2016-2017, Vanderbilt Mechanical Engineering
30. Jered Dominguez-Trujillo; 2016, Vanderbilt Mechanical Engineering
31. Noah Gertler; 2017, Vanderbilt Mechanical Engineering
32. Siyuan (Dominic) Jiang; 2017 – present, Vanderbilt Mechanical Engineering
33. Chuanzhe (Jackson) Meng; 2017 – present, Vanderbilt Mechanical Engineering
34. Jennifer Donohue; 2017, REU from Binghamton University (Caltech Fall 2018)
35. Rebeca Gurrola; 2018, REU from St. Mary's University
36. Osama Assal; 2018 – present, Vanderbilt University Mechanical Engineering
37. Jacob Fine; 2019 – present, Vanderbilt University Mechanical Engineering
38. Ezra Brody; 2019 – present, Vanderbilt University Mechanical Engineering
39. Nora Ait Boucherbil; 2019 – present, Vanderbilt University Mechanical Engineering
40. Alexander Stephens; 2019 – present, Vanderbilt University Mechanical Engineering

High School Student Researchers Advised (5)

1. Thomas Metke, Vanderbilt School for Science and Math, 2012 – 2014
(now Vanderbilt ME *en route* to Princeton University, 2018)
2. Rob Edwards, Vanderbilt School for Science and Math, 2013 – 2014
3. Evan Gordon, Vanderbilt School for Science and Math, 2014 – 2015
4. Christian Gonzalez, Home schooled (from Birmingham, AL), 2015
5. Neha Ramanna, Harpeth Hall Girls School, 2017 - present

Other Advising Activities

- Faculty academic advisor for 30 Mechanical Engineering undergraduate students
- Faculty reviewer for a ME Senior Design Project, Fall 2013-Spring 2014
- Faculty judge for ME Senior Design, Spring 2015, Spring 2017

ENTREPRENEURSHIP AND INNOVATION

1. Founder and CTO of SkyNano LLC

Company mission and value proposition: To use scalable electrochemistry to convert CO_2 captured from air to single- and multi-walled carbon nanotubes (value: $500 - $100,000 per kg) with operating cost < $5/kg. This will overcome current supply chain bottlenecks that prevent nanotube-enabled technologies, and build from sustainable high value carbon-negative manufacturing methods. *SkyNano LLC is based on the only demonstrated technology to yield carbon-negative manufacturing when considering energy consumption of the process (and their emissions).*

Awards: Numerous cash prizes. Was placed in top 6 finalists nationally for the DOE Cleantech University Prize after advancing from regionals competition.

Partnership: We are currently partnered/collaborating with numerous companies including those in sectors of tires, coatings, adhesives, batteries, and oil/gas.

Company Size: 6 Personnel; (summer, 2019)
CEO is Ms. Anna Douglas (current Ph.D. student of Pint); CTO is Pint.

2. Advisory Board Member, GridSpan Energy (2017 – present)

CEO: Mr. Alec Macklis (Vanderbilt Alumnus)
Location: Boston, MA

Company Vision – to revolutionize energy availability and reliability to countries outside of the US utilizing a novel mobile energy transmission platform that combines automated software systems and large-scale transmission platforms that rely on low-cost battery technology.

Role: Technical advising. Macklis and Pint are collaborating to submit a high impact technical research paper, and Pint is working with Macklis to assist in start-up efforts.

*Note: Macklis started company after being inspired in Pint's ME-220 Thermodynamics course offering at Vanderbilt, where Macklis was an undergraduate student.

SERVICE

PROFESSIONAL SERVICE

Professional Memberships

- American Society of Mechanical Engineers (ASME)
- Materials Research Society (MRS)
- American Chemical Society (ACS)
- Electrochemical Society (ECS)

Conference Leadership

Track Organizer, ASME IMECE Track 2, "Advanced Manufacturing, "ASME IMECE 2014 (Montreal, CA). [included 15 individual topics, with multiple sessions each]

Explanation: In 2014, I served as Organizer for the Advanced Manufacturing track at the 2014 ASME IMECE Conference held in Montreal, CA. This track consisted of 15 topics, each of which contained multiple sessions. Duties included managing the conference proceeding submissions to ensure proper completion of peer-reviews across the > 200 papers submitted to the track, and working with the two other co-organizers to distribute accepted papers into sessions with times and locations at the conference site.

Conference Co-Organizer, 2019 Guadalupe Conference on Carbon Nanotube Synthesis.

I co-organized the 2019 Guadalupe Conference (the CNT equivalent of a Gordon Research Conference) along with Prof. John Hart at MIT and Dr. Eric Meshot at LLNL. This conference was started by Prof. Richard Smalley, and is the premier world workshop-type conference on carbon nanotube and recently graphene research. Generally, this involves 25 invited speakers, and ~ 100 total attendees.

Other Conference Organization

9. Session Chair, MRS Fall Meeting, ES04.06: In Situ Characterization and Operando Techniques I, November 2017 (Boston, MA).

8. Session Chair, 231st ECS Meeting, session A05: Al, Mg, and K Batteries, May 2017 (New Orleans, LA).

7. Session Chair, 231st ECS Meeting, session B01: Synthesis and Separations 1, May 2017 (New Orleans, LA).

6. Session Chair, ASME IMECE session 2-17-1, "Plenary Lectures." Nov. 2014, (Montreal, CA)

5. Session Chair, ASME IMECE session 2-1-1, "Tribology and Mechanical Properties." Nov. 2014 (Montreal CA)

4. Session Chair, ASME IMECE session 2-21-1, "Relevance of Material Characterization to Manufacturing Processes," Nov. 2013 (San Diego, CA)

3. Session Chair, ASME IMECE session 2-10-1, "Manufacturing and Processing of Nanostructured Materials Session I." Nov. 2013 (San Diego, CA)

2. Session Chair, ASME IMECE session 2-10-2, "Manufacturing and Processing of Nanostructured Materials Session II." Nov. 2013, (San Diego, CA)

1. Rapporateur for 2013 Annual International Carbon Nanotube Growth Mechanisms Workshop, February 2013, Flying L Ranch, TX

Lobbying/Service to the Profession

- **May, 2017**, Traveled to Washington DC to participate in NSF Advocacy Day (with student, A. Douglas). Visited congressional offices of TN Senator Alexander and TN Representatives Cooper, Cohen, Blackburn, Fleischmann, and Kustoff to discuss the importance of NSF to the education and research mission of our country.

Editorial Board Membership

- Associate Editor, *Energy Storage Materials,* Elsevier. Citescore rating of 13.31 (compared to Nano Letters at 13.06). ENSM is a high impact journal that is the premier outlet for energy storage research worldwide.

*Other Extensive Service Activities including Proposal Review Panels, University Service, Engineering School Service, Departmental Service, and Service to the Community through Outreach Programs can be made available upon request.

OTHER RELEVANT EXPERIENCES

2000 – 2002; United States Marine Corps
Landing Support Battalion, 4th LSB; Charleston, SC (Camp Lejeune, NC)