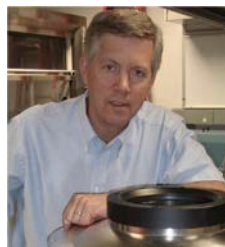


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Education

University of Maryland, Baltimore County	Physics	B.S., 1978
University of Illinois at Urbana-Champaign	Physics	Ph.D., 1987

Research Interests

Understanding and controlling the synthesis of thin films and nanostructured materials through the development of time resolved laser spectroscopy and imaging diagnostic techniques. Fundamental studies of growth mechanisms of single-walled carbon nanotubes and nanohorns, nanoparticles, inorganic and organic nanowires. Laser interactions with materials for synthesis, characterization, and processing of nanoscale materials which exhibit new nanoscale properties. Exploring the functionality of nanoscale materials for energy, including hydrogen storage, solid state lighting, and photovoltaics.

Professional Experience

2011–p	Interim Group Leader, Functional Hybrid Nanostructures Group, Center for Nanophase Materials Sciences (CNMS), Oak Ridge National Laboratory (ORNL)
2001–p	Distinguished Research Staff, ORNL
1996–2001	Senior Research Staff, ORNL
1987–1996	R&D Staff, ORNL
1986–1987	Postdoctoral Associate, Electrical and Computer Engineering, University of Illinois at Urbana-Champaign (UIUC)

Professional and Synergistic Activities

2003–p	Adjunct Professor, University of Tennessee-Knoxville, Department of Materials Science and Engineering
2006–p	Co-Chair, SPIE Photonics West Conference “ <i>Synthesis and Photonics of Nanoscale Materials</i> ”
2009–p	Co-Organizer, Guadalupe Workshop, “ <i>Nucleation and Growth Mechanisms of Single-Wall Carbon Nanotubes</i> ”
2010; 2008	Co-Chair, Spring MRS Symposium, “ <i>Carbon Nanotubes and Related Nanomaterials</i> ”
2009	Co-Chair, DOE-BES Synthesis and Processing Science Contractor's Meeting
2007	Co-Chair, COLA 2007 9 th International Conference on Laser Ablation
1997–1999	Editorial Board <i>Applied Physics Letters, Journal of Applied Physics</i>

Reviewer	<i>Nano Letters, ACS Nano, Small, Journal of Physical Chemistry C, Applied Physics Letters, Journal of Applied Physics, Applied Physics A, Applied Physics B, Carbon, Journal of Nanophotonics.</i>
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Member	<i>American Physical Society, Materials Research Society</i>
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Honors and Awards

2011	Fellow, American Physical Society
2009	Distinguished Service Award, International Conference on Laser Ablation
1999	Lockheed Martin Technical Achievement Award for Sustained Research
1998; 1990	Lockheed Martin & Martin Marietta Technical Achievement Award
1983	Outstanding Graduate Assistant Award, Teaching, Physics Dept., UIUC

Selected Patents / Invention Disclosures (7 U.S. Patents issued, 15 Patent Applications Filed)

“Transparent Conductive Nanorod Composites,” D. B. Geohegan, I. N. Ivanov, A. A. Puzetzkyy, S. Jesse, and B. Hu, U.S. Patent No. 7,923,922 B2, Issued: Apr. 12, 2011.

“Condensed Phase Conversion and Growth of Nanorods and Other Materials Instead of From Vapor,” D. B. Geohegan, R. D. Seals, A. A. Puzetzkyy, and X. Fan, U.S. Patent No. 7,815,973 B2, Issued: Oct. 19, 2010.

“Fabrication of High Thermal Conductivity Arrays of Carbon Nanotubes and Their Composites,” D. B. Geohegan, I. N. Ivanov, and A. A. Puzetzkyy, U.S. Patent No. 7,763,353, Issued: Jul. 27, 2010.

“SEM Technique for Imaging and Measuring Electronic Transport in Nanocomposites Based on Electric Field Induced Contrast,” S. Jesse, D. B. Geohegan, and M. A. Guillorn, U.S. Patent No. 7,491,934, Issued: Feb. 17, 2009.

Publications (Author of > 150 articles in refereed journals and books, h=36): *Last 5 years publication list follows CV.*

Collaborators from other Institutions (past 3 years): A. R. Esker, (VA Tech); J. C. Ge (VA Tech); N. S. Goroff (SUNY); J. Guo (Univ. of Nebraska); C. Hicke (Michigan State Univ.); W. Huang (VA Tech); G. Singh (VA Tech); Z. Sun (Univ. of Alabama); E. Wang (CAS-Beijing); S. Wang (CAS-Beijing); X. Wang (Iowa State); C. Zhang (VA Tech); J. H. Sim (VA Tech); W. Adams (Rice Univ.); R. Aggarwal (NC State); C. Ahn (Caltech); C. Brown (NIST); B. G. Burke (Univ. of VA); T. A. Campbell (VA Tech); J. Chan (Univ. of VA); E. N. Chung (VA Tech); A. Cooper (APD); F. D. Corwin (VA Commonwealth); A. Dillon (NREL); T. Do (VA Tech); H. C. Dorn (VA Tech); J. Dubowski (Univ. of Sherbrooke); P. P. Fatouros (VA Commonwealth); T. Fuhrer (VA Tech); R. A. Gerhardt (GA Tech); H. W. Gibson (VA Tech); C. P. Grey (SUNY); M. A. Guillorn (IBM); G. P. Halada (SUNY); A. Harutyunyan (HRI-US); R. Hauge (Rice Univ.); S. C. Henderson (VA Commonwealth); A. S. Holmes (Imperial College); W. Hu (CAS-Beijing); H. Hu (Chase Corp.); R. H. Hurt (Brown Univ.); S. Irlle (Univ. of Nagoya); A. Kane (Brown Univ.); C. Kittrell (Rice Univ.); I. Kulaots (Brown Univ.); J. G. Kushmerick (NIST); R. Li (CAS Beijing); J. Liu (Brown Univ.); J. Y. Liu (Duke Univ.); X. Y. Liu (Brown Univ.); Y. Liu (NIST); L. Luo (SUNY); M. K. Manson (VA Tech); R. J. Narayan (NC State); D. Neumann (NIST); G. T. R. Palmore (Brown Univ.); D. Resasco (Univ. of Oklahoma); J. Robertson (Cambridge Univ.); C. G. Rylander (VA Tech); M. N. Rylander (VA Tech); S. Sarkar (VA Tech); R. D. Seals (BWXT); S. Sen (Brown Univ.); C. Shu (VA Tech); C. Y. Shu (Brown Univ.); M. D. Shultz (VA Tech); C. Song (Clemson Univ.); D. Thao (CNRS-France); J. Tour (Rice Univ.); F. Trager (Univ. of Kassel); C. Vincent (Univ. of Bordeaux); H. Wang (SUNY); P. Wang (Clemson Univ.); J. R. Whitney (VA Tech); C. Wilhelm (SUNY); K. A. Williams (Univ. of VA); S. Wong (SUNY); Y. Wu (NC State); S. Yang (CAS Beijing); Y.-K. Yap (MI Tech.); C. N. Young (SUNY); T. Young (SUNY); T. Young (VA Tech); B. Yakobson (Rice Univ.); D. Yuan (Duke Univ.); J. F. Zhang (VA Tech).

Graduate and Postdoctoral Advisors:

Graduate Advisor: J. G. Eden, University of Illinois at Urbana-Champaign

Thesis Advisor and Postgraduate-Scholar Sponsor:

Graduate Students: S. Jesse, Physics, University of Tennessee-Knoxville, with Prof. A. Pedraza; M. Garrett, Physics, University of Tennessee-Knoxville, with R. N. Compton

Postdoctoral Scholars (recent/shared): D. Styers-Barnett (Univ. of Indianapolis); H. Hu (Selah Tech.); I. Ivanov (ORNL); J. J. Jackson (SenTech); Z. Liu (SiGen); J. D. Readle (Agile Tech.); K. Xiao (ORNL); B. Zhao (Selah Tech.); H. Schittenhelm (Bosch, Germany)

Total Graduate Students Advised: 2

Total Postdoctoral Scholars Advised: 9

RECENT PUBLICATIONS
(2007-2011)

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Book Chapters

- D. B. Geohegan, A. A. Puzetky, C. M. Rouleau, J. J. Jackson, G. Eres, Z. Liu, D. Styers-Barnett, H. Hu, B. Zhao, K. Xiao, I. Ivanov, and K. More, "Laser Interactions in Nanomaterials Synthesis," Book Chapter 1 in Laser-Surface Interactions for New Materials Production: Tailoring Structure and Properties, Vol. 130, pp. 1-18, Eds., A. Miotello and P. M. Ossi, Springer Series in Materials Science, Springer-Verlag, Berlin Heidelberg, Germany (2010).
- D. B. Geohegan, A. A. Puzetky, and G. Eres "Enabling Nanoscience for Atomically-Precise Manufacturing of Functional Nanomaterials," Book Chapter 14 in Productive Nanosystems: A Technology Roadmap, Working Group Proceedings, pp. 1-176, *Foresight Nanotech Institute*, Eds., K. Eric Drexler, J. Randall, et al, (2008).
- D. B. Geohegan, A. Puzetky, I. Ivanov, G. Eres, Z. Liu, et al, "Laser-Based Synthesis, Diagnostics, and Control of Single-Walled Carbon Nanotubes and Nanohorns for Composites and Biological Nanovectors," in Photon-based Nanoscience and Nanobiotechnology (Photon-NST'2005), NATO Science Series II: Mathematics, Physics and Chemistry, Vol. 239, pp. 205-223, Eds., J. J. Dubowski and S. Tanev, Sherbrooke, Quebec, Canada (2006).

Recent Peer-Reviewed Publications (Author of >150 articles in refereed journals and books, h=36):

- Y. Liu, C. M. Brown, D. A. Neumann, D. B. Geohegan, A. A. Puzetky, C. M. Rouleau, H. Hu, D. Styers-Barnett, P. O. Krasnov, B. I. Yakobson, "Metal-Assisted Hydrogen Storage on Pt-Decorated Single-Walled Carbon Nanohorns," *Carbon* **50** (13), 4953–4964 (2012).
- X. Yui, K. Xiao, J. H. Chen, N. V. Lavrik, K. L. Hong, B. G. Sumpter, and D. B. Geohegan, "High-Performance Field-Effect Transistors Based on Polystyrene-b-Poly(3-hexylthiophene) Diblock Copolymers," *ACS Nano* **5**, 3559 (2011).
- J. R. Whitney, S. Sarkar, J. F. Zhang, D. Thao, T. Young, M. K. Manson, T. A. Campbell, A. A. Puzetky, C. M. Rouleau, K. L. More, K. L., D. B. Geohegan, C. G. Rylander, H. C. Dorn, and M. N. Rylander, "Single Walled Carbon Nanohorns as Photothermal Cancer Agents," *Lasers in Surgery and Medicine* **43**(1), 43 (2011).
- Z. Z. Sun, K. Xiao, J. K. Keum, X. Yu, K. L. Hong, J. Browning, I. N. Ivanov, J. H. Chen, J. Alonzo, D. W. Li, B. G. Sumpter, E. A. Payzant, C. M. Rouleau, and D. B. Geohegan, "PS-b-P3HT Copolymers as P3HT/PCBM Interfacial Compatibilizers for High Efficiency Photovoltaics," *Advanced Materials* **23**, 5529 (2011).
- L. Luo, C. Wilhelm, C. N. Young, C. P. Grey, G. P. Halada, K. Xiao, I. N. Ivanov, J. Y. Howe, D. B. Geohegan, and N. S. Goroff, "Characterization and Carbonization of Highly Oriented Poly(diiiododiacetylene) Nanofibers," *Macromolecules* **44**, 2626 (2011).
- X. Y. Liu, S. Sen, J. Y. Liu, I. Kulaots, D. Geohegan, A. Kane, A. A. Puzetky, C. M. Rouleau, K. L. More, G. T. R. Palmore, and R. H. Hurt, "Antioxidant Deactivation on Graphenic Nanocarbon Surfaces," *Small* **7**, 2775 (2011).
- W. Huang, J. F. Zhang, H. C. Dorn, D. Geohegan, and C. M. Zhang, "Assembly of Single-Walled Carbon Nanohorn Supported Liposome Particles," *Bioconjugate Chem* **22**, 1012 (2011).
- D. B. Geohegan, A. A. Puzetky, J. J. Jackson, C. M. Rouleau, G. Eres, and K. L. More, "Flux-Dependent Growth Kinetics and Diameter Selectivity in Single-Wall Carbon Nanotube Arrays, "

- ACS Nano* **5**, 8311 (2011).
- B. G. Burke, J. Chan, K. A. Williams, T. Fuhrer, W. J. Fu, H. C. Dorn, A. A. Puzos, and D. B. Geohegan, "Vibrational Spectrum of the Endohedral $Y_2C_2@C_{92}$ Fullerene by Raman Spectroscopy: Evidence for Tunneling of the Diatomic C(2) Molecule," *Physical Review B* **83**(11), 5457 (2011).
- J. F. Zhang, J. C. Ge, M. D. Shultz, E. N. Chung, G. Singh, C. Y. Shu, P. P. Fatouros, S. C. Henderson, F. D. Corwin, D. B. Geohegan, A. A. Puzos, C. M. Rouleau, K. More, C. Rylander, M. N. Rylander, H. W. Gibson, and H. C. Dorn, "In Vitro and in Vivo Studies of Single-Walled Carbon Nanohorns with Encapsulated Metallofullerenes and Exohedrally Functionalized Quantum Dots," *Nano Letters* **10**, 2843-2848 (2010).
- C. Y. Shu, J. F. Zhang, J. C. Ge, J. H. Sim, B. G. Burke, K. A. Williams, W. M. Rylander, T. Campbell, A. Puzos, C. Rouleau, D. B. Geohegan, K. More, A. R. Esker, H. W. Gibson, and H. C. Dorn, "A Facile High-speed Vibration Milling Method to Water-disperse Single-walled Carbon Nanohorns," *Chemistry of Materials* **22**, 347-351 (2010).
- A. A. Puzos, D. B. Geohegan, C. M. Rouleau, "Narrow and Intense Resonances in the Low-Frequency Region of Surface-Enhanced Raman Spectra of Single-Wall Carbon Nanotubes," *Physical Review B* **82**(24), 5402 (2011).
- D. Linton, P. Driva, B. Sumpter, I. Ivanov, D. Geohegan, C. Feigerle, and M. D. Dadmun, "The importance of chain connectivity in the formation of non-covalent interactions between polymers and single-walled carbon nanotubes and its impact on dispersion," *Soft Matter* **6**, 2801 (2010).
- J. J. Jackson, A. A. Puzos, K. L. More, C. M. Rouleau, G. Eres, and D. B. Geohegan, "Pulsed Growth of Vertically Aligned Nanotube Arrays with Variable Density," *ACS Nano* **4**, 7573 (2010).
- M. P. Garrett, I. N. Ivanov, R. A. Gerhardt, A. A. Puzos, and D. B. Geohegan, "Separation of Junction and Bundle Resistance in Single Wall Carbon Nanotube Percolation Networks by Impedance Spectroscopy," *Applied Physics Letters* **97**(16), 3105 (2010).
- B. G. Burke, J. Chan, K. A. Williams, Z. L. Wu, A. A. Puzos, and D. B. Geohegan, "Raman Study of Fano Interference in P-Type Doped Silicon," *Journal of Raman Spectroscopy* **41**(12), 1759 (2010).
- B. G. Burke, J. Chan, K. A. Williams, J. C. Ge, C. Y. Shu, W. J. Fu, H. C. Dorn, J. G. Kushmerick, A. A. Puzos, and D. B. Geohegan, "Investigation of $Gd_3N@C(2n)$ ($40 < n < 44$) family by Raman and inelastic electron tunneling spectroscopy," *Physical Review B* **81**, 115423 (2010).
- K. Xiao, A. J. Rondinone, A. A. Puzos, I. N. Ivanov, S. T. Retterer, and D. B. Geohegan, "Growth, Patterning, and One-Dimensional Electron Transport Properties of Self-Assembled Ag-TCNQF(4) Organic Nanowires," *Chemistry of Materials* **21**, 4275 (2009).
- K. Xiao, R. J. Li, J. Tao, E. A. Payzant, I. N. Ivanov, A. A. Puzos, W. P. Hu, and D. B. Geohegan, "Metastable Copper-Phthalocyanine Single-Crystal Nanowires and Their Use in Fabricating High-Performance Field-Effect Transistors," *Advanced Functional Materials* **19**, 3776 (2009).
- G. Eres, C. M. Rouleau, M. Yoon, A. A. Puzos, J. J. Jackson, and D. B. Geohegan, "Model for Self-Assembly of Carbon Nanotubes from Acetylene Based on Real-Time Studies of Vertically Aligned Growth Kinetics," *J Phys Chem C* **113**, 15484 (2009).
- M. Yoon, S. Y. Yang, C. Hicke, E. Wang, D. Geohegan, and Z. Y. Zhang, "Calcium as the superior coating metal in functionalization of carbon fullerenes for high-capacity hydrogen storage," *Physical Review Letters* **100**, 206806 (2008).
- K. Xiao, J. Tao, A. A. Puzos, I. N. Ivanov, S. T. Retterer, S. J. Pennycook, and D. B. Geohegan, "Selective Patterned Growth of Single-Crystal Ag-TCNQ Nanowires for Devices by Vapor-Solid Chemical Reaction," *Advanced Functional Materials* **18**, 3043 (2008).
- C. M. Rouleau, G. Eres, H. Cui, H. M. Christen, A. A. Puzos, and D. B. Geohegan, "Altering the catalytic activity of thin metal catalyst films for controlled growth of chemical vapor deposited vertically aligned carbon nanotube arrays," *Applied Physics A* **93**, 1005-1009 (2008).
- A. A. Puzos, D. J. Styers-Barnett, C. M. Rouleau, H. Hu, B. Zhao, I. N. Ivanov, and D. B. Geohegan, "Cumulative and continuous laser vaporization synthesis of single wall carbon nanotubes and nanohorns," *Applied Physics A* **93**, 849-855 (2008).
- A. A. Puzos, G. Eres, C. M. Rouleau, I. N. Ivanov, and D. B. Geohegan, "Real-time imaging of vertically aligned carbon nanotube array growth kinetics," *Nanotechnology* **19**, 055605 (2008).

- Z. Liu, D. J. Styers-Barnett, A. A. Puzos, C. M. Rouleau, D. Yuan, I. N. Ivanov, K. Xiao, J. Liu, and D. B. Geohegan, "Pulsed laser CVD investigations of single-wall carbon nanotube growth dynamics," *Applied Physics A* **93**, 987 (2008).
- J. Q. Guo, X. W. Wang, D. B. Geohegan, G. Eres, and C. Vincent, "Development of pulsed laser-assisted thermal relaxation technique for thermal characterization of microscale wires," *Journal of Applied Physics* **103**, 113505 (2008).
- J. Q. Guo, X. W. Wang, D. B. Geohegan, and G. Eres, "Thermal Characterization of Multi-Wall Carbon Nanotube Bundles Based on Pulsed Laser-Assisted Thermal Relaxation," *Functional Materials Letters* **1**, 71 (2008).
- R. Aggarwal, R. J. Narayan, K. Xiao, and D. B. Geohegan, "Fabrication of Ag-tetracyanoquinodimethane nanostructures using ink-jet printing/vapor-solid chemical reaction process," *Journal of Vacuum Science & Technology B* **26**, L48 (2008).
- Z. X. Zhou, K. Xiao, R. Jin, D. Mandrus, J. Tao, D. B. Geohegan, and S. Pennycook, "One-dimensional electron transport in Cu-tetracyanoquinodimethane organic nanowires," *Applied Physics Letters* **90**, (2007).
- K. Xiao, J. Tao, Z. W. Pan, A. A. Puzos, I. N. Ivanov, S. J. Pennycook, and D. B. Geohegan, "Single-crystal organic nanowires of copper-tetracyanoquinodimethane: Synthesis, patterning, characterization, and device applications," *Angewandte Chemie-International Edition* **46**, 2650 (2007).
- R. F. Wood, S. Pannala, J. C. Wells, A. A. Puzos, and D. B. Geohegan, "Simple model of the interrelation between single- and multiwall carbon nanotube growth rates for the CVD process," *Physical Review B* **75**, 235446 (2007).
- S. L. Mensah, V. K. Kayastha, I. N. Ivanov, D. B. Geohegan, and Y. K. Yap, "Formation of single crystalline ZnO nanotubes without catalysts and templates," *Applied Physics Letters* **90**, 113108 (2007).
- R. Jin, Z. X. Zhou, D. Mandrus, I. N. Ivanov, G. Eres, J. Y. Howe, A. A. Puzos, and D. B. Geohegan, "The effect of annealing on the electrical and thermal transport properties of macroscopic bundles of long multi-wall carbon nanotubes," *Physica B* **388**, 326 (2007).
- D. B. Geohegan, A. A. Puzos, D. Styers-Barnett, H. Hu, B. Zhao, H. Cui, C. M. Rouleau, G. Eres, J. J. Jackson, R. F. Wood, S. Pannala, and J. C. Wells, "In situ time-resolved measurements of carbon nanotube and nanohorn growth," *Physica Status Solidi B* **244**, 3944 (2007).
- M. D. Cheng, D. W. Lee, B. Zhao, H. Hu, D. J. Styers-Barnett, A. A. Puzos, D. W. DePaoli, D. B. Geohegan, E. A. Ford, and P. Angelini, "Formation studies and controlled production of carbon nanohorns using continuous in situ characterization techniques," *Nanotechnology* **18**, 185604 (2007).